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Abstract

This is a sociolinguistic study of sound change in progress in San Francisco White English. Both phonemic and subphonemic recategorizations have taken place in the phonology in the last 50 years. The dissertation reports on observations of variation in the speech of 14 working class and middle class San Franciscan women, ranging in age from 22 to 74. Vowel movements involving /æ/, /a/, and /ɔ/ (treated as principal variables (æ), (æN), (a), (ar), (ɔ), (ɔl), and (ɔr)) are traced through apparent time.

/æ/ before nasal consonants, treated as the variable (æN), is becoming increasingly tense. The development of complementarity between /æ/ in this environment and /æ/ elsewhere is reflected in the gradual separation of (æN) from (æ) in vowel space over time. There is also sound change for low, nonperipheral (æ); (æS), that is, /æ/ before fricatives, is centralizing. Lexical conditioning is found. In the last few decades the distributional structure internal to (æN) and (æ), considered as a whole distribution, has changed; presently vowels followed by nasals are frontnest and highest, followed by vowels before stops, followed by vowels before fricatives.

The merger of /a/ and /ɔ/ is traced through apparent time. (a) and (ɔ), representing historical /a/ and /ɔ/ when not followed by liquids, are both fronting; (ɔ) also shows lowering. In particular, (aT), that is, /a/ before alveolar stops, is moving forward; there is lexical conditioning. This movement is impeded by the low, nonperipheral position of (æ). This block to the fronting of (a) provides the condition for merger of /a/ and /ɔ/, given the forward movement of (ɔ). Realignments of environmental distributions have taken place, making the internal structure of (ɔ) conform to that of (a). Vowel rotation underway in

Eastern and Midwestern cities is not paralleled in San Francisco, due to the maintenance of a low, lax position for a portion of /æ/ and the merger of /a/ and /ɔ/.

At both phonemic and subphonemic levels phonological recategorization has been accomplished before the phonetically gradual processes (as reflected in informal speech), corresponding to loss of distinction on the one hand and complementarily on the other, are themselves completed. Comparison of vowel charts for formal and informal speech suggests that a loss of contrast between /a/ and /O/ came about several decades ago in the phonology, coinciding with the accomplishment of complete phonetic overlap of one historical vowel are with another; environment by environment neutralization, however, began before that time and continues now. Merger is viewed here as a series of environmental coalescences; the process is not quite complete, although recategorization has taken place.

Vowels in two frequently used words, *class* and *got,* are observed to be advanced in the backing of (æS) and the fronting of (aT), respectively. It is suggested that selection of frequently used items for lexical diffusion in sound change comes about as a rule acts upon sounds word by word as the items are used. There is opportunistic, iterative rule application. This notion associates performance with competence in process operation.

Signature of Committee Chair Leanne Hinton Date April 25 '91

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by

Birch Moonwomon

for Shirley Silver

What do you mean, why?

Why do you think, Shirley?

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Acknowledgments

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Chapter 1: Introduction

Sound change is in progress in San Francisco White English involving at least six historically distinct vowels, the low vowels /æ/, /a/, and /ɔ/, and the nonlow back vowels /o/, /ʊ/, and /u/. This work reports on observations of change for the low vowels made in the first sociolinguistic investigation of English phonology in the City.

In American English the low vowels have been involved in chain shifting, phonemic split, and merger. The changes are long-term processes in varieties found in the Northeast, Midwest, and South of the continental United States, all of them beginning before this century. Observed low vowel changes in San Francisco have shorter histories. The low vowel changes are processes that eastern and western varieties are subject to in common, however. The tensing of /æ/, a change that is restricted in some varieties and unrestricted in others, is a pan-American English phenomenon. Fronting of /a/ is found both east and west. The merger of /a/ and /ɔ/, also found both east and west, is one of several treatments of /ɔ/ in American English. The merger results partly from directional movement that is the same as low vowel movement observed over several decades in Eastern and Midwestern cities.

Observation of the low vowel changes, using spectrographic analysis, allows a detailed account of the route of movement by which the White English of San Francisco passes from one state to another. The development of complementarity between /æ/ before nasal consonants and /æ/ in other environments can be traced from a point near the inception of tensing to a point near completion of separation of nasal environment and nonnasal environment distributions. The gradual progress of the merger of /a/ and /ɔ/ can also be traced; the vowels are clearly distinct for older speakers, but distributions have coalesced for younger adults. Both these change processes are made graphic by the plotting of formant height measurements for many vowel tokens, producing distributional

pictures that allow comparison across speakers. The distributions can be seen to drift through apparent time.

These processes, and two others, the conditioned fronting of /a/ and the conditioned backing of /æ/, have places in a larger picture of low vowel changes in American White English. Some of the San Francisco vowel movements correspond to older movements in the rotation of vowels in Northeastern and Midwestern cities. In San Francisco forward movements of /æ/, /a/, and /ɔ/ are impeded, as they are not in the eastern Northern Cities Shift, by the occupation of low nonperipheral front vowel space by /æ/when not before nasals and the backing of /æ/ before fricatives. The impediment to low back vowel fronting provides the condition for the low back vowel merger.

Observation of variation provides an empirical base for diachronic phonological theory. It has been observed that in lexical diffusion sounds in frequently used words are affected first and become advanced in change. Two cases of lexical conditioning are found in the San Francisco changes. It is suggested that frequently used words are advanced in sound change through the mechanism of iterative rule application to sounds as they occu in words in use. Detailed observation of the merger process through apparent time allows an account of asynchronicity between the recategorization of two formerly distinct sounds as one and the distributional shift that brings phones of the two together in the same area in vowel space. Environment by environment neutralizaiton in sound change both procedes and follows recategorization. Phonetic neutralization is a gradual process; recategorization does not wait for its completion.

The present study continues work begun in a preliminary investigation of California vowel variation made several years ago. In the spring of 1986, under the direction of Leanne Hinton, a graduate seminar at UC Berkeley conducted a pilot dialectology study of several front and back vowels in California speech. The seminar participants interviewed mainly White college students. Eight informants were high school

students, however, including four Black adolescents and a Latina; a few were White adults not in school.

The pilot study discerned directions of movements for the vowels under consideration. The front and back vowels show movement under various conditionings. Impressionistic transcriptions suggested that nonlow front vowels are lowering in most environments; and that (æN) is fronting and rising. Back vowels are fronting, unrounding and truncating under most conditions. (o), (ʊ), and (u) move forward, and the diphthongs truncate in White speech (Luthin 1986; Hinton, et al 1987). Transcriptions from the pilot study suggested that (u) has fronted furthest towards the territory of the front vowels. This has now been confirmed by later spectrographic analysis.

Two project workers investigated (ɔ)—Hazel Corcoran, who interviewed the eight high school students and used their speech, and myself; I transcribed (ɔ) tokens from the speech of the college students and older informants. Corcoran and I also obtained examples in a reading style by asking some informants to read a short passage and a word list style by asking questions designed to elicit a word list containing /a/and /ɔ/minimal pairs. Comparison of informal and formal speech results indicated that speakers who were not heard to be neutralizing in all environments in interview style speech were doing so in more careful speech, in which they could be said to be paying more attention to how they talked. Speakers appeared to regard formerly distinct /a/ and /ɔ/ as not distinct; yet, in informal speech, they produced phonetic distinction.

Four of the high school students that Corcoran interviewed were white, three females and a male, three were black, two females and a male, and one student was a Chicana. White student behavior appears to be in accord with that of older whites, most of whom showed considerable lowering and fronting of the vowel. The Black students lowered and fronted /ɔ/ very little in any environment.

The investigation of low vowels in White English in San Francisco confirms some of transcription-dependent findings of the pilot study. The present work is a report that

considers findings for San Francisco in relation to dialectology observations of the 1950s and to Labovian sociolinguistic findings for English in other cities.

Chapter 2 reports on David DeCamp's findings for the pronunciation of English in San Francisco. DeCamp was the Linguistic Atlas of the Pacific Coast surveyor for San Francisco. The LAPC, under the direction of David Reed, was the Far West project of the Linguistic Atlas of the United States, the major dialectological undertaking on this continent. Chapter 2 reviews some of the history of the LAUS as a whole.

Modern sociolinguistics inherits from American and European dialectology. Chapter 3 briefly considers some issues for the study of sound change in progress including the place of lexical conditioning and the nature of merger. The chapter also summarizes findings of sound change in progress studies conducted in other American cites, placing these in the 'three dialects of English' scheme of William Labov (in press).

Chapter 4 is an account of procedures used in the present investigation. Native English speakers who grew up in San Francisco were the informants for this language study. Observation of the vowel movements in progress has relied on spectrographic analysis. Both informal and formal speech styles have been considered.

Chapters 5 and 6 contain descriptions and interpretations of the distributions of variables (æ), (æN), (a), (al), (ar), (ɔ), (ɔl), and (ɔr). Vowel movements are traced in apparent time. Correlations with socio-economic index scores of speakers are made. Four vowel movements are in progress for three historically distinct vowels.

Chapter 7 compares the San Francisco findings with those reported in DeCamp's dissertation (1953) and in various papers dealing with vowel changes going on in cities such as Buffalo, Detroit, New York City, and Philadelphia. The merger of /a/ and /ɔ/ was barely beginning in San Francisco when the LAPC survey took place. At that time DeCamp noted almost no tensing of /æ/ before nasals. Changes have come about quickly in San Francisco English that correspond to older processes of American English in some other regions.

Chapter 8 summarizes the findings presented in Chapters 5 and 6 and the comparisons made in Chapter 7. There follows a discussion of how frequently used words come to be carriers of sound change in advance of less frequently used items. Then the nature of the sound change process in relation to cetegorization is considered; change in the directions of both category addition—development of complementarity and phonemic split—and category loss—the process of merger—is examined.

Chapter 2. The Linguistic Atlas of the Pacific Coast

2.0. It has been more than thirty-five years since the first published material from the survey of the Linguistic Atlas of the Pacific Coast-California/Nevada (LAPC-Ca/Ne) appeared. The longest and most informative of the writings based on LAPC is David DeCamp's UC Berkeley dissertation, *The Pronunciation of English in San Francisco* (1953). A present day investigation of sound change in progress in San Francisco English must make a careful review of DeCamp's work, to consider the data, analysis, and theoretical assumptions, and to make further analysis if possible and helpful to the present undertaking. It is also necessary to consider the LAPC project as a whole—how it was situated in the American dialectology of the time.

Section 2.1 of this chapter reviews the dialect atlas work in the eastern, midwestern, and southwestern parts of this country that comprised the Linguistic Atlas of the United States project, of which LAPC was the last attempted work. Section 2 is a consideration of the work of the LAPC, with particular attention to the San Francisco study; DeCamp's findings and analysis of vowel phonemes that correspond to vowel variables investigated in the present sociolinguistic project are detailed.

2.1. American dialectology background for the LAPC. The LAPC study was conducted as part of a large and long effort, which still continues, to account for regional dialect areas and differences in the continental United States. The west coast survey was preceded by two decades of linguistic atlas work in this country; this was preceded by European dialect geography investigations begun before the turn of the century. There is a direct line of scholarship from the European work, to east coast American work, to Midwest American work, and finally to linguistic atlas surveys in the west.

In the course of this European dialect geography work the basic theory and methodology of regional dialect investigation were established and terminology developed.

The early work set dialectology apart from diachronic linguistics first and synchronic linguistics later, both of which relied on the idea of rule regularity to explain variation. As the family tree model is associated most closely with the neogrammarian claim, the wave model is associated with attempts to modify or refute that claim. The neogrammarians' most serious opposition came from the early dialect geographers. A diffusionist model allowed for the effects of language and dialect contact. It allowed for residue from incomplete changes and for the presence of alternate forms due to competing changes. Isogloss patterns showed focal areas for diffusion of phonetic and lexical forms and relic areas maintaining archaisms because of geographic or cultural isolation (Bloomfield p.331; Lehmann pp.120-128). Whatever could be inferred about the diffusion of linguistic forms from the data gathered by dialect geography fieldworkers and plotted on map after map could itself be used for inferences about ancient folk migrations and settlement history. The questions of migration and settlement history became basic inquires of continental and later American dialectology.

The lexical and phonetic levels of linguistic study remained the ones that dialectology inquired most about. Regularity depends on the reification of word classes; these are defined by the phonological sameness of some sound common to all members of the class. Dialect geographers, however, were uncovering irregularity in every area of every country they worked in. An emphasis on phonetic detail was key to early dialectology's separation from neogrammarian historical linguistics. Finding irregularity, the dialect geographers refused to regard a collection of phones, evidencing variation in the pronunciation of a word from place to place, as a unity simply because of etymological association. It seemed apparent from field evidence that every work had its own history. American dialectology inherited the practice of attending most to lexical and phonetic evidence for comparison of usages across geographic areas. The American discipline, however, was also firmly committed to phonemic analysis from the start. This has made for a special tension in American dialectology work.

Fieldworkers, always men, spoke with little-travelled, elderly males of the countryside and small villages; Chambers and Trudgill (1984:33) characterize their informants by type: NORMs (nonmobile, older, rural males). The interviews were highly structured, consisting of elicitations of forms through direct and indirect questions (pp.24-26). Any survey required the production of at least hundreds of dialect geography maps. The atlases were reports about usage. The reports were not timely. The usages whose existence and distribution they announced might be obsolete by the time of publication. Since the goal of the discipline was historical, however, this was not regarded as a drawback. American dialectology inherited this emphasis on reconstruction of settlement history along with the practice of atlas map making.

2.1.1. American dialectology. The Linguistic Atlas of the United States and Canada (LAUS-C) was a project initiated in 1928-1929 at the annual meetings of the Modern Language Association of America and the Linguistic Society of America; sponsorship came from the American Council of Learned Societies (Kurath et al 1939:x-xii; Metcalf and Reed 1978:2). Hans Kurath and his associates chose New England as a first project region because it was a compact area of primary US dialects (since the territory was settled early) for which information was already available. Publications based on the New England survey include Kurath and associates' *Handbook of the Linguistic Geography of New England* (1939) and the first US linguistic atlas,*The Linguistic Atlas of New England* (1939-1943).

In the mid 1930s survey work began in the next large geographic area selected, the Atlantic states. Kurath and Raven McDavid were principally responsible for the project; the main fieldworker was Guy Loman (Carver 1990:3; Chambers and Trudgill, p.21). Three volumes based on the survey have been published as the official report of the Linguistic Atlas of the Middle and South Atlantic States (LAMSAS): Kurath's *A word geography of the eastern United States* (1949), Atwood's *A survey of verb forms in the eastern United States* (1953), and Kurath and McDavid's *The pronunciation of English in the Atlantic*

states (1961). The Atlantic states survey was also the basis for many other publications, due largely to the fact that McDavid was a prolific writer for several decades: McDavid's *Postvocalic /-r/ in South Carolina* (1948), *Midland and Canadian words in upstate New York* (1951a), *The folk vocabulary of New York State (1951b), The folk vocabulary of eastern Kentucky* (1973), etc.

The project of The Linguistic Atlas of the Upper Midwest (LAUM) began in 1947 as a study of Minnesota speech. It was intended for later incorporation into a Linguistic Atlas of the North Central States (LANCS), for which survey work had been done under Albert Marckwardt's direction in the 1930s (Allen 1973:1). This latter atlas was not completed. Harold Allen's *The Linguistic Atlas of the Upper Midwest* (1973-1976) remains the main published work from midwestern surveys. Published works based on the LANCS/LAUM investigations include Allen's 'The primary dialect areas of the Upper Midwest' (1971), Davis's dissertation, *A word atlas of the Great Lakes regions* (1948), Shuy's 'The Northern-Midland dialect boundary in Illinois' (1962), and Dakin's dissertation, *The dialect vocabulary of the Ohio River Valley* (1966).

Some atlas work was done in the deepest South and the Southwest. The records of a survey of some southern states, the Linguistic Atlas of the Gulf States (LAGS) appeared on microfilm in 1981. The materials provided the basis for several articles by Pederson, including 'The Linguistic Atlas of the Gulf States: an interim report' (1969) (followed by interim reports 2 (1974), 3 (1976), and 4 (1981), 'Southern Speech and the LAGS project' (1971), and 'Dialect patterns in rural Northern Georgia' (1973). Finally the first volume of the atlas, edited by Pederson and associates, appeared in 1986. William Van Riper directed the survey for the Linguistic Atlas of Oklahoma (LAO) (Davis 1983:26). He never completed the editing of the materials. Atwood's *The regional vocabulary of Texas* (1962) is based on elicitation of lexicon from residents of the southwest which Atwood undertook in order to help define the areas of the Delta South and the Southwest.

Associates of the Linguistic Atlas of the Pacific Coast project are responsible for almost all regional dialectology survey work in the far West. In 1956, while Metcalf and Reed were editing LAPC materials, Raven McDavid and Virginia McDavid presented a summary report of 'Regional linguistic atlases in the United States'. Map 1 (p.350) shows the progress of the atlases—by then all independent projects rather than surveys subsumed by LAUS. LANE, LAMSAS, LANC, LAUM, LAGS, LAO cover the entire east and Midwest US except for Kansas and Nebraska. LAPC sits isolated on the west coast, separated from the LA collective by many western states in which 'preliminary work' of some sort was being done.

The history of regional dialectology in the United States overlaps with that of modern sociolinguistic study of synchronic and diachronic variation, the beginning of which is marked by Labov's *The Social stratification of a sound change* (1963). American scholars addressed matters of theory and practice in regional dialectology over many decades, with theory feeding and fed by their practice.

Basic to the original rationale for dialect geography was the goal of tracing of settlement history through evidence of diffusion of linguistic forms either from far locales or among neighboring areas. When LAUS was instituted American workers accepted this goal for dialectology from the European work. The goal has been responsible in some part for dialectologists' resistance to investigation of social variation within dialectology work per se: 'Since the very function of an atlas is to show geographical or lateral distribution, it is unwise to superimpose on it systematically a social or vertical distribution' (Menner 1933:6).

Menner was responding to the fact that LANE was investigating the correspondence of usage to certain social traits. An awareness of the relevance of a speaker's age, mobility, education, and urbanness or ruralness was part of the heritage from European dialect geography also. That is, the use of NORMs as informants meant a selection of traits for speaker type. The particular package of preferred traits was justified by the notion that

the speech of elderly, socially isolated persons would be characterized by features that would reveal earlier folk movements. The sociolinguistic thinking that led to NORM selection in Europe led away from it in America. The goal of migration and settlement history reconstruction was gradually deemphasized; but, at least up through the 1950s, it was not rejected.

The factor of race could not be ignored in the United States, and so some (never many) Black speakers were interviewed in atlas surveys. Also, from the beginning American dialectology sought women as well as men informants. Surveys wanted urban as well as rural and middle-aged as well as elderly informants. Young speakers were not used, however, until sociolinguists began conducting studies of sound change in progress. Awareness of the need to collect data from a wider variety of speaker types than European dialect geographers had, better representing the whole population, increased over the first two decades of work in the States. The focus shifted away from the collection of archaic, supposedly more truly folk, speech forms.

An early concept of a 'general American' speech, a kind of folk standard speech accounting for much of United States English, was abandoned with the first results of LANE and LAMSAS. Project work treating different regions of the country as separate dialect entities, at first mostly a matter of practicality, was justified by the evidence from surveys. Kurath, McDavid, Allen and others defined large dialect regions and subareas within them. It was of course clear that there were no discrete boundaries separating one region from another or one subarea from another. Networks of isoglosses, often revealing that opposed forms (*pail* versus *bucket,* presence or absence of postvocalic *r* had overlapping territories of usage, evidenced dialect continua within and across all regions. 'Language variation ...is an almost seamless fabric covering the land. A person traveling southward from Superior, Wisconsin, to Mobile, Alabama, would be aware of the differing speech patterns but would not be able to say at what points along the route the changes occurred.' (Carver, 1990:19)

Although American dialectology has made some observations about morphological and syntactic traits characterizing different English varieties, all surveys have attended mostly to lexical and phonetic linguistic evidence. The inception of LAUS marked a shift of collective energy from a large dictionary project to a large atlas project, and so a shift of interest away from lexicon to some extent. *Dialect Notes,* which had been full of reports of word and phrase usage was, from the early 1930s on, full of reports of atlas findings, particularly Kurath's (Carver 1990:2); so dialect differences in phonetics became as important, and gradually more important, to American dialectology, as differences in lexicon. In the United States, dialectology's interest in phonetics was always tied to the goal of phonemization. This would have to be so if American dialectology was not to be an entirely separate enterprise from American linguistics.

The practice of atlas work involved the deployment of fieldworkers into the countryside, towns, and cities, with questionnaires that necessitated long interviews with informants who could and would tolerate them. The practice involved making questionnaires, training fieldworkers, selecting informant types, finding informants, conducting interviews, recording findings, and editing materials for publication (either in the form of atlas map collections or not). Even when atlas publication was delayed, as in the case of LANE, or never took place at all, as in the case of LAPC, it was often possible for interested scholars to use unpublished materials for interpretation of dialect findings.

Consulting *Dialect Notes* and *American Speech,* LANE's Kurath and colleagues selected items for elicitation on the basis of whether or not there was already evidence for lexical or phonetic variants in American English. The LANE questionnaire, called worksheets (as future atlas questionnaires were), contained more than 700 items (Chambers and Trudgill 1984:24-25). LAMSAS sheets had over 800 (Kurath and McDavid 1961:2). The list could have grown larger with each atlas survey, but by the 1950s LAPC was using only about 600 items to test for phonetic, lexical and grammatical variation (Metcalf and Reed1978:1).

For LANE, Kurath and associates decided to use both degree of education and age as criteria for informant selection. Use of the education criterion was the only way in which dialectology considered the social factor of class in America. There were three informant types by education: Type I was little educated and had few social contacts; Type II was better educated (perhaps through high school) and more widely read and socially mobile; Type III had a higher education, was well read, and had extensive social contacts. No speaker was supposed to be under 30; few were under 35. There were two speaker types by age: Type A was elderly or 'old-fashioned'; Type B was middle-aged or 'more modern'. Keeping these criteria in mind, and trying to interview individuals representing each type, a fieldworker selected several speakers from each town, township, or city. 'In every community...an elderly descendant of an old local family was to be included: a simple but intelligent farmer or farmer's wife in rural districts, a working man, tradesman, or shopkeeper in larger villages and cities....The second informant...was to be a middle-aged man or woman, native to the community, who had received better schooling....Cultured informants, with a college education...were to be chosen in most of the larger cities....This type is represented in approximately one-fifth of the communities; three-fourths of these are in urbanized southern New England, one-fourth in the largely rural north.' (Kurath, et al 1939:41).

The LANE study sought to balance the sample population, then, by gender, degree of education, urbanness, and (somewhat) age. There was a significant move away from the sole use of NORMs. It is likely that the choice of New England as a starting place for LAUS work was influential here. The history of English in New England is as much associated with urban settlements as with rural; the best example of this is the long history and cultural importance of Boston. Further, secondary school and college education has had a positive value in the culture of the region since the 1600s.

Later atlas surveys kept the basic LANE model for informant selection. Allen, for instance, discussing speaker selection for the Midwest study, describes informants as

representing three types: Type I was 'an elderly locally-born life-long resident with little education'; Type II was younger, with a high school education; Type III speakers were middle-aged also, with college or university educations, and almost all of them turned out to be 'residents of large or small urban centers' (1973: 24). Allen conflated the two kinds of speaker types (I-III and A-B); later LAPC followed this practice.

2.1.2. Dialect divisions in the US: In the course of American regional dialectology work the main dialect regions for English in the United states were defined. This map of the dialect geography of the country, especially the eastern part of it, was drawn by the time the workers in the West began surveys subsumed under the LAPC.

In his review of Kurath's *Word Geography* (1949) McDavid (1950:442) claims that Kurath's work 'compels a sharp revision of the traditional regional analysis of American dialects. No longer can one speak glibly of a 'General American' type of speech including everything west of the Hudson and north of the Mason-Dixon Line.' One of the major achievements of the publication of LANE and LAMSAS findings was the destruction of the 'General American' notion. This began when LANE survey results revealed the existence of west and east regions in New England (Kurath et al 1939); a major dialect boundary runs north from lower Connecticut through upper Vermont, following the Connecticut River and the Berkshire and Green Mountains. Kurath (1949), then Kurath and McDavid together (1961), produced statements on the regional divisions of American English in the east. Even before they were published, the dialect geography these statements represent was used by atlas surveyors in other parts of the country. In *A word geography of the Eastern United States* Kurath defines three major dialect regions (1949: passim, and esp. Fig.3): North, Midland, and South, dividing these into 18 subregions as follows:

North:	Northeastern New England
	Southeastern New England
	Southwestern New England
	Upstate New York and western Vermont
	the Hudson Valley
	Metropolitan New York
Midland:	the Delaware Valley (Philadelphia area)

the Susquehanna Valley
the Upper Potomac and Shenandoah Valleys
the Upper Ohio Valley (Pittsburgh area)
northern West Virginia
southern West Virginia
western North and South Carolina

South: Delamarvia
the Virginia Piedmont
northeastern North Carolina
the Cape Fear and Pee Dee valleys
South Carolina

Kurath and McDavid (pp.5-8) discuss vowel pronunciation differences among three 'types' of American English: Type I is found in upstate New York, Eastern Pennsylvania, and the South Midland; Type II is found in Metropolitan New York, the Upper South, and the Lower South; Type III is found in Eastern New England. Type I, then, overlaps the original North and Midland division. The regional assignments for no type completely cover the areas first named by Kurath; but leaving aside problematic 'upstate New York', the types correspond well enough to the North, Midland, South divisions.

By the beginning of LAPC work, most of the country had been at least partially surveyed or survey work was getting underway. But results from LANCS, LAUM, LAGS, and LAO did not then or later change the basic American dialect division scheme based on LANE and LAMSAS results. Because American English west of the Atlantic seaboard derives from eastern speech by western migration, midwestern and western regional varieties were regarded as definable as blends of eastern varieties. At the same time LAPC materials collection and editing were going on McDavid and McDavid wrote 'Regional linguistic atlases in the United States' (1956) which presents a map of eastern dialect divisions with a list of subregions exactly duplicating Kurath's 1939 scheme. McDavid's 'The dialects of American English' (1958) presents the same view. Regarding the evidence of LAUS findings as a whole as indicative of four major dialect areas for the east—Northern, North Midland, South Midland, and Southern—DeCamp, in his dissertation, subdivides them further into eight areas (1953:90). I discuss these in Section 2.2.

The latest regional dialect division scheme deriving from the Kurath map is Carver's (1990), although he is relying most directly on DARE materials. He divides the continental US into six major dialect regions: New England and the Northeast; the North; the South; the lower South; the Midlands; the West. The first six divisions, and most of the subdivisions within them, accord with eastern dialect areas established by the 1950s.

Labov (in press) presents a set of American English dialect divisions that departs significantly from the divisions discussed above. It is based on his scheme of vowel pronunciation variation in the United States and makes particular use of his own principles for chain shifts. Acknowledging that the early Kurath and McDavid (1939) Northern, Southern, Midland division is not disputable for the east coast (p.2), Labov proposes 'three dialects of English': one for the north—Northern Cities Shift (pp.20-29)—one for the south—defined by the Southern Shift (pp.30-40)—and another—the Third Dialect or Low Back Merger (pp.41-45)—represented in a variety of regions, including, especially, the far west. (See Chapter 3.)

2.2. The LAPC. Dialectology survey work in the far west, begun as one atlas effort which soon separated into two, did not result in a published atlas. The materials collected in the California and Nevada investigations provided the basis for articles and books presenting and interpreting some of the lexical and phonological evidence. David DeCamp was responsible for one of the largest samplings of a community's speech, in San Francisco. His dissertation, in which he gives most of the San Francisco atlas data and presents a preliminary phonemic analysis of San Francisco speech, reveals the probable early stage of /a/ and /ɔ/ coalescence in the city.

2.2.1. History and overview of LAPC work. Following a conference on the Linguistic Atlas of the Pacific Coast, David Reed began directing the atlas work for California and Nevada (Metcalf and Reed 1978:3). The LAPC was two separate projects almost from the beginning, with Carroll Reed and Henry Person directing the Linguistics Atlas of the Pacific Northwest (LAPN) and Reed heading the southern survey (p.4).

Reed's area was not only coastal, since it included Nevada as well as California. The title became the Linguistic Atlas of the Pacific Coast-California and Nevada (LAPC-Ca/Ne).

Project workers thought of the survey as part of the still officially existent LAUS. Metcalf and Reed refer to the west coast work as 'the extension into California and Nevada of the Linguistic Atlas of the United States and Canada...designed to accord in method and materials with the New England prototype and the other LAUS-C regional studies'. (p.2). The ideological goals were to 'contribute to the national picture of English language variation as well as provide information on variation within California and Nevada.' (p.2). The practical linguistic purpose for the whole atlas was that of DeCamp's San Francisco speech study: 'to provide, in readily usable form, a body of data...together with preliminary analysis and interpretation.' (DeCamp 1953: ii)

Previous to the Stockton conference Reed had done several years of preliminary work for the atlas survey. In 1948 he mailed questionnaire checklists to native Californians throughout the state, in order to get pertinent data about 100 different dialect features (DeCamp 1953:3). These mimeographed lists *(Collation of check lists used in the study of American linguistic geography)* were prepared in cooperation with Virginia McDavid and Raven McDavid, who at the same time were compiling the worksheets from all the LAUS surveys (Metcalf and Reed p.3). From the responses to the mailing Reed obtained a tentative survey of the dialect areas of California. There was indication of a major Northern-Southern division, with each area containing the focal area of a large urban center (DeCamp pp.3-4).

Early on David DeCamp became part of the group working on LAPC. He and Reed developed the final worksheets for the survey field interviews, using two main criteria: the prevalence of an item in the worksheets of other LA surveys; and the likelihood (which could be judged from checklist response) that an item might show variation within the two states that were to be surveyed (Metcalf and Reed, p.4). Partly because of adherence to the first criterion the lexicon selected for the worksheets was originally

'weighted toward the older and rural domains' (p.5). Reed and DeCamp decreased the proportion of rural oriented items. Further, they composed the worksheets to get phonetic more than lexical information about dialect differences. And 'As if to insist on the greater prominence of the cities in the LAPC, the first field work took place not in a small town but in San Francisco.' It was a departure from previous LA survey work for there to be 'not just two, three, or five informants' in a community, 'but 25' (pp.5-6). The San Francisco survey is both a preliminary and integral part of the LAPC work (p.ii). It was a pilot study for the project, testing the worksheets and the general suitability of the methodology for a western survey.

The LAPC, DeCamp states in his dissertation's introductory chapter, inherited its methodology from the European atlases; and 'the present study has rigidly adhered to the methodology described in the *Handbook of the Linguistic Geography of New England* .' (1953:6). The main differences between LAPC design and that of earlier atlases were matters of degree: there was more emphasis than in previous atlas surveys on collecting data for phonological analysis (Metcalf and Reed, p.5); there was more serious attention given to gathering information for correlation of linguistic and social traits (p.2); and there was greater weight given to urban communities, since the 1950 census showed 80 percent of Californians living in cities (pp.6-9).

Between June 1952 and December 1959 300 interviews took place— 270 of Californians and 30 of Nevadans. The speakers represented 93 communities. They subjected themselves to interviews of 5 to 15 hours long, answering questions from worksheets that covered 602 items for the gathering of phonetic, lexical, and morpho-syntactic information (Metcalf and Reed, p.1).

Reed and Moncur (in charge of the Southern California portion of the survey) sought out fieldworkers who were already familiar with phonetic transcription. Fieldworkers received a workshop training and were then sent out. There were nine of them besides Reed, DeCamp, and Moncur, with greatly varying degrees of experience with

fieldwork (Metcalf and Reed, pp.12-19). Aside from himself, Reed considered DeCamp the best transcriber (David Reed, personal communication). The quality of transcription was uneven and the records therefore not completely comparable across communities (David Reed, personal communication; June McKay (fieldworker), personal communication).

Ten urban areas were selected for California, of which Los Angeles and San Francisco provided the most informants by far, 55 and 25 respectively (Metcalf and Reed, p.9). Seventy-two other geographical points 'scattered throughout California and Nevada in such a way as to give maximum spread' were designated; from these selection was made on the basis of length of history of continuous settlement (p.7). Like other LA surveys LAPC sought older, less widely traveled informants, 'emphasizing the oldest patterns of speech' (p.10). All informants were 30 years old or older (with the exception of two underage SF informants), native speakers of English, with no foreign language spoken at home before adulthood, and lifelong residents of the community (p.10). There had to be a fair distribution of female and male speakers, blacks as well as whites, persons of different religious backgrounds and different degrees of education (p.11). In the San Francisco study DeCamp selected speakers by type, conflating Kurath's Types I, II, III and Types A, B into three types, which I discuss below. Fieldworkers looked for willing and suitable interviewees by putting announcements in papers and seeking referrals from postmasters, librarians, clergy, and so on (p.20).

As in all other LAUS surveys, LAPC workers recorded responses in the phonetic system (based on the IPA but not identical to it) that Kurath had originally used. Field record responses were made in duplicate, allowing for an eventual dual filing system. The records consist of 22,500 pages of biographical information and phonetic transcription.

The voluminous field records of LAPC-Ca/Ne are now stored in bound volumes at Northwestern University. A copy of the *Guide* and a microfilm copy of the the field records, including the key to informants, is available at the Bancroft Library at UC

Berkeley. As is a common LA tale, the records have never been fully edited. No atlas has been published; and publication is unlikely. A number of articles and books have resulted from the California-Nevada study. The first was Reed's 'California dialects including your own' (1952), in which he discusses the subject matter, methods, and likely final products of checklist and field interview studies. DeCamp's dissertation, *The Pronunciation of English in San Francisco* (1953), discussed at length in the next section, was published in large part as two *Orbis* articles (1958, 1959). Reed's 'Eastern dialect words in California' (1954) discusses lexical evidence in responses to the mailed checklists. Two other works that deal with lexical comparisons only are Bohlen's 'Which do YOU say' (1957), in which *chesterfield,* among other items, gets attention, and Bright's *A word geography of California and Nevada* (1971). Presenting isoglosses for lexical variation from LAPC field records, she compares vocabulary with that reported in studies of other regions. The book is reviewed by Raven McDavid (1977). Moncur's 'A comparative analysis of [u-ʊ] variants in the San Francisco and Los Angeles areas' (1956), Metcalf's *Riverside English: the spoken language of a Southern California community,* (1971) and 'Directions of change in Southern California English' (1972), and Carroll Reed's and David Reed's 'Problems of English speech mixture in California and Nevada' (1972) treat phonetic evidence as well as lexical. Moncur's article, allowing him to report some of his own survey work as the interviewer in the LA area, shows that LA speakers favor [ʊ], SF speakers [u] in some of the same lexical items. Metcalf's works on Southern California speech and the Reed and Reed article report some findings on vowel pronunciation that include [ɑ] and [ɔ] variation.

2.2.2. The pronunciation of English in San Francisco, 1952. DeCamp's study of San Francisco English, based on his survey work—the first LAPC survey involving interviews with one of the two largest speaker samples ever used in LAUS work—is the largest product from the LAPC project. The dissertation is by far the most informative LAPC work about the phonology of the community investigated.

DeCamp considers San Francisco speech a phenomenon reflecting dialect mixture. He and the other principal workers of the LAPC survey regard this culturally dominant city as an important geographic center for both linguistic input and diffusion. Referring to the results of the mailed questionnaire, he writes: 'Preliminary research has indicated that California is a dialect transition area; that is, there are few if any clear-cut linguistic boundaries, but only overlapping, modulated subareas, continually swept over by linguistic currents and cross currents. In such a situation, the importance of a focal point such as San Francisco cannot be overestimated, for linguistic influences radiate from such focal points. ...the speech of San Francisco is a mixture composed of so many parts New England, so many parts New York, etc, for the Eastern United States were the linguistically genitive region for California as well as for the inland states.' (1953:1-2) The English of the city is to him a mixture, not a compound. There is no distinctly San Francisco English variety—or California English variety. He expects the speech of native San Franciscan informants to reflect dialect influences from other regions; and he examines and characterizes the phonology he finds according to this expectation.

2.2.2.1. Selection of informants. Although two underage informants were interviewed in San Francisco, DeCamp's participants otherwise met the criteria set for the LAPC as a whole. The native San Franciscan informant represented a small minority of the city's residents, as is still true now; but to reliably investigate lexicon and phonology imported to and settled into the city, only the atypical resident would do as a subject (p.9). The fact that the informants had to be available for many hours of interviewing must have weighted the participant group for retirees or housewives without small children. As with informants from all communities included in the LAPC survey, relatives of already selected informants were avoided, and selection through extensive networking was minimized. The selection process included both publicizing the survey and asking for referrals from librarians, clergy, friends, etc.

2.2.2.2. Classifications of informants. Ten of DeCamp's informants are Type I, having less than a year of high school education; ten are Type II, with completed high school educations; five are Type III, with college educations and 'professional standing in the community'. DeCamp refines this classification further by the use of plus and minus signs, indicating slightly more or less schooling or 'level of cultivation' than the unadorned type rankings allow (p.9). Nine of the Type I, nine of the Type II, and four of the Type III participants are white. For the most part I discuss here only the linguistic data from and biographical information about these twenty-two informants.

There is a high degree of correlation between age group and type category, and between these two traits and speaker sex, as is clear in Table 2.1. Not only are there more female informants than male, but also the males are overall both older and less educated than the females.

	Age group by decade						
	-30	30-39	40-49	50-59	60-69	70-79	80-90
Type 1-			2M	3F	1M		
Type I			5M,6M	7F	9M	4M	
Type I+					8M		
Type 2-		19F	11F				
Type 2		12F,17F	13F,14F			15F,16F	
Type 2+			18M				
Type 3	22F	21F,24F					
Type 3	+23M						

Table 2.1: Age group and speaker type of LAPC SF white informants. Number is informant number assigned by DeCamp. F = female; M = male.

A summary chart of informant characteristics appears in both Metcalf and Reed (1978:94) and DeCamp (1953:11). He devotes Chapter VII to descriptions of each informant based on biographical information elicited in a questionnaire at each interview and on his own observations.

2.2.2.3. US dialect traits. Consulting with various sources—Kurath et al. (1939-1943), Atwood's 'Outline of the principal speech areas of the eastern United States' (n.d.) (based on LANE and LAMSAS material that provided Kurath's divisions of the US

regional dialect map), Frank (1948), and Hubbell (1950)—DeCamp identified subareas within Northern, North Midland, South Midland, and Southern regions. His scheme differs from Kurath's in having four major divisions (dividing the Midland into two regions), and ignoring many of Kurath's regional subareas:

Northern	A. Eastern New England
	B. New York City
	C. Inland North
North Midland	D. Eastern Pennsylvania
	E. Western Pennsylvania
South Midland	F. South Midland
Southern	G. Eastern Virginia
	H. South Carolina-Georgia Low Country

He labeled subareas A through H, according to the presence or absence of 46 diagnostic phonological traits. In areas AFGH (Eastern New England, South Midland, Eastern Virginia, and South Carolina-Georgia Low Country), for instance, the vowel in *hoarse, mourning,* and *porch* is /o/; while in other areas it is /ɔ/. Many diagnostic traits show variation within areas. Both /a/ and /æ/, for example, are found in the items *calf* and *dance* in Eastern Virginia. The ten traits relevant to both DeCamp's work and the present study of San Francisco speech are assigned to subareas as follows:

The use of /o/ in *hoarse, mourning, porch:*	AFGH
The use of /ɔ/ instead:	BCDE
The use of /ɔ/ in *hogs, log, fog:*	AEF
The use of /a/ instead:	BCDGH
The use of /a/ in stressed *on:*	BCD
The use of /ɔ/ instead:	ADEFGH
The use of /a/ in *calf, dance:*	AG
The use of /æ/ instead:	BCDEFGH
The use of /ɔ/ in *oranges:*	ACEF
The use of /a/ instead:	ABDFGH
The use of /a/ in *wash, wasps:*	ABCD
The use of /ɔ/ instead:	AEFGH
The use of /ɔ/ in *crop, god:*	AEH
The use of /a/ instead:	BCDFG

Table 2.2. Seven traits diagnostic for dialects in regional subareas

With the list of traits DeCamp correlates results for each individual from elicitations of the 300 items providing the most useful phonological (rather than just lexical) information. A speaker will display so many traits characteristic of one region, so many

characteristic of another, and so on. For each informant he ranks the collections of dialect area traits thus obtained (pp. 90-100). (See Table 2.3.) Informant 1, with trait collections ordered DCEAFBGH, displays more traits characteristic of Eastern Pennsylvania (D) than any other region; then of traits characteristic of the Inland North (C), etc. In some cases the correspondence of individual informant trait collections with dialect area traits can be attributed to family background or the settlement history of the neighborhood of the informant's youth; in some cases, not.

Type I		Type II		Type III	
inf.	areas	inf.	areas	inf.	areas
1	DCE	11	DCE	21	ECF
2	BCD	12	CED	22	DCE
3	BED	13	ECA	23	ECD
4	EDA	14	CED	24	EAD
5	BDE	15	ECA		
6	EDC	16	AEF		
7	CDB	17	DCE		
8	BDC	18	CED		
9	ABE	19	DCE		

Table 2.3. For each informant, the three highest ranked dialect areas on the basis of a comparison of the informant's phonology with traits characterizing US dialect regions. After DeCamp (1953:100).

It is clear from Table 2.3 that the interviewees as a whole use phonology similar in many important particulars to that of the Inland North and Pennsylvania. The speech of Type I informants also sometimes resembles that of NYC; several speakers of all types show traits found in Eastern New England speech; for two speakers there is some resemblance to South Midland speech. Immigrants to San Francisco from other parts of the US came mainly from New England, the Middle Atlantic states, the North Central states, and the Pacific states during the century between the Gold Rush and DeCamp's survey (pp.31-32). Settlement from New England and NYC was greatest in the last century, and has steadily declined in this one. The geographic sources of immigration to the city have moved gradually south and west (pp.33-34). Given the high correlation between speaker type and age group, the influence of settlement history on native San Franciscan speech seems clearly reflected in the rankings given in Table 2.3. The speech

of speakers 2,3,5,7,8, and 9, all but one of whom are over 60, for instance, resembles that of NYC. DeCamp remarks that there is 'a tradition in San Francisco that ...Irish Catholics born south of Market Street ..."talk like Brooklynites" ' (p.104), and notes that this folk belief is confirmed by his investigation. 'A sub-type of speech exists in San Francisco with remarkable similarities to the uncultivated speech of New York City.' (p.105) Informants 2,3,5,7, and 8 are of Irish background and grew up south of Market. All but informants 3 and 7 are male. This shows the bias for older male, younger female informants. It is pointless even to speculate whether the NYC-like speech (signalling working class toughness?) is more characteristic of male than female speech behavior here.

DeCamp presents a preliminary phonemic analysis of the San Francisco material. This analysis, not intended as a thorough account of the sound system, nevertheless remains the only one for the phonology of English in San Francisco. Chapters III and IV, 'A tentative phonemic sketch of San Francisco speech', and 'San Francisco pronunciation in its social and historical context', contain, in lengthy footnotes as well as in the body of the text, discussions of the phonemics that touch on a number of issues salient in American structuralism of the time. These include the concept of a phonetic target for a phoneme, free variation, overlapping phonemes or macrophonemes, uniformity of representation, and coexistent phonemic systems in the grammar of an individual.[1] DeCamp classifies variation in San Francisco English according to whether it is found within the speech of an individual or between different informants, whether it is structural or not (that is, affecting the phonemic inventory size and shape), and whether it is phonemic or subphonemic (p.80). Cross indexing these three types of variation (p.81), he then briefly discusses his findings in theoretical terms.

DeCamp presents (p.46), in a chart partially reproduced in Table 2.4, a vowel inventory consisting of five front, two central, and four back vowels.

	front	central	back
high	/i/		/u/
lower-high	/ɪ/		/ʊ/
higher-mid	/e/		/o/
lower-mid	/ɛ/	/ə/	
low	/æ/	/a/	/ɔ/

Table 2.4. Phonemic inventory for San Francisco English. (After DeCamp 1953:46)

Alongside each of these phonemes DeCamp gives a square-bracketed 'phonemic norm': 'the normal pronunciation by the plurality of informants of that variant of the phoneme which occurs in the least restricted phonetic environment.' (p.45) DeCamp does not speculate about whether or not a norm corresponds to a cognitively real target for the phoneme's realization within the inventory of an individual speaker.

DeCamp comments on free variation: 'Some linguists propose a further classification into "socially conditioned" and "free" variation. This is objectionable because presumably all speech differences are either prosodically or socially conditioned, although the conditioning factors may not be apparent. The "free" variations which emerge from such a classification are merely those for which the prosodic and social interpretations are as yet unknown.' (p.81) This comment both evidences an awareness of the structural relevance of socially conditioned variation (dialectology which has associated with structural linguistics has always been aware of this), and at the same time avoids, as was common practice, the task of accounting for the socially conditioned variation *along with* phonologically conditioned variation. Such an account would have been impossible, of course. What is worth noting is that free variation, described within structuralism by optional rules, and socially conditioned variation, not described at all, would reduce to one thing, in an ideal linguistic practice; and that one thing would be describable with

categorical not optional rules, when the 'prosodic and social interpretations' became known.

In his discussion of the distribution of allophones DeCamp uses the words 'common', 'occasional' and 'rare' to refer to the frequency of occurrence of a variant in the speech sampled for the city. He does not give his tabulation for the determination of frequency, but discusses his labels and his method of calculation in a note to Chapter III (pp.69-71). DeCamp believes that observation of frequency can help in a determination of complementary distribution and free variation. Clearly referring to the use of Pike's recommendations for procedure in analysis (1947: 58-61), DeCamp states: 'First, if a more detailed description of the distribution of allophones in less frequent phonetic environments were made, many phones would then be classed as phonetically conditioned, prosodic variants rather than as free variants. That is, a full phonemic study rather than a sketch would leave fewer variations unexplained. Second, a great deal of variation would be eliminated by ignoring the extremely rare phones.' (p.80)

It is apparent that DeCamp has been influenced by Reed here. In his 'A statistical approach to quantitative linguistic analysis' (1949) Reed asks what quantitative analysis can contribute to linguistic knowledge, and answers: 'If one wishes to analyze a language either synchronically or diachronically, a purely qualitative analysis is incomplete. A qualitative synchronic study discloses the nature and variety of linguistic forms but in no way indicates the frequency or magnitude or such forms.' (p.247) Reed likens a qualitative analysis to a cake recipe that lists ingredients but does not indicate proportions. About qualitative work in diachronic linguistics he goes on: '...rules of qualitative change...describe merely the manner of initiation of change and the overall correspondences between the language of different periods resulting from such changes; they do not attempt to describe the basic processes involved in the change....[T]he process of any linguistic change...is largely a matter of fluctuation in the frequency of linguistic forms.' (p.247)

DeCamp's analysis for San Francisco requires the recognition of overlapping phonemes. /æ,o,u/ before *r* ' may be considered macrophonemes', that is, 'the phonetic range of the allophones is greater than that of the allophones not followed by /r/.' (p.72) To put it in Bloch's way, the issue is whether phonemes may intersect, whether 'a given sound...may belong to two or more different phonemes.' (1941:278) DeCamp asserts that the distinctions between certain vowel pairs (e.g. /o/ and /ɔ/) are neutralized before *r;* this phenomenon is, of course, not unique to English in the far west of the States; the presence or absence of vowel difference in *mourning* and *morning* is one of the diagnostic tests in DeCamp's dialect subarea scheme. The vowel pairs show 'complete intersection', that is, 'successive occurrences of x under the same conditions are assigned sometimes to A, sometimes to B.' (Bloch p.278)

For several speakers /or/, varying with /ɔr/, was limited to words for which there is a possible homophonic conflict (p.87). In exploring this matter DeCamp reports the results of a perception test some informants took. Tested on their ability to distinguish /or/ from /ɔr/, eight informants could tell *hoarse* from *horse,* and *mourning* from *morning;* but all of these eight used /ɔr/ themselves. In their speech the vowels before *r* are neutralized, but 'the /or/-/ȯr/ distinction has a psychological reality for these speakers which is not indicated in the phonetic transcriptions.' (p.86). The pair /or/ and /ɔr/ are used mainly to distinguish words that would otherwise sound the same; and individuals who do not use the distinction are aware of it. DeCamp concludes that the structure is in a state of transition (p.87). Modern sociolinguistic theory based on sound change in progress investigations of reported and actual partial and complete mergers (e.g. Labov, Yaeger, Steiner 1972; Faber 1990) associates the kind of perception phenomenon DeCamp observed with transitional states also.

There are frequent nonstructural phonemic differences between informants. Alternation is common between /a/ and /ɔ/, /æ/ and /a/, /u/ and /ʊ/. Nonstructural subphonemic differences are even more frequent. Having pointed these things out,

DeCamp discusses variation within the speech of single informants which involves the question of whether or not one person can have two or more inventories for the phonology of one dialect. Nonstructural phonemic variation within the speech of single informants includes the alternation of /a/ and /ɔ/, as in the word *wash*. Any one phonemic analysis which tried to account for the variation 'would grossly misrepresent the phonemic system of the informant.' (p.82). There is variation involving [æ] and [a] variants of /æ/. Some informants frequently, but never always, use [a] in 'ask words' and certain other items. For most of these speakers the rare occurrences of [a] are not in complementary distribution with [a], as shown by pairs like *calf* and *loft*. (p.83). Noting that ideolectal structural variation is considered impossible by most American linguists of the time, DeCamp refers to Fries and Pike's argument (1949: esp. 32-33) that two or more systems can coexist for a single speaker. 'For some San Franciscans one must recognize the coexistence of San Francisco and other phonemic systems, in this instance Eastern New England. For these twelve informants, [a] is a point of articulation which is rarely used, which has certain affinities with both /æ/ and /a/, but which is an allophone of neither of these phonemes; rather it belongs to a phoneme in an alien system.' (p.84)

2.2.2.4. Phonemes corresponding to the present study's variables. Of the 11 vowels DeCamp identified for phonemic inventories of his San Francisco informants, three correspond to variables considered in the present study. Here I examine DeCamp's results for those three vowels using the 23 items; 19 of these, listed in Table 2.5 below, are also items providing measured vowels in the present study. These allow a comparison of DeCamp's findings with those for present day speakers in formal styles. Although each of these vowels shows variation across speakers, and many show variation in the speech of individuals across lexical items, for the majority of the vowels, as DeCamp transcribed them, the variation is slight. Front vowels have some raised and some lowered variants. While /a/ shows very little alternation, the pronunciation of /ɔ/ varies across speakers and items more than that of any other vowel. Nonlow back vowels have variants

that are truncated, lowered, or fronted. Speaker type (I,II, or III), sex, and age are relevant to an interpretation of group behavior. Also important is the individual behavior of at least two informants. The items are given below in Table 2.5.

/æ/	/a/	/ɔ/
bag	*barn*	*all*
bath	*bottle*	*cough*
cans	*Chicago*	*fog*
glass	*palm*	*frost*
half	*palm*	*wash*
pan	*wasp*	*wasp*
Saturday		

Table 2.5. Items in the LAPC worksheets for which there are also formant measurements from formal speech style elicitation of the present study.

2.2.2.4.1. /æ/. DeCamp transcribed the following phones for these vowels in the 65 items examined:

/æ/ [æ^, æ^ə, æə, æ, æˇ, a^, a]

Although DeCamp has transcribed the tokens of /æ/ in seven different ways, variation with this vowel is slight. Only [æ] is found across all items. All speakers use this variant the most. Raising, both with and without a centering offglide, occurs across type, sex, and age groups in *marry* and *bag*. There is one instance of a raised vowel and one of the vowel with following [ə] in *cans;* two women produced these tokens.[2] Five Type II female speakers also lower the vowel in the words *bag, bath, glass,* and *half;* the latter three of these are '*ask* words', having a historical alternation of [æ] and [a].[3] The use of [a] in these items is characteristic of dialect areas A and G, Eastern New England and Eastern Virginia. Of the women who use [a] here, three (speakers 15, 16, and 24) have collections of speech traits which overall match traits diagnostic for Eastern New England more than for most of the other dialect areas. Two different kinds of conditioning seem responsible, phonetic and lexical. The pronunciations may be hypercorrect.

2.2.2.4.2. /a,ɔ/. The following transcriptions appear in DeCamp's field worksheets for /a/ and /ɔ/ in the items examined.

/a/ [ɑ, ɑᵊ, ɑ˃]

/ɔ/ [ɑ, ɑ˃, ɑ̟˃, ɑ̟̞, ɑ̟, ɒ, ɔᵛ, ɔ̞ᵛ, ɔ̞, ɔ]

Three speakers in their 80s lack r-constriction in *barn*. Several middle-aged women gave tokens of *palm* with dark *l*; /l/ is historical in this word. Across type, sex, and age groups there are backed phones of the vowel in *barn, Chicago, notch*. There is little to say about /a/. Note, however, that the phonetic overlap between /ɑ/ and /ɔ/ is slight; as phonetic realizations, /a/ and /ɔ/ have only [ɑ] and [ɑ˃] in common.

By far, the pronunciation of /ɔ/ is more varied than any other vowel. The phoneme has more variants than any other in DeCamp's study, many of which are used across speakers and lexical items. He distinguishes three degrees of height and four degrees of backness. He regards lip rounding as a matter of degree also, tracing it in a continuum from most rounded, relatively high, back variants to completely unrounded relatively front, low variants in the following scheme (p.110):

unrd V	rd unrdV	unrd rd V	rd V	rd rd V
ɑ˃, ɑ̟˂, ɑ̟̞,	ɑ̟̞˂, ɑ̟̞̞,	ɒ, ɔ̞,	ɒ, ɔ,	ɒ̟, ɔ

About one-sixth of all tokens of /ɔ/ in the words examined are transcribed as [ɑ,ɑ˃,ɑ˃]. Although this suggests considerable overlap in the pronunciation of /a/ and /ɔ/, that is not the case. DeCamp often notes lip-rounding for /ɔ/, writing, for example, [ɑ̟˃]. He never transcribes a variant of /ɑ/ as round. Further, about one-fifth of all tokens of /ɔ/ are written as ɔ (with or without diacritics for rounding, unrounding, or lowering); and about one-half of all tokens are [ɑ̟̞]. DeCamp gives [ɑ̟̞] as the phonemic norm for /ɔ/ (p.46). This norm is clearly distinct from [ɑ], the norm for /a/.

Phonological and possible lexical conditioning are evidenced. Sex, type, and age of speaker are relevant. *Fog* is the only item for which no speaker gives a vowel that is transcribed as some form of [ɔ] (that is, [ɔ̞,ɔ̞ᵛ,ɔ̟,ɔᵛ]). Only lower or lower and fronter variants were noted. /a/ rather than /ɔ/ in this item partly defines certain Northern and Southern areas (BCDGH) in American English at the time of DeCamp's work. If sound

change is underway in the 1950s for this vowel, *fog* may be an advanced item due to alternation already used in the speech community. Both *wash* and *wasp* have dialectal alternants of /a/ and /ɔ/, characterizing areas north and south of Pennsylvania, respectively. In general, DeCamp's informants favor low or low and fronted vowel variants in these words.

Of the /ɔ/ class items under consideration, *wash* is the only one for which the LAPC fieldworkers elicited two tokens, one of the noun *(the wash),* and one of the verb *(wash the dishes),* with questions in different parts of the long worksheets. Most informants give two pronunciations; a variety of forms are used: (1) [ɒ,ɑ], (5) [ɒ,ɑ̟˃], (16) [ɑ˃,ɒ], (22) [ɔ,ɑ], etc. Noun or verb status is not reflected in the choice of phone. The range of realizations does suggest that the word class of *wash* is not clear to individuals.

If there is confusion about the lexical class of *wash* and *wasp* the available dialectal alternates are probably not the only reason. *Coffee, cough, faucet, frost, launch. wash,* and *wasp* are written with both *ɔ* or *a* variants. Of the items considered in this discussion, only *all, saw* (consistently given as a form of *ɔ)* and *fog* (consistently given as a form of *a)* do not show this variation.

An inspection of environment strongly suggests that the variation is due mainly to a conflict of conditioning environments. A preceding [+lab] or [+rd] consonant favors a round vowel. A following sibilant favors fronting of the vowel. Only elderly speakers produce a form of *ɔ* in *coffee* and *cough,* where the labial consonant follows the vowel.

In his discussion of /ɔ/ DeCamp inquires about how frequently and to what degree the vowel is unrounded. Using the scheme given above to consider unrounding by individual informants, he finds that all but a few individuals usually use 'the weakest degree of rounding', that is, a V̲rd; exceptional speakers are 15 and 16, who almost always use a form of *ɔ* (pp.110-111). DeCamp wants to attribute the presence of relatively high, back, rounded realizations of the vowel in the data to these speakers. A consideration of

his findings for the vowel in 65 words in relation to speaker sex, age, and type shows that speaker category is more important than ideolect, however.

Tokens from men are generally lower or lower and fronter than those from women. (See Table 2.6.) There are only three male speaker tokens of ɔ in any form. As with all other vowels, much less variation is attributed to men than to women. As noted above, there are fewer white male speakers than white females; and men and women are not distributed even roughly evenly across age of speaker type groups. Seven of the nine men are elderly Type I informants. This bias in the sample does not account for the distribution of variants for /ɔ/. The men informants avoid using any but the lowest alternants, greatly favoring [ɑ] over any other phone. Across age and speaker type groups women make use of almost all possible degrees of height, backness, and roundness for the phoneme within the low, back and central area of vowel space.

	Type I F N:2	Type II F N:8	Type III F N:3	Type I M N:7	Type II M N:1	Type III M N:1	Total 22
ɑ	5	5	1	5	1		17
ɑ˃	1	12	1	5	2		21
ɒ˃			1	4	2	2	9
ɒ	7	39	18	47	6	7	124
ɒ̞	2	5	7	13	1	2	30
ɒ̟		3	1	7			11
ɔ̟˘		4				1	5
ɔ˘		5					5
ɔ̞	1	18	4	2			25
ɔ	8	5	3				16
	(24)	(96)	(36)	(83)*	(12)	(12)	
		(total # tokens for type)					

Table 2.6: Distribution of alternant phones for /ɔ/ by speaker type
*Number of tokens 83 not 84; *wasp* not given by informant (2).

The high correlation of age and speaker type makes it difficult to separate these two factors and consider their influences. The peculiarity of speakers 15 and 16 further complicates an attempt at interpretation. Type II and Type III women informants favor *a*,

like the men do. All these informants except 15 and 16 are in their 30s and 40s. Elderly 15 and 16 avoid using low and low, front variants of /ɔ/. Their speech accounts for most of [ɔ̞] in the transcriptions; even without these speakers' data, however, variation from Type II and Type III female informants includes all the forms of ɔ given in the record, accounting for about one-fifth of the realizations of the vowel from these speakers. Unlike the other two elderly women, 15 and 16 very rarely (only for *fog* (15,16) and *faucet* (16)) use variants that are not forms of ɔ. Within variation covering a large range of vowel phones older, less educated female speakers favor either [ɔ] or [ɑ], younger, more educated female speakers use [ɑ̟] most frequently. Type II informants 15 and 16, who use [ɔ̞] much more than anyone, may be producing particularly careful, conservative variants.

That older male speakers use only low variants, while older female speakers use higher, back ones as well means that a socially defined difference in behavior is available for exploitation in sound change, if sound change occurs. That middle-aged women prefer low variants, like the men, suggests that a subphonemic change, possibly initiated by male speakers, has already taken place by the time of DeCamp's survey. The phonetic target for /ɔ/ has become a low, unrounded or only slightly rounded vowel, whereas it had previously been higher and rounder. The phonemic norm, [ɑ̟], represents frequency of use that reflects the newer target. It may be that there is ambiguity about the target for the oldest female speakers, and that Type II informants 15 and 16 correct toward the conservative target.

A shift in phonemic norm does not mean that a merger is underway. DeCamp's transcriptions give about one out of seven tokens for this vowel as [ɑ] or [ɑ˃]. Without audio tapes of the material spectrographs cannot be made; and without these it can't be known whether or not the F1 and F2 measurements of these vowel tokens match or approximate the measurements of /ɑ/ tokens. Accepting DeCamp's transcriptions, there is a notable amount of intrusion of /ɔ/ into the territory of /a/. Given this, and an observable shift over real time of the distribution of vowel phones to a lower and fronter area of vowel

space, it is plausible to suggest that neutralization is going on. Male speakers may have initiated it. Female behavior apparently lags behind male in the change. Women's speech shows more variation, whether because female speakers have not settled on a new phonemic target, or because female speech tends to show more variation than male. The distribution of vowel tokens from women suggests that for Type I and II informants there is a phonemic norm conflict.

DeCamp suggests that the merger might be beginning in San Francisco white English. He notes that his three black informants avoid using either low and unrounded variants of /ɔ/ (pp. 110-111). 'The phoneme /ɔ/ has a wider phonetic range than any other phoneme....It is curious that lip rounding of this phoneme is more common among the three Negro informants. These almost entirely avoided the completely unrounded variants and used the strongly rounded variants with about twice the frequency of the other informants. Some informants tend to favor fronted allophones...especially in such words as *hogs* and *foggy*,...so that the /ɑ/-/ɔ/ contrast is partially obscured....In parts of the western United States (Utah, for example), /a/ and /ɔ/ have fallen together into one phoneme, usually with a wide phonetic range. In certain other western areas, including parts of Washington, this coalescence is not complete...Clearly the coalescence of /a/ and /ɔ/ is a phonemic change which is now moving into the Pacific Northwest. It is possible that the peculiar use of fronted allophones of /ɔ/ is an indication that this coalescence is beginning in San Francisco. The ever-increasing number of migrants to San Francisco from other western states seems to support this hypothesis. The entire subject needs further investigation.' (1955:555-556)

2.2.2.4.3. Individuals. The speech of elderly Type II female informants 15 and 16 is responsible for weighting the distribution of phones of more than one phoneme in unusual ways. Informants 15 and 16 are two of the five speakers who use lowered alternants of /æ/ in *bag, bath, glass,* and *half;* only speaker 15 lowers the vowel in the non *ask*-class item *bag*. These two women use forms of ɔ for /ɔ/ in more items than any other

speaker, far exceeding their age group and sex peers in the frequency of this conservative pronunciation. Unlike other Type II informants, 15 and 16 almost totally avoid using variants of the lowest height and completely avoid fronted phones for this vowel.

DeCamp observes that informant 15 displays speech traits that, overall, correspond most to traits of Western Pennsylvania, the Inland North, and Eastern New England (areas ECA); and that informant 16 has speech characteristics most like those of Eastern New England, Western Pennsylvania, and the South Midland (areas AEF). Specifically, both have /a/ in *calf*, /a/ in *horse* and *water*, /ɔ/ in *oranges* and *God*, etc.

The parents of informant 15 emigrated from Ireland to San Francisco. The parents of informant 16 were born and grew up in New England. One can also speculate that the speech of informant 15 most resembles speech of the dialect area E, Western Pennsylvania, because that area's white English itself retains some traits imported from Ireland. The most massive emigration to the early colonies was of 250,000 people mainly from northeastern Ireland and the borderlands of Scotland; these settlers took the 'back country', mainly the Inland North, Western Pennsylvania, and some southern inland regions (Fischer 1989:608-612). At least as pertinent for both speakers is the fact that, for the 22 white informants interviewed by DeCamp, speech is characterized primarily by traits corresponding to traits defining the Inland North and Eastern and Western Pennyslvania. By means of whatever settlement history of the city, speech similar in certain respects to speech from these areas is prevalent, if we regard DeCamp's study as valid and reliable.

Both informants have high school educations. Informant 15 is the oldest participant in the San Francisco survey. DeCamp notes that she is 'somewhat self-conscious about speech' (1953:156). Informant 16 is 'somewhat correctness conscious...Usually accepted only one form, rejected all other variants as nonsensical vulgarisms...she stated that she hates those who slur their words' (p.157). These correctness conscious women are perhaps engaged in hypercorrection in their lowering of /æ/ and their refusal to lower /ɔ/.

2.2.2.4.4. Summary of analysis. Variation in the San Francisco LAPC data is greatest for /ɔ/, much less for /æ/, and remarkably little for /a/. An examination of the data suggests that a merger of /a/ and /ɔ/ has been initiated in San Francisco white English. The rest of the total distribution is best interpreted as stable, synchronic variation.

For many speakers, the lexical class membership of *fog, wash* and *wasp* is unclear. A conflict of phonetic conditionings in the cases of *wash* and *wasp*, the process of merger, which, like other sound changes, advances change in particular lexical items, and the availability of dialectal variants through the settlement history of the city are factors perhaps jointly responsible for the ambiguous status of these words.

A nasal consonant following the vowel is a conditioning factor for the raising of /æ/. A following /r/ or /g/ encourages raising or diphthongization of /ɛ/ and /æ/. A [+lab] or [+rd] preceding consonant favors a relatively high, back, rounded pronunciation of /ɔ/; a following sibilant favors fronting of the vowel. A preceding *r* encourages truncation and lowering of /u/.

For some variation speaker sex, age, or type is an important factor. The majority of Type II female speakers lower /æ/ in 'ask words'. Some older speakers lack postvocalic *r* after /a/ and /ɔ/. Men vary the pronunciation of /ɔ/ much less than women, realizing the vowel as [ɑ] for the majority of tokens. Across age and type groups women are responsible for the great range of variation for /ɔ/. There is some indication, however, that neutralization of /a/ and /ɔ/ has begun, and that males initiated the change in San Francisco some decades prior to the LAPC survey.

Elderly Type II female informants 15 and 16 show unusual behavior that skews the results of DeCamp's study somewhat. They produce lowered variants of /æ/ in *bag, bath,* etc.; they use relatively high, rounded, back variants of /ɔ/ much more than any of the other speakers. Their parents' phonologies may be partly responsible. The informants may also be hypercorrecting.

2.3. Conclusion. Regional dialect surveys, involving directly interviewing of native inhabitants of a local to obtain information about a present variety of a language, was innovative, empirically oriented work begun by Wenker, Gilliéron and others in western Europe before this century. Concepts, methodology, and terminology developed in European dialect geography were inherited by American dialectology. Many survived the two decades of LAUS practice preceding LAPC work. The concepts of focal and relic areas are pertinent to the selections that Reed, Moncur, and DeCamp made for LAPC, of, on the one hand, San Francisco and Los Angeles and, on the one hand, small rural areas with long settlement histories . At the time of LAPC explanation in dialectology was still a matter of historical particularism. Migration history was thought to account for the 'dialect mixture' that DeCamp called the speech of San Francisco. Migration history was held to account for the major regional division of California into northern and southern areas.

DeCamp's study of San Francisco English is primarily a record of the San Francisco phonetic findings, with background information on the city's history and demography. Secondarily, the work is a preliminary phonological analysis. DeCamp dealt with the phonetic data of San Francisco speech in the terms of American structuralist phonemics of the early 1950s. It is fair to say that a phonemics orientation is characteristic of American dialectology. The issues of phonemic target, biuniqueness, phonemic overlapping, uniformity of representation, and coexistent phonemic systems for one individual touch variously on the findings of phonetic variation and the analysis of this variation. In his analysis DeCamp suggests that a merger of /a/ and /ɔ/ is underway. His material also shows variation for /æ/. The variability shown for all these vowels is of interest in the present investigation of sound change in San Francisco English. DeCamp's results can be compared with formal speech style material from present day informants.

Notes.

1. DeCamp references the following: Bloch (1941, 1948), Bloch and Trager (1942), Bloomfield (1933), Fries and Pike (1949), Harris (1951), Pike (1946, 1947), Trager and Smith (1951), Twaddell (1935), Swadesh (1937, 1947). Of these he makes particular use in his discussion of phonology of Bloch's 'Phonemic overlapping' (1941) and Fries and Pike's 'Coexistent phonemic systems' (1949).

2. The same environments are involved as for /ɛ/. Diphthongized variants of /ɛ/ are found across speaker groups, but only for items *chair* (never *merry*) and *egg*. An offgliding schwa takes the place of r-constriction in *chair* for a few speakers. Items in which the vowel occurs before a nasal have [ɛ^,ɛ^] variously.

3. 'Ask words' refers to a lexical subclass having a low, central vowel phone in some dialects. In these items the vowel is followed by a voiceless fricative or by /nt/.

Chapter 3: Sound change studies

3.0. In the Labovian framework variability is regarded as an orderly heterogeneity, inherent in the grammar and reflected in speech in any speech community. Through time language changes. The synchronic variation inherent in the grammar is the basis of—is the immediate, passing state of—diachronic change.

Labov was the prodigy and later colleague of Uriel Weinreich. Labovian sociolinguistics is a field of mixed heritage; it derives as much from American and European dialectology as from structural/generative mainstream linguistics. In the Weinreich, Labov, and Herzog essay (1968) the authors announce, with their title, that they are laying 'An empirical foundation for a theory of language change'. The dynamic approach of dialectology, while avoiding the error of presumed homogeneity for a language variety, has always lacked a viable model of its own for linguistic system. The model taken from structural linguistics treats any speech community's variety ideally, 'regardless of all its heterogeneity' (Weinreich 1954:268). Weinreich asked, 'Is a structural dialectology possible?' (1954), and answered, yes, patterned diversity could be adequately described; he suggested the construction of diasystems. Weinreich, Labov, and Herzog's collaborative work, and indeed all of Labov's and other variationists' work, is an attempt to address this question responsibly, that is, to address it as fully as possible and to provide as developed an answer as possible. This has meant continuing the diachronic linguistics attempt 'to span the Saussurean dilemma, to elaborate a discipline which would be structural and historical at the same time.' (Weinreich, Labov, and Herzog 1968:98)

Labovian analysis of synchronic or diachronic linguistic variation entails finding and interpreting correlations between the use of variants and the social realities of speaker identity and discourse context. Syntactic and phonological processes are reflected in the frequency of a form's use, which varies. The heterogeneity of the speech community is relevant. The speech context is relevant; the use of style shifting, which is sometimes

situational, sometimes metaphorical, depends, in part, on speaker identity. The variation involves, then, a set of linguistic forms, a set of social identities, and a set of style options. Correlations are found between each of these and the other two.

The development of variationist theory has included an attempt at modification of or integration into (understandings about this differ) generative theory, in particular, phonological theory. The variable rule enterprise tried to contribute to the generative phonology theory of types by providing a way to attend to tokens within one and the same formalism. Out of this now abandoned undertaking some things remain. One is the ability to describe collections of speech phone realizations as distributions representing variables. Comparison across distributions allows one to attach performance frequencies to the variables in particular linguistic and social contexts. The variables themselves, with their performance information, are associated with units of phonological status, that is, with types. Another remnant of variable rule development is the ability to describe priority relations among conditions in a phonological process such as a vowel movement. The several conditions are regarded as differently weighted constraints. Determination of frequencies makes this possible.

Association of performance and linguistic competence, and association of these with the extralinguistic-structure factors of speaker identity and speech style selection are made within a diachronic linguistic theory. Labov and others engaged in the enterprise have specified questions concerning the origination, spread, and eventual regularity of the sound change process (initially addressed in Labov 1963). These problems of constraints, transition, embedding, etc, apply to a set of sound change types (Labov 1973). The elaboration of these types followed upon investigations of sound changes of mainly two kinds: vowel chain shifts and vowel mergers. For each type principles governing and patterns manifesting from the processes have been stated (Labov, Yaeger, and Steiner 1972).

Labov and co-workers, other investigators working within this American linguistic subdiscipline, and sociolinguists elsewhere who study variation within the same framework or one with similar assumptions and claims have attended mostly to urban speech—in Philadelphia, Detroit, Belfast, and so on. In the United States most work has been done in Northeastern and northern Midwestern cities—New York City, Philadelphia, Buffalo, Rochester, Chicago, Detroit, and a few others. Investigations have also been carried out in the Southeast, in particular in Atlanta and New Orleans, and in the West, in Salt Lake City, Albuquerque, and Los Angeles.

The focus on urban speech is one of the ways in which modern sociolinguistic sound change in progress work differs from traditional dialectological work. The use of informants from a wide age range, but with emphasis on young speakers in a community, is another. These differences make findings from one kind of study and the other difficult to compare. Another difference between the data gathering procedures of the two traditions is the elicitation, in sociolinguistic work, of continuous, conversational speech, in as informal a style as possible, and the elicitation, in dialectological work, of isolated forms delivered in a careful speech style. This difference is a more serious one for comparison of findings.

In this chapter some sociolinguistic theory relevant to interpretations of the findings of this study is discussed and the results of some sound change investigations are reported. A review of findings from other work is mainly confined to those to which the San Francisco study results can best be compared in order to further an understanding of current vowel processes in American English.

3.1. Sound change process. A major concern for variationist work is how to relate theoretical concepts to empirical evidence. There are several problems to be solved. Their specification provides ground for the ongoing enterprise. Models for sound change have been developed, for processes that are variable or categorical, that involve lexical

conditioning or do not. These models are based on observations of change processes and reinterpretations of historical changes.

3.1.1. Problems. Labov's *On the mechanism of linguistic change* (1965, revised 1972) is groundwork for the later piece coauthored with Weinreich and Herzog (1968). Labov, and then the three authors, develop the formulation of the questions of the origination, spread, and eventual regularity of language change. The problems are presented first as three—the transition, embedding, and evaluation problems (1965:518-519)—, then as five—the constraints, transition, embedding, evaluation, and actuation problems (1968:183-187). The constraints problem is to discover the set of possible changes and conditions for change. The transition problem is to find the route by which one stage of a linguistic change has evolved from an earlier stage. This involves both the bare phonetic facts of transition, reflected in the variation employed by speakers over apparent time, and the specifics of rule change; how one rule changes into another is 'the generative aspect of the transition problem' (Labov 1973:101). The embedding problem is to find the matrix of social and linguistic behavior that carries linguistic change, through correlations of the linguistic and nonlinguistic systems. The evaluation problem is to find the subjective correlates of objective linguistic changes, that is, language attitudes. General attitudes and aspirations of informants correlate with linguistic behavior; and unconscious subjective reactions to alternants of a variable can be measured The actuation problem is to determine stimuli and constraints on language change from both society and language structure.

3.1.2. Models of sound change. Labov presents five models of sound change meant to capture the truth of the internal evolution of phonological processes (p.105-111). Each model is a set with two members: a categorical form; and a variable form. (See Figure 3.1 below.)

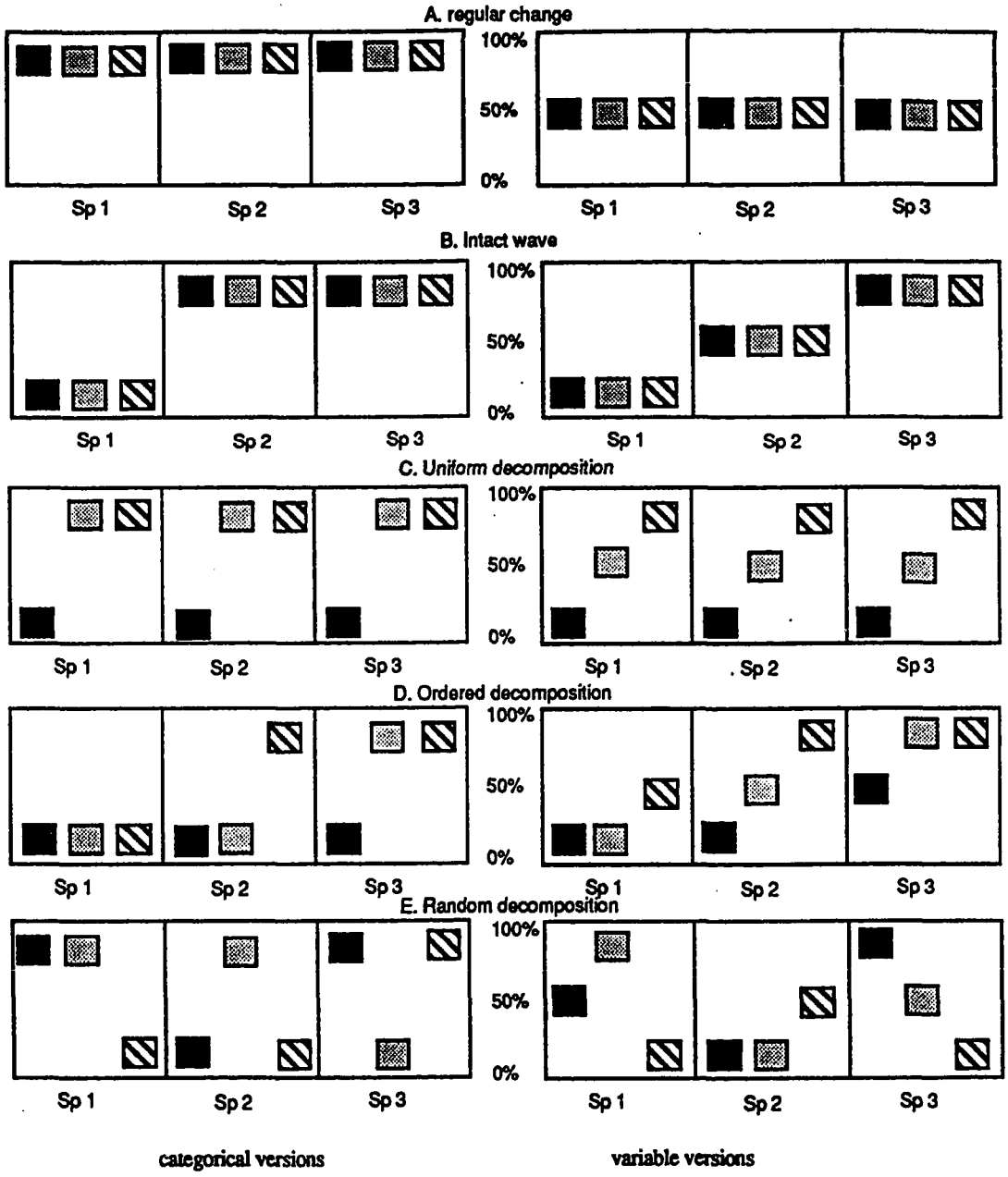

Figure 3.1. Five models of sound change. (after Labov 1973:106) (Sp = speaker; boxes represent lexical items.

The first set, A, 'regular change', is a model for classical neogrammarian change, in which all speakers behave alike; all word classes remain intact, that is, there is no lexical diffusion. The rule governing change may apply categorically or variably, but applies for all speakers and to all relevant lexical items. Labov finds the model 'useful for viewing completed changes...But no such cases have ever been observed in progress' (p.105). B, 'intact wave', may be phonetically gradual or abrupt, but word classes are intact. Groups of individuals behave differently, using different dialects. In this model and the first, phonemes change. The whole word class involving a phoneme changes, either by unconditioned or conditioned process, resulting in complete change or phonemic split. The process may be categorical or variable; if variable, some group(s) of speakers would apply the rule with a certain, but increasing, frequency. Set C, 'uniform decomposition', and D, 'ordered decomposition', involve lexical diffusion. In C the change moves through the entire population at the same rate, but through the word class gradually. This means that social conditioning for variation is slight or nil (contrasting with B, where there is social but no lexical conditioning). In D 'word classes are decomposed in a given order, in an ordered wave passing through the population. Words form an implicational series. ' (p.108) If the sound changes in some items, it will change in others until the rule is no longer productive. In the variable submodels for C and D a rule applies to word classes with increasing frequency; in D this is different for different groups of speakers. It is worth noting that through rule loss or the effect of competing sound changes there can be residue. E, 'random decomposition', is ideolectal, lexically gradual change, 'the enemy to rational explanation' (p.109). In observed sound changes there is usually unordered decomposition within the smallest word classes but only there. Ordered decomposition is always found.

3.1.3. Lexical conditioning. Study of sound change in progress, using data from the vernacular or speech as close to the vernacular as it has been possible to obtain, shows neat allophonic distribution in phonological space and regular, gradual phonetic

change in time. Change is regular, but more in its outcome than at its inception (Labov 1972:23; Weinreich, Herzog, and Labov 1968:187). Investigators of sound change, both historical linguists and sociolinguists, have naturally looked for the working of phonological processes within the phonological level of language. Change is manifested, though, in different phonetic realizations within words and reassignment of words from one class to another class within the lexicon. The lexicon is a domain for investigation of sound change just as it is for an inquiry into synchronic phonemic inventory. Within phonological and lexical domains change may be found to be gradual or abrupt. An understanding of the interaction of phonological and lexical levels of structure in sound change is to be found in an examination of the process itself.

The neogrammarian doctrine that sound changes operate without exception has always been resisted by dialect geographers. Wang (1969:10-15) presents the four logical possibilities for the operation of sound change within a grammar: phonetic and lexical abruptness; phonetic abruptness and lexical gradualness; phonetic gradualness and lexical abruptness; phonetic and lexical gradualness. The first of these is observably wrong, the third the neogrammarian tenet. Of the second and the fourth, the lexical gradualist possibilities, Wang finds the second preferable because it posits that diffusion moves from morpheme to morpheme while the phonetic shape hold steady. Lexical inspection in a number of languages, Wang states, reveals sound change residue that is not explained by analogy, borrowing, or homonym avoidance, but which can be explained by lexical diffusion. The competition between phonological processes operating at the same time that are in bleeding or feeding relationships may keep change from reaching all relevant morphemes as the changes diffuse through the lexicon (pp.18-20). Incomplete sound change reveals the working of lexical conditioning.

Cheng and Wang (1972:99) follow up Wang's original argument that there is evidence for lexical gradualism with the stronger claim that until lexically abrupt changes are verified (and, Cheng and Wang assert, they are not), and since there is evidence for

lexically gradual changes, one must assume that lexical diffusion is the primary mechanism for implementing phonological change. Cheng and Wang (pp.101-111) discuss tone in Chinese. Reconstructed Middle Chinese tone III is reflected in the Chaó-sho:u dialect as tones 2b and 3b. Among items with historical voiced and sonorant initials there is a nearly even lexical split that is not phonetically conditioned and not explainable by borrowing. The unconditioned split is evidence for lexical diffusion.

Wang (1979) points to two difficulties with the neogrammarian stance: the isolation of language from its social context; and the assumption of phonetic gradualness in sound change (p.355). In this article Wang appears to be modifying his earlier position that lexical diffusion is the primary mechanism for implementing sound change. He states that of the two parameters of sound change—phonetic and lexical—the first has been the focus of almost all historical study. He asks what the relationship is between any particular type of sound change and the process of change itself, e.g. the interrelationships of vowel movement, phonetic change (whether gradual or abrupt) and lexical change (whether gradual or abrupt). He acknowledges: 'The neogrammarian conception of language change will probably continue to be part of the truth.' (p.369)

Pertinent to resolution of the contradiction is the notion of phonetic strength, introduced by Cheng and Wang (1972:111). A change with great phonetic strength, such as the nasalization of vowels before nasal consonants, is completed rapidly. Changes that are phonetically weak, like tone shift (and, Cheng and Wang suggest, perhaps vowel shift), proceed slowly and characteristically leave a large residue of unaffected words, as the rules retreat in the phonology, eventually becoming unproductive.

Diachronic linguistic study of completed sound changes made during the last two centuries and modern work on sound change in progress in American cities as well as in London, Birmingham, Norwich, Glasgow, and Belfast give evidence of phonetic regularity (Labov 1981:276). Both types of sound change process are found in Philadelphia. Labov reviews and interprets (pp.274-299) Payne's (1980) Philadelphia

neighborhood study and Labov, Yaeger, and Steiner's (1972) report on vowel changes in certain Northeastern cities. Regularity is found in changes involving vowel position changes, but tensing involving (æ) show evidence of past and present lexical diffusion as well. Labov claims (1981:296-305) the discrepency can be understood by distinguishing abstract phonological change—in which morphemes are redistributed from one abstract class into other abstract classes—from neogrammarian change—change in low level output rules. He suggests there is a hierarchy of abstractness that is relevant to the nature of the transition process, with vowel position changes near the bottom in English, and tensing and laxing near the top; at the top, change is abstract and subject to lexical diffusion. Shortenings and lengthenings are irregular because they are not sound changes 'in a literal sense' (p.299) but changes in membership in abstract classes of tense or lax vowels, involving switches in values for whole sets of features at once. Regular, phonetically gradual change is found within phonological subsystems, but lexical diffusion is most likely when change occurs across systems (e.g. of tense and lax vowels) or involves multiple changes in feature matrices (p.299).

Interacting with the tension between phonological and lexical control of sound change is the matter of word use frequency. Items in the lexicon heard more frequently may be subject of change either faster, or, on the other hand, slower than items used less frequently. Wang notes that 'In all cases of lexical diffusion, we find leaders and laggers among the words, which raises the issue of what determines these schedules.' (1979:364) He reports a study of change (Hopper 1977) in which more frequently used words carried the sound change first; but when cases of analogical change are considered, where it is certain there is lexical conditioning, the opposite is true. There are apparently contrasting tendencies between the two types of change. Wang asks whether the difference can be traced to differences in how changes are actuated (p.365).

Phillips (1984:336) hypothesizes that, for sound changes for which there is evidence of lexical diffusion, changes motivated by physiological factors affect the most

frequently used words first, acting on surface phonetic forms, while changes that are 'conceptually motivated' affect the least frequently used words first, acting on underlying forms. She further suggests that physiologically motivated changes effect restructuring of the lexicon much more slowly than non-physiologically motivated ones (p.337). Phillips is saying that either the less frequently used items or the more frequently used ones may be affected first in change involving lexical diffusion; the important correlation is not between item frequency and diffusion in change but between item frequency and type of sound change motivation (physiological or conceptual). She discusses changes affecting most frequently used words first, typically involving, she claims, vowel reduction (p.322), and changes affecting least frequently used words first, both change by analogy and ordinary sound change (p. 323).

Phillips's attention to the distinction between changes that affect surface forms and those that affect underlying forms parallels (but is not the same as) Labov's attention to the distinction between changes in low-level output rules and phonological changes. If, as Phillips says, surface sound changes are those that are physiologically motivated and affect the most frequently used words first, and changes acting on underlying forms are conceptually motivated and affect the least frequently used words first, is it also true, as Labov says, that sound changes affecting only output rules show neogrammarian regularity and occur within subsystems, and changes affecting the abstract structure show lexical diffusion and occur across systems? Although the two sets of claims seem compatible, Phillips argues that Labov is partly wrong. She challenges his objection to Wang's diffusion model, instancing sound changes such as the raising of OE /a/ to [o] before a nasal in West Saxon and Kent dialects, a physiologically motivated change involving the subsystem of back vowels. There is evidence of lexical diffusion in the change. This change reversed itself, and only the items *on* and *from* restructured (p.337). Her point is that lexical diffusion may be involved whether or not change happens across or within phonological subsystems, but physiologically motivated changes will begin by affecting the

most frequently used words (like *on* and *from)*, while non-physiologically motivated changes will begin with infrequently used lexical items.

In the set of nested controversies just reviewed, summarized in Table 3.1 below, attention has been directed to the possible roles of a hierarchy of phonological processes and to lexical item frequency.

claims about domain for control of sound change

which mechanism	**claimant**	**evidence**
lexical gradualism main mechanism for sound change; but phonetic regularity has some role.	Cheng, Wang	lexical residue from incomplete sound changes; more likely when change progresses slowly due to low phonetic strength.
phonetic gradualism main mechanism for sound change; but also there is lexical diffusion	Labov	observed sound changes in progress

claim about conditions under which regularity or lexical diffusion operates

conditions	**claimant**	**evidence**
regularity when low-level output rules working within *phonological sub-systems*; diffusion when more abstract changes involving two sub-systems	Labov	observations of changes in progress

claims regarding the interaction of word frequency and lexical diffusion

interaction	**claimant**	**evidence**
most frequently used words affected first, unless analogy	Wang	various historical studies
most frequently used words affected first if change physiologically motivated; least frequently used words affected first if change conceptually motivated	Phillips	various historical studies

Table 3.1. Summary of discussion of phonetic regularity versus lexical diffusion in sound change.

3.1.4. Picturing the sound change process. For any state of a language in which sound change is ongoing, certain of the theoretical problems stated above (transition, embedding, etc.) will be pertinent; the process of change may fit one of the models for

sound change; there may be interaction between phonetic and lexical conditioning. The character of the change while it is progressing can be ascertained only through evidence from the phonologies of individuals. The evidence can be obtained by eliciting speech or performing experiments in which the language state of the instant is directly or indirectly reflected. Variation in one person's speech, and variation across speakers—including across speakers of different ages—can be observed.

Comparison across speakers may indicate that some are more advanced in the sound change than others. Numbers and pictures provide this information. Vowel charts or graphs of some kind may show, for instance, that some speakers have more diffuse distributions of tokens of a variable than others. If the more compact distributions represent conservative speech and the more diffuse show variation between more and less conservative realizations of phones, the charts or graphs have captured a stage of sound change at which the movement has assumed direction, but realization in a new area of vowel space is not yet prevalent. In another change graphics may show that complementarity has been effected. A variable representing phones under some conditioning may be found to distribute completely separately from phones of the same distinctive sound for certain informants. Or the allophonic distribution may be found to be compromised by the intrusion of phones in other environments, but only some instances of these, consistently, in the same words. This is evidence for lexical conditioning which, in such a case, may allow argument for phonemic split. That is, if the separate distributions of variables corresponding to one historical vowel cannot be accounted for by phonetic conditioning, split can be said to have occurred.

Whereas historical linguistics has traditionally studied successive language states, viewing these as the results of change rather than as temporal points in continually modified systems, modern sociolinguistic work allows the view that diachronic phonological processes are the same stuff as synchronic processes; and they are interesting when they do not bring about restructuring as well as when they do. Over time subphonemic structures

change. In sound change in progress investigations it is possible to accurately picture the structural changes when the most sonorant sounds are involved, since spectrograms of these can be made and formant frequencies measured. Therefore the subphonemic changes in the processes of vowel shifts and mergers can be best known and described. Subphonemic movements trace particular paths through vowel space. The concept of a marginally maintained distinction and the sociolinguistic work that has been done on merger will be dealt with in the following two subsections. The vowel movement producing the marginal phoneme will be discussed in greater detail in section 3.2.

3.1.4.1. The marginal phoneme. In the Northern Cities Chain Shift (æ) is being raised in communities from New York to Baltimore and west to Chicago; in New York the raising takes place before voiced stops, voiceless fricatives, and nonvelar nasals (Labov 1973:134-139). In communities in which tensing occurs under the most complex conditions nasals presently condition the fronting and raising more strongly than voiceless fricatives, which condition the change more strongly than voiced stops. (There is some variation for this relative weighting.) In Philadelphia a collection of tense phones noted as (æh) is completely phonetically separate from lax (æ) in the current phonology. There are, however, some disruptions to the pattern of phonetic conditioning. (æh) before nasals in strong verbs like *ran, began* are not tense; (æh) before voiced stops in *mad, bad,* and *glad* are tense, although in other words the vowels in the same position are relatively lax (Labov 1981:286). There are a few other lexical exceptions to the phoneticaly controlled pattern.

Tense (æh)—or /æh/— exemplifies a marginal phonemic split. Tensing is almost, but not quite, predictable by phonetic conditioning. Split is declared first because the difference between the distributions of variables (æ) and (æh) cannot quite be described as allophonic; also, it is difficult for children who have moved to Philadelphia from out of state to acquire the correct distinction, separating words into the proper classes, and to discriminate the lax from tense classes when tested (Payne 1980; Labov 1981). Labov considers marginal distinctions in a widely circulated dittoed paper, *The significance of*

marginal phonemes. He discusses the northeastern (æh) case and others. In nonvariationist generative linguistics procedure and formalism are distanced, through dependence on binary contrasts, from the concept of intrinsic variation (p.3). There is no place in the grammatical theory for cases where a simple yes or no—for the presence of a feature, for categorical status for a phonological element—does not tell the structural truth. Marginal cases for these elements, however, are natural within a system of categories responsibly applied to actual linguistic behavior. In phonological fact, '[c]ategories are so constructed that marginal cases can be expected and accounted for; ...the close investigation of marginal cases will reveal a great deal about the over-all structure of the system without removing their marginal character.' (p.2)

3.1.4.2. Merger. Labov (in press) formulates two principles for mergers:

> mergers expand at the expense of distinctions;
> mergers initiate pull shifts and inhibit push shifts.

The first principle refers to geographical expansion. It is known that an area in which a merger has taken place will progressively intrude into an area where a distinction is maintained (Labov in press:39, citing Herzog 1965). The second principle refers to the part mergers play in dynamics of a system, given the conflicting tendencies toward expansion and contraction of the actual distribution of allophones of a phoneme. On the one hand vowel phones together maintain a certain a range in vowel space; on the other the peripheral area of that range separates a phoneme's realization from some other phoneme's realization. A merger produces a wider marginal area between two distinct vowels, allowing the second to expand into the larger 'margin of security' (Martinet 1955); a pull chain shift is underway. Another kind of change may make for a decreased peripheral area between two distinct vowels, so that the second vowel has a smaller range in vowel space and may expand in another direction; a push chain has been initiated. If the phonetic distribution for a vowel resulting from a merger is greater than the range of either of two distinct vowels before merger, as is most likely, then the maginal area will also be greater

than it was for either vowel before merger. In this way merger maintains new distinctions, in the newly configured vowel inventory, more securely than old distinctions were maintained in the former inventory. A greater peripheral area—the greater margin of security—allows expansion of neighboring vowels. Mergers encourage pull shifts. Labov claims that while mergers and pull chains are mutually feeding, mergers and push chains are mutually bleeding. Push chain shifts and mergers are alternative responses to narrowed margins of security for distinctiveness (p.40). In mergers, distinctiveness is given up. In push shifts it is maintained by movement away from a narrow peripheral area in vowel space.

3.1.4.2.1. Near mergers. In sociolinguistic literature reported mergers in several varieties of English have been examined, in order to address a number of methodological and theoretical matters, including the use of findings of sound change in progress studies to aid historical investigations, the issue of sound change actuation, and the question of what speaker-hearer unconscious knowledge is. Discussions have been almost entirely of reported but only apparent mergers, that is, mergers that have been falsely reported as completed.[1] These are near mergers, in that there is very close phonetic correspondence between realizations for one and the other historical vowels, and in that each apparent merger represents a stage of progress toward merger (sometimes maintained for a very long time) that is near completion. The *perception* that the mergers have taken place is quite real for many speakers of the dialect and for outsiders. There is a discrepancy between production and perception in each case. Almost all the near mergers involve phonemes with back vowel nuclei. It seems that back vowel space, where crowding of distinct vowels is most likely to occur, is the likely territory for apparent partial and complete mergers. In this packed area phonetic distinctions are often minimally maintained but perception of distinction is lost.

Mergers involving (ɔ) have been falsely reported for White English varieties in NYC and mid-Pennsylvania. In his investigation of the social stratification of White

English in NYC Labov found raising of (ɔ) across environments (1966:539-543). Native New Yorkers who are r-less report that they pronounce *sauce* and *source, law,* and *lore,* the same. Spectrograms show, however, that the nucleus of the vowel in *source* and *lore* is higher and/or backer than the nucleus in the other items (Labov, Yaeger, and Steiner 1972:230-231). An earlier merger of /ɔr/ and /or/ occurred, leaving *mourning* and *morning, hoarse* and *horse, four* and *for* no longer minimal pairs but homophones. The raising of /ɔ/ in New York City has not brought this phoneme back together with its lost allophone, /ɔr/ (p.230). Historical /or/ and historical /ɔr/ are the phonetically the same; but /ɔ/ with and without an underlying postvocalic /r/ are not the same. Level of formality is a factor. Speakers are more likely to maintain F1 distinctions (that is, maintain different vowel heights) between the vowels in words like *law* and *lore* in less formal speech. In a minimal pair test the F1 of *source* was lowered to that of *sauce*. In the context of this test, which encourages the speaker to pay a great deal of attention to the question of distinction, the vowels were both judged the same and made the same in height; the difference in backness, however, was maintained (pp.231-232). The test did not reflect the phonological rules used by the speaker, who corrects in the direction of merger.

Labov, Yaeger and Steiner state (p.235) that '[o]ne of the most active sound changes taking place in the United States is the unconditioned merger of short ǫ and long open ǫ in *hock* and *hawk, Don* and *dawn, cot* and *caught.*' The eastern expansion of the merger from Western Pennsylvania to the center of the state has resulted in native speaker judgments of 'sameness' for items in which the vowels are still pronounced differently. The items with etymolgical /ɔ/ have vowels higher and more peripheral than items with /a/ (pp.235-236). An elderly man who maintained a clear distinction in his speech reported *caught* and *cot* as the same for him, perhaps correcting in very careful speech and *in his perception* to the merger of younger people in his area with higher prestige (p.235).

Similarly, the apparent partial merger of /ʊ/ and /u/ before syllable-final /l/ in the Southwest—Salt Lake City and Albuquerque—is reported to have taken place although

phonetic distinction is maintained by many speakers in casual speech. In Albuquerque some speakers who pronounced pairs like *fool* and *full* the same when reading a minimal pair list produced a distinction reflected in F1 and F2 measurements in less careful speech (p.238). In a commutation test listeners who were Easterners had more difficulty than New Mexicans in correctly identifying the items that an Albuquerque speaker produced (p.240). Labov, Yaeger and Steiner suggest that the merger is still in progress and that some members of the speech community have begun to disregard distinctions which they can no longer rely on to distinguish words, since the real acoustic differences, in terms of F1 and F2 frequencies, are very slight (p.241).

In Salt Lake City the inventory of distinctions prelaterally has been greatly reduced through merger for both front and back vowels. The merger most general for the speech community is of /ʊl/ and /ul/ (p.236). Faber has found (1988) that speakers who did not seem to make the tense/lax vowel distinction in their own speech could distinguish a difference in the speech of others. This is the opposite of perception/production discrepencies found in other studies. Further investigation revealed that a distinction was being made in speech. Although F1 and F2 for /ʊ/ and/u/, and for other relevant vowel pairs, was virtually the same, there was a difference in the amplitude of the fundamental frequencies of the vowels in comparison with the strongest harmonics of their first formants (DiPaulo, Faber, and McRoberts 1989, n.d.; Faber n.d.). Specifically, the historically more peripheral vowels—the tense vowels—have more prominent first harmonics (Faber n.d.); the fundamental frequencies of the more peripheral vowels have greater amplitudes, when compared with the amplitudes of the strongest harmonics of F1, than the paired lax vowels do. This means that the laryngeal constriction is different in the articulations of the paired vowels. Such a cue to vowel quality does not show up at all, of course, in regular measurements of F1 and F2. First and second formant frequencies are the usual main cues for vowel height and backness. The amplitude of F0 is not usually noted in spectrogram readings.

The most frequently paraded example of apparent merger in English in the Labovian literature is the *line–loin* merger in Essex, England (see Labov, Yaeger, and Steiner 1972; Nunberg and Labov 1972; Nunberg 1980); the label stands for the coalescence of /oy/ and /ay/. It is interesting because of its association with an apparent reversal of the same merger in other areas of the country. Orton and Dieth (1970) report complete coalescence of /oy/ and /ay/ in Essex County, reflecting a wider-spread reported merger of the seventeenth and eighteenth centuries (Labov, Yaeger, and Steiner 1972:247). Spectrograms showed that /oy/ was actually more peripheral than /ay/ in the interview style speech of Essex informants. Some of the same speakers judged pairs like *loin* and *line, voice* and *vice* as homophonous (p.248-50).

3.1.4.2.2. Reversal of merger. Cases of apparent reversal of merger have been reinterpreted in light of the above observations of current changes in progress. A famous example is the supposed reversal of the *loin-line* merger in some varieties of British English, reconsidered by Nunberg and Labov (Nunberg and Labov 1972; Nunberg 1980).[2] Several hundred years ago an allophone of /oy/ fell on a track peripheral but parallel to a track on which /ay/ was rising. As shown in Figure 3.2, for a time, in several dialects, the area of confusability, a moat-like territory in vowel space surrounding the area of production for /oy/, overlapped with the areas of production for /ay/ and vice versa. Due to this overlap, recategorization took place, resulting in classification of the two historically distinct vowels as one in the phonology of many speakers in that period. However, the subsequent backing of the whole of historical /oy/ in most affected varieties reversed the recategorization (Nunberg 1980: 230-240).

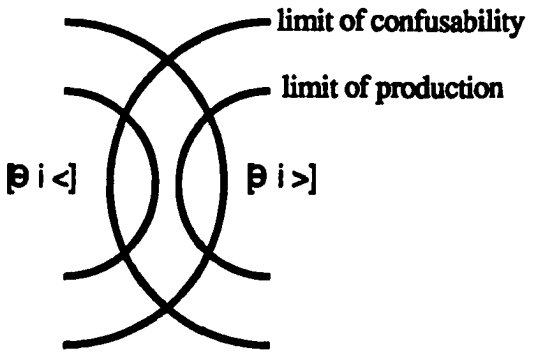

Figure 3.2. Intrusion of the area of confusability for /oy/ into the area of production for /ay/ and vice versa during an eighteenth-century reported merger in British English. (after Nunberg 1980)

Nunberg presents a model for 'reversal of merger' (pp.227-230). It contains a model for apparent merger. He distinguishes between a smaller area—'the constant probability/error contour for tokens of vocalic nuclei of a given word class' (p.227)—and a larger surrounding area of vowel space in which vowel phones, if they occur, could be understood as belonging to the phoneme delimited by the smaller area. Nunberg regards the parameter of the first as the 'limit of production' and the parameter of the second as the 'limit of confusability.' If the range of a phoneme is close to the range of another, that is, if there is a small margin of security for each, the area of confusability of each one will intrude into the area of production of the other. (Refer to Figure 3.2.) This state of affairs may come about because the phonemes are undergoing phonetic processes of raising or lowering, fronting or backing, that is, movements that one would observe in apparent time by measuring F1 and F2 frequencies. Perhaps 'two word classes...pass close by each other on parallel tracks' (p.230), each keeping the integrity of allophonic sets. Over time the distributions of one or several allophones of one distinct vowel may move close enough to distributions of the other phoneme to cause overlap of the area of confusability of each with the area of production of the other. The areas of production, however, would not merge. In the course of the vowel movements reseparation could occur. Nunberg suggests this is just what happened in the *loin-line* case. Both /oy/ and /ay/ were lowering. The allophonic set of /oy/ that was [ʌ>y], with a lax nucleus, fell along a more central

path than the set [oy] did. For a time there was confusion for many speaker-hearers about the distinction between /oy/ and /ay/. When [ʌ>y] followed original [oy] back to [ɔy], the confusion ended in varieties now having a categorical distinction.

In all cases of near merger examined, present and past, there is a discrepancy between speaker production and hearer perception. It is truer to say there is a discrepancy between production and speaker-hearer phonemic knowledge. In the present day cases there is spectrographic evidence, in formant frequency differences or, in the Utah case, in harmonic amplitude differences, that the vowel qualities of the two members of the supposedly merged pair do not really match. Either the phones do not have the same height and/or backness, or they are not produced with the same laryngeal constriction. About the *meat-mate* apparent merger, Labov states that 'many speakers heard *meat* and *mate* as the same. That does not mean that they were the same. It does mean that they were in close approximation, and could not be relied on—for a time—to distinguish words....We must reject the principle of Bloomfield that there is no such thing as a small difference in sound....Native speakers hear these as small differences—if they hear them at all—and react to them as small differences....[T]he set of phonemic categories does not exhaust the set of distinctions in the phonological system.' (1974:307)

The phonemic categories can be maintained over long periods of time in spite of the close approximation of phonetic realizations. Clearly, sensitivity to very subtle acoustic cues to vowel distinction must be acquired by one, two, or many generations of speakers. Faber (n.d.) speculates that there is a critical age for acquisition of certain sensitivities, and further assumes that speakers differ in linguistically relevant motor abilities. If this is so, then in a situation of apparent merger one can expect some speakers to produce the subtle distinction better and some hearers to perceive it better than others. This is just what has been observed.

The well-known unreliability of speaker reports of difference in pronunciation, e.g. between *prints* and *prince*, apparently has another side to it; the unreliability of speaker

reports of sameness (Nunberg 1980:226). Speakers can produce differences that they can not hear. 'or at least are not aware of hearing.' (p.226, quoting Labov). The classical concept of a phoneme as a collection of allophones together distinguishing one word class from another in the lexicon is limited. The psychological reality of a phoneme apparently entails unconscious knowledge of how to realize all the allophones that can conflict with other knowledge of what the distinctive sound's range is. A speaker can maintain an unconscious phonemic distinction that can not easily be brought to consciousness and that can be transmitted generation to generation.

A number of matters relevant to phonology and diachronic linguistics present themselves when one looks closely at apparent mergers. Questions about speaker and hearer roles, the psychological reality of vowel distinctions, the paths of vowel movements on vowel space, the interaction of separate processes over time, and the age, social identity, and sensitivity to acoustic cues of the individual are involved.

3.1.5. Rules: accounting for observed processes. Labovian sociolinguistics argues for 'an extension of the notion of rule to include orderly differentiation over a range of linguistic environments'. (Labov 1973:103). Observable linguistic processes or their results should be codable in formal statements. The development of variationist theory has included an attempt at development of an adequate formalism. In *Contraction, deletion, and inherent variability of the English copula* (Labov 1969) the purpose of the new formalism is made explicit: to join the methods of generative grammar and phonology and the techniques of quantitative analysis of systematic variation (p.715).

The structural description and structural change components of the phonological rules coded in this new way have been unlike categorical or optional rules. First of all, social factors have been included in the conditioning in some way. The variable rule notation reflects most of all the sociolinguistic claim that variability is inherent in the

grammar, which is grammar for an orderly heterogeneous community. The rules are based on community behavior. They are rules of community grammar.

Also, the statements have included ordered constraints; that is, the environments involved in the conditioning are ordered in relation to each other, reflecting the claim that, variably, some are more favorable to rule application than others. Individuals' phonologies reflect the probabilities involved in variation. The formalism involves not only rules with weighted social and linguistic constraints with conditions of variables, but also probabilities for constraint influence and rule application determined from observation of variation in a community.[3] Over time the order of the constraints can change.

In Labov's first formulation of variable rules (1969) rule application is governed by the two factors of the frequency of the input variable (an ideolectal constraint) and frequencies of linguistic and social feature constraints (the variable constraints) (p.733). He presents and illustrates the postulate of geometric ordering of the weighted constraints; each constraint in the hierarchy outweighs the effects of all constraints below it (pp.740-749). This geometric ordering happens to be auxiliary to the math involved in the rule writing.[4]

Throughout the 1970s there was excitement among variationists about the new, variable rule formalism. Bailey and Shuy (1973: xi) called the rules as 'an epochal breakthrough for nonstatic models of linguistic description'. The notation itself is no longer in favor. Variable rules are regarded as a failed attempt. They have presented, however, a clear challenge to the extreme dichotomy of competence and performance that underlies (nonsociolinguistic) generativist linguistics. Rule formulation based on observed frequencies has provided a way to talk about relative favoring of rule application.

3.1.6. Social and stylistic correlates. Observation of different 'speech styles' (an expression used to refer to the degree of formality, or carefulness, or self-consciousness in speech) allows association between linguistic observations and certain facts of social identity. The factors considered in Labovian work have been age, class (that

is, socio-economic status (SES) index), sex, race and ethnicity, urbanness, and membership in a social network. Sex and class of speaker have been used together to interpret style shifting.

From the beginning sociolinguistic investigation of sound change in progress has relied on variance analysis more than contrastive analysis in determining what categorical distinctions there are in a given language variety and how these change (1966:520-524). In any investigation of phonemic inventory variance analysis relies on distribution of tokens of a variable. Impressionistic transcriptions or instrumentally determined measurements of sound from conversational speech are used; vowel charts are plotted for individuals and then compared. Speech from individuals in different age groups allow observation of change through 'apparent time' (1972:163).

Contrastive analysis relies on apparent differences between lexical items to establish distinctions. This type of analysis, with history in both structural linguistics and (particularly American) dialectology, has gathered data through elicitations of careful speech styles—in narratives, word lists, minimal pair lists. Distinctions established in this way, and inventories constructed from them, have been regarded in sociolinguistics as unreliable accounts of the phonology of a language variety. It has been observed that the fine phonetic conditioning found in less formal speech is not reliably found in more formal speech. This observation underlies the claim that the more the attention of an informant is drawn to speech, the less clear and consistent the patterning is (Labov 1972:79-87).

Labov ranges speech styles along a continuum, measured by the amount of attention paid to speech, or by of degree of formality (Labov, 1970:46). Labov isolates (1972: 77-85) style contexts A through D':—casual speech, careful speech, reading style, word list style, and speech used for reading minimal pair lists. The least formal level, the one in which minimum attention is given to self audio-monitoring, is 'the vernacular'. This speech is the 'most systematic' speech, Labov states, since overt social correction is extremely irregular (1972:208). This is the phonemic level of speech (1966:523). At this

least formal level linguistic relationships determining the course of language evolution can be seen most clearly.[5]

Reading, word list, and minimal pair list 'styles' are elicited in a formal portion of a sociolinguistic interview or at some other time. Of these. the use of a minimal pair list more directs attention to distinctions; directly asking an informant whether one vowel sound seems the same or different from another is just a little more overt an inquiry about contrast. Formal speech elicitation calls forth conscious or almost conscious categorization. Style shifting is characterized by changes in the values of the variants of certain linguistic forms. Besides variation across formality levels, some forms show variation mainly across socioeconomic class. As the context increases in formality, the value changes for the standard variant of a variable.

The importance early Labovian theory attributed to the mechanism of hypercorrection from above, discovered through observation and description of style shifting, resulted directly in a particular emphasis on a speech community's reference to standard language variants. It is seen that while lower class speakers use nonstandard forms more frequently than speakers of higher classes across formality levels, speakers of all status groups use nonstandard forms in casual speech more frequently than in formal speech, and standard forms more frequently in formal speech than in casual speech. Standard speech is associated with formality as well as high status, and nonstandard speech with informality as well as lower status. In a number of cases women of different classes correct toward the standard more than men, and lower middle class women correct beyond the standard. A contrasting behavior is also observed. In some cases women use nonstandard forms that are innovative variants involved in change more frequently than men of their own socioeconomic status group, in casual speech. Lower middle class women are found to use these variants more frequently than female or male speakers of the class below them.[6]

3.2. American English vowels. Outside of LAUS dialectology there were inquiries about the vowel pronunciation and vowel systems of urban American English speakers before modern variationist work, for instance Babbitt's (1896), and much later Trager's (1930, 1940), and Hubbell's (1950) studies of urban speaker vowels. Sociolinguistic investigation began with *Labov's Social Stratification of English in New York City* (1966), involving seven variables, including four vowels: (ay), (aw), (æh), and (oh) (long open o). (See Appendix E.) Labov and colleagues have been engaged in the study of English vowel systems principally in US cities for about three decades, accumulating observations, interpreting the data, building theory. Of particular importance has been the Labov, Yaeger, and Steiner report (1972) to the National Science Foundation. This is a variationist study of sound change in progress in varieties of American (and some British) English, detailing findings from numerous cities—some based on substantial material, some on more scanty data. From results concerning chain shifting Labov, Yaeger, and Steiner have abstracted patterns of vowel rotations and presented principles governing these. The LYS report reflects the fact that sociolinguistic observations have been most fully carried out in certain large cities, like New York City, Philadelphia, Detroit, Chicago, Buffalo. Labov and his associates have also worked in England. Work by Trudgill, Leslie Milroy, James Milroy and others in Britain represents a parallel variationist school. The British and American sociolinguists collected and sorted through enough material by the early 1980s for Labov (in press) to decide to make descriptive claims about vowel movements in different Englishes, dividing all English into three parts.

Labov distinguishes English varieties not geographically but by linguistic processes, specifically by vowel movements. He claims that three types of phonetic change, ranked by their 'relative magnitudes of effect', account for the present differences among vowel systems of American White English: chain shifting, mergers, and shifts of syllabicity (in press:5). The three dialects of English are defined by ongoing system changes involving chain shifting and merger. For the Northern Cities Shift, the Southern

Shift, and the Third Dialect of English the low front and back areas of vowel space are where dialect-characterizing differences are found. There are two 'pivot points' (p.16), the low front area of historical /æ/ and the low back area of historical /ɔ/. In the vowel rotation of the Northern Cities Shift the shift 'pivots' around these points. In the other two dialects /æ/ remains in place, according to Labov, but the vowel in *caught* either rises, in the Southern Shift, or lowers and fronts, merging with /a/, in the Third Dialect.

LYS's comprehensive report deals extensively with principles and patterns of chain shifting as observed in current movements and as reconstructed for historical shifts. Principles for chain shifting are presented, defended, and their implications for phonological and historical linguistic theory explored in this work and in Labov's *Three dialects of English.*

All vowel movements take place within a phonological space of a certain shape. For chain shifting the concept of that shape is particularly relevant since multiple movements are more likely than single movements either to be constrained by vowel space peripheries or to find room for expansion in more open areas. Labov, Yaeger, and Steiner state that 'the space appears to be typically convex, with outer envelopes curved outward....The movements of the long or tense vowels upward appear to follow the contour of the outer envelope....The most important fact about this space is the existence of an inner and outer path for both front and back vowels' (p.259). That is, peripheral vowels move along outward curving paths of the convex space. Less peripheral vowels may follow routes that, drawn on a plane, appear to curve in toward the center of the space. From sound change in progress observations LYS abstract (pp.109-110; Fig. 4-1) four patterns of chain shifting and, given these, plot eighteen possible routes for shifting across sub-systems, involving both front and back vowels.[7]

The first two of the three principles of chain shifting have been formulated in two ways: in terms of tense/long vowels and lax/short vowels; and in terms of peripheral and non-peripheral vowel nuclei. (Labov, Yaeger, and Steiner:106-7; Labov in press:7-8). The

second way, a reformulation regarded by the authors as better because of the apparent significance of peripherality to movement in a convex vowel space, is as follows:

In chain shifts,
1. peripheral nuclei rise;
2. non-peripheral nuclei fall;
3. back vowels move to the front.

Peripherality, defined relative to any particular system (Labov in press:14), tends to correlate highly with increased vowel length and tongue root retraction (or increased muscular tension during articulation). Vowel length and tongue root retraction are each relative themselves, and so more peripheral, longer, tenser vowels tend to be paired with allophones or other phonemes that are less peripheral, shorter, and laxer; the contrasts, that is, whether phonemic or subphonemic, are systematic; peripherality, length, and tenseness are phonetic correlates of a phonological truth of contrast.

3.2.1. The Third Dialect of English (or, the Low Back Merger). This is the lect of speakers who are not participating in the Northern Cities Shift or the Southern Shift. Labov's dialect scheme, based on the processes both of vowel rotation and merger, gives prominent place to the action of chain shifting, probably because the Philadelphia-centered American variationist work has been done mainly in Northern cities. A consequence of this emphasis is that an American English variety that is not experiencing vowel shift is defined negatively. Labov speaks of the 'stability of the Third Dialect', noting that, 'Neither the Northern Cities Shift nor the Southern Shift appears to operate noticeably in the third dialect areas.... there are no sweeping rotations of the entire system' (in press:45). The Northeastern cities' rotation turns on the pivot vowel points, of which /æ/ is the more established. This important vowel space area, from which there has been vowel movement and tensing in the eastern rotation, even to phonemic split, is an area of little activity in the Third Dialect, according to Labov. 'The original low front /æ/ remains in place, at least in part', undergoing tensing only in favored phonetic environments, such as before nasal consonants (p.42).

The Third Dialect, or the Low Back Merger, is also defined positively, however, by the process of vowel merger. The second pivot point for vowel rotation, /ɔ/, is not involved in chain shifting here. The historical vowel is falling and fronting to merge with /a/, which remains mainly in place because /æ/ does. The Martinet notions of margin of security and economy are pertinent. Either /a/ does not front and so /æ/ as a whole is not nudged fronter and higher in order to maintain distinction; or /æ/ does not tense and so /a/ cannot front. The second possibility describes the beginning of a drag chain, which is how Labov, Yaeger, and Steiner view the Northeastern rotation. With stability of both /æ/ and /a/, if /ɔ/ moved down and front merger would be hard to avoid.

Where are the speakers of this dialect found? Although not geographicaly defined, the three dialects correspond roughly to traditional dialect divisions, as mentioned in the preceding chapter. Eastern New England (or Southeastern New England) and Western Pennsylvania (or the Upper Ohio Valley) are subregions of Kurath's (1949) North region in which a merger of /a/ and /ɔ/ is found. Labov speaks of 'an assembly of speech communities is Canada and the United States where conditions [of stable /æ/ and merged /a/ and /ɔ/] prevail' (Labov in press: 42) The phenomenon is mainly western. The LAPC survey documented different degrees of merger in different localities. Merger has been completed more in rural areas than cities, especially on the Pacific Coast. A telephone survey of long distance operators, conducted in the late 1960s, used the items *cot, hock* and *caught, hawk* to determine whether or not an operator recognized and produced a distinction (p.59) Based on this Labov provides a map showing communities in which he claims there is merger or variation including merger scatter-shot all over the Midwest and Far West.

It is not clear, however, that this western merger process is historically associated with the mergers effected long ago in Boston and Pittsburgh; or that the mergers have all processed in the same way (Herold 1990 makes this point). While defining dialects by vowel change process rather than geography, Labov does not seem to intend to lump

historically unrelated processes together by type, at least not in consideration of movement of historical /æ/. He sees /æ/ tensings in various localities as the common behavior, within a vowel system inherited in common, of allophones of current /æ/, which is partly a residue of the English Vowel Shift (in press:16; also Labov, Yaeger, and Steiner:1972:47). It is not clear that the merger of /a/ and /ɔ/, in Eastern New England and on the Pacific Coast but *not* everywhere in between, can be treated in the same way. Further, the eastern /a/ and /ɔ/ mergers are older processes. Herold (1990) regards merger spread from west to east in Pennsylvania as a completed process in many communities. In the American English of the Far West the process is necessarily newer for whole speech communities there. Its establishment in the White community of San Francisco is quite recent, as will be shown. It is proper to ask whether or not the merger is completed in any particular community, and to try to trace the process through stages if it is ongoing.

3.2.2. The Southern Shift. In this dialect, as in the Third Dialect, /æ/ remains in place. In the front of vowel space historically short, lax vowels rise peripherally, becoming tense, while the historically tense diphthongs fall centrally. /ɔ/ and /a/ remain distinct, and /ɔ/ becomes higher and more peripheral. Additionally, in the back, the diphthongs front. The nuclei of /ay/ and /aw/ become peripheral, shifting even further away from their respective glides than they have been in American English. This dialect, then, is characterized by two shifts, one in front, involving two subsystems, and one in back, where the fronting of the nonlow tense vowels is associated with the peripheral raising of /ɔ/. The three main chain-shifting principles are exemplified in the Southern Shift. Formulation of the principles depends in part on observations of this shift, of course. Nucleus-glide differentiation is also seen.

The Third Dialect of English is a North American variety, because it is here that the merger of /a/ and /ɔ/ occurs. For the other two, dialects areas outside the continent are involved. Labov claims (in press: 30) that the conditions of stable /æ/ and distinct (usually) rising /ɔ/ hold for the Upper and Lower South of the US (and into Texas), but also for lects

in Southern England, Australia, New Zealand, and South Africa. Again the question of definition of dialect by process type or historical identity of process arises. Here Labov does seem to characterize the dialect by process type: 'The dialects of these areas have traditionally been considered quite different from each other. Nevertheless, they are all dominated by a *similar pattern* of chain shifting.' (pp.30-31) (emphasis mine)

The Northern Cities Shift and the Southern Shift seem to join as a dialect continuum, which has always been understood in geographic terms. Labov and others (Labov, Yaeger, and Steiner 1972, Labov 1981, in press; Payne 1980) have noted that some Middle Atlantic cities, ones within the dialectology subregions of the North, in particular New York City and Philadelphia, have White dialects demonstrating some of the same processes as the Southern Shift. For part of the NYC population /ɔ/ rises; in NYC and Philadelphia the tensing of /æ/ as (æh) has been more phonetically restricted than in other large northern cities, so a part of /æ/ remains in place. Also, the tensing of /æ/ under some conditions is found in Southern Shift areas.

3.2.3. The Northern Shift. The Low Back Merger is positively defined by the coalescence of /ɔ/ with /a/, the Southern Shift is characterized by /ɔ/ raising among other movements; for neither of these varieties is there much change involving /æ/. The Northern Cities Shift is defined by a rotation in which /æ/ occupies a pivotal position. Movement at this pivot point is the best documented vowel activity in American English, having been described by Babbitt, Trager and others before Labovian sound change in progress work, and having been observed by sociolinguists in various Eastern cities in the last few decades. Buffalo, Chicago, Cleveland, Detroit, New York City, Philadelphia, Rochester, and Syracuse are the large cities in which the rotation has been studied and /æ/ tensing found advanced (Labov, Yaeger, and Steiner 1972:2). The vowel changes of the Northern Cities Shift are found 'across an area extending westward from the White Mountains, covering western New England, New York State, the Northern Tier of counties in Pennsylvania, northern Ohio, Indiana, and Illinois, Michigan, Wisconsin, and a

less well defined area extending westward.' (Labov in press:21) Data have also been gathered from a number of British cities, including Liverpool and Glasgow (p.13).

There are older and newer stages in the rotation, illustrated in Figure 3.3. /æ/ raising, /a/ fronting, and /ɔ/ lowering have preceded /ɪ/ lowering, /ɛ/ lowering and backing, and /ʌ/ backing (Labov in press:20-23). There are several shifts of subsystem in the rotation. /æ/ tensing happens in accordance with principle 1. The falling and laxing of /ɔ/ is in accordance with principle 2. The movement of /æ/ pulls /a/ forward, that is, encourages expansion into an enlarged margin of security. Although little lexical conditioning is involved in the rotation, items *got* and *not* are typically advanced in (a) fronting (p.23; for Buffalo, Labov 1981:279). The forward movement of /a/ allows the lowering of /ɔ/ without loss of distinction. There is little correction toward conservative values for these vowels in formal speech; the new positions are established and unstigmatized (Labov, Yaeger, and Steiner 1972:92). The newer movements are front to back shifts, and therefore contrary to principle 3 for chain shifting. Commonly (ɛ) lowers toward the former position of /æ/, on an inside (not peripheral) track, but in Detroit (ɛ) is also backing (Eckert 1978; Labov in press).

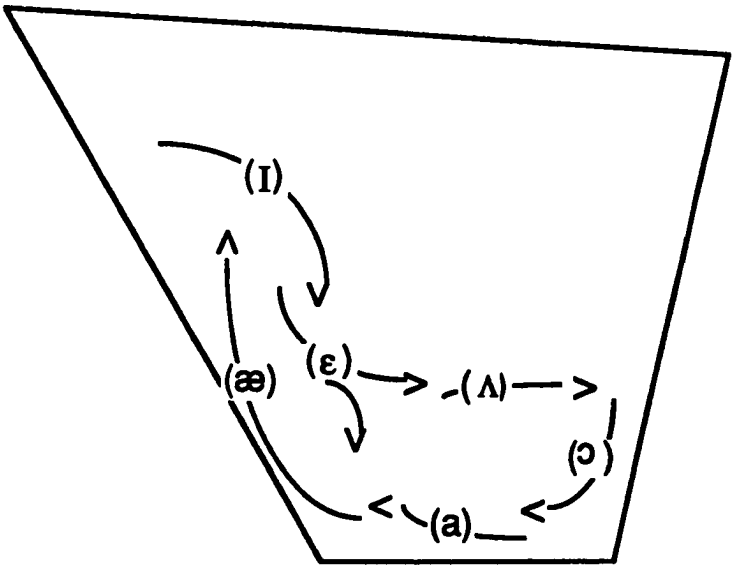

Figure 3.3. The Northern Cities vowel rotation.

Although Labov regards the Third Dialect as the most stable dialect it is in the Northern Cities Shift that loss or gain of distinctions for a system is avoided by position shifts in a complete loop. 'One of the most important features of the Northern Cities Shift is the absence of change.' (p.25) There is phonetic conditioning, differing somewhat from city to city, under which /æ/ tenses before nasal consonants and obstruents, /a/ and /ɔ/ front and lower depending on the manner and place of the following consonant, and so on.

There is some activity outside the rotation. (ɔr), representing the distribution of phones from historical /ɔr/, in *for, morning,* and /or/, in *four, mourning,* is undergoing raising (Labov 1981:276). Some fronting of /u/ has been noted, involving monophthongization (Labov in press:25).

In the Northern Cities Shift the tensing of /æ/ has been examined in the greatest detail. New York City and Philadelphia, although well studied, are exceptional cities and are discussed separately below. In these the fronting and raising of /æ/ is more constrained than in more northern and inland cities. In northern cities such as Buffalo, Detroit, and Rochester the shift of /æ/ conforms to the Intact Wave model (Labov 1973:160), set B in

Figure 3.1. All of historical /æ/, some of which has also fronted, rises variably as (æ) (Labov, Yaeger, and Steiner 1972:75). Because (æ) shifts as a whole, (a) can move forward (p.123).

The lexical subset with the vowel before nonvelar nasals shows the most fronting and raising, although originally the vowel in this position was lowest. (In Buffalo and Chicago the vowel is tensed before the velar nasal as well for the youngest informants (p.71)). /æ/ followed by voiceless fricatives or voiced stops form two other major distributional subsets. Nasality, sonorance, and voicing determine the degree of tensing. There is variation for relative favoring for tensing. In Buffalo (æ) before nasals shows more tensing than (æ) before voiceless fricatives, which distribute ahead of (æ) before voiced stops (Labov in press: 20); but in Detroit voiceless fricatives do not condition tensing as strongly as voiced stops (Labov, Yaeger, and Steiner 1972:88). Conditioning by place of articulation interacts with conditioning by manner. Palatal and alveolar following consonants favor raising and fronting, in general, but there is variation (pp.77,83). Morpheme boundary following the conditioning consonant is favorable for movement as well. Both following and preceding liquids impede fronting and raising (Labov in press:20).

Labov, Yaeger, and Steiner (1972:62-73) understand the variation in degree of raising and fronting for the continuant and noncontinuant obstruent environment distributions to reflect different stages in the sound change process. In Buffalo, Cleveland, Chicago, etc. one can locate a person's stage by finding the relationships among nasal, fricative, and stop environment distributions. One can observe a progression from the oldest speakers interviewed, to middle-aged speakers, to young speakers, with the ordering of most, less, and least favored environment for the movement changing from fricative-stop-nasal, to nasal-stop-fricative, to nasal-fricative-stop. (æN) stands out in the charts from the other subvariables; the differences between (æ) before voiceless fricatives and

before voiced stops is much less than between (æ) before nasals and the other two (pp.40-150).

In her study of the speech of White adolescents in Livonia, a suburb of Detroit, Eckert finds that the distribution of variables' values corresponds to delicate aspects of social identity (1987:102). In the high schools Jocks and Burnouts are social categories embodying middle class and working class cultures respectively. Where individual adolescent identity is expressed by association with Jocks or Burnouts (or the separate category, Inbetweens), speech patterns conform not to parents' class but to social category. Self-selection of category, but not class background, is a predictor of frequency for certain nonstandard vowel values (1988:187).

The Burnouts have better access to urban sound change than the Jocks. The backing and lowering of (ɛ), as in *bet,* and (ʌ), relatively recent processes in the Northern Cities Shift, are more advanced in the speech of Burnouts than of Jocks (Eckert:1987:103). An extremely raised variant of (æ) is used much more frequently by high school girls of all categories than boys. Gender of speaker interacts with social category. Sharply differentiated patterns for female Jocks and male Burnouts, showing extreme (æ) raising for the one and extreme (ʌ) backing for the other, are not found for Jock boys and Burnout girls. Some Burnout girls, the Burned-out Burnouts, back (ʌ) more than Burnout boys. Eckert mentions that in many cities the older Shift changes have been led by young, female speakers; Eckert (1988:205) associates the Burnout girls' scores for the backing of (ʌ) with this larger pattern.[8]

3.2.4. The seaboard exceptions. Some northern cities on the Atlantic seaboard from Hartford to Baltimore 'fall outside of the three-dialect classification' (Labov in press:51; 1982:284). Among these are urban speech communities that are participating in (æ) fronting and raising in a manner that brings about phonemic split; there are lax vowel and tense vowel word classes (p.30). New York City and Philadelphia are the two 'exceptional cases' (p.50) that have been given the most attention. The Philadelphia vowel

tensing pattern is a subset of the New York City one. In brief, as Figure 3.4. shows, New York City speech show (æ) fronting and raising before voiced stops as well as voiceless fricatives and nonvelar nasal, but the Philadelphia variety keeps the vowel lax before voiced stops (Payne 1980:158-9).

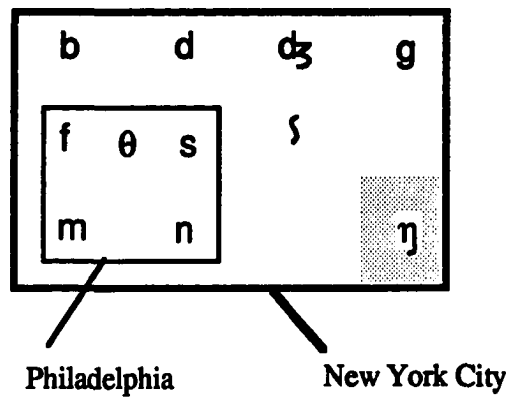

Figure 3.4. Philadelphia and New York 'core patterns' (Labov 1981:285) for the tensing of (æ). The postvocalic environments conditioning fronting and raising in Philadelphia are a subset of the ones in New York speech. The velar nasal conditions movement for some speakers.

In both cities some of (æ) remains low and nonperipheral. In the back of vowel space /a/ and /ɔ/ remain distinct, with (ɔ) rising rather than lowering and fronting as part of a rotation (Labov in press:50). In *The social stratification of English in New York City* (1966) Labov discovered (æ) raising, in particular before nasals, paralleled by (ɔ) raising before nasals; symmetrical movements show high vowels in *San, ran* corresponding to high vowels in *song, wrong* . Also, another shift is underway: (ar) > (ɔr) > (ur) (Labov, Yaeger, and Steiner 1972:95).

There are fine points and lexical exceptions for the New York (æ) tensing rule, which LYS discuss in detail, crediting Trager with its original discovery (pp. 48-49,123). It is basically the same as for the other Northern Cities, but the vowel followed by a voiceless stop is regularly low and unfronted, preserving, by its place, a contrast with /a/. (æ) before nonvelar nasals, or voiceless fricatives, or voiced stops (in that order of priority) is tensed, if morpheme boundary or a second obstruent then follows. There is some

raising before velar nasals. Lexical exceptions interfere with the phonetic determination. Words in which the vowel is regularly not stressed do not show raising; occasionally, however, they do. The vowel in strong verbs is not tensed, even though it occurs before nasals: *ran, swam, began.* Before voiced fricatives there is regularly no tensing, but the vowel is tense in *avenue* (and not *average).* *Waggin'* has a tensed stressed vowel, as expected; the vowel in *wagon* is found both tense and lax.

In NYC (æ) and (ɔ) raising age, sex, class, and ethnicity of speaker are significant social factors. Jews raise (ɔ) most, Italians raise (æ) most (Labov 1966). Women are advanced in (æ) tensing, ahead of men of the same age by two decades; but lower middle class women are also the speakers who correct in careful speech (Labov, Yaeger, and Steiner 1972:52, 58).

The Philadelphia situation is similar. (ar) and (ɔr) rise, as in NYC, but in Philadelphia (or) is merging with (ur); *moor* and *more* are homophonous. As in the Southern Shift there is fronting of (u) and (o). The fronting of (u) is extreme for young speakers except before /l/ (Payne 1980:146-147). (o) fronting is a newer movement, showing age grading (Labov 1981:280). (æ) is tensed before nonvelar nasals and voiceless fricatives followed by morpheme boundary or an obstruent. The vowel is lax before stops, voiced fricatives, liquids and the velar nasal (Payne 1980:158-159).

The Philadelphia pattern is subtly different from the New York City one and the more general Northern Cities one. Acquisition of the tensing rule and its lexical exceptions is difficult for children arriving from out of state to acquire. They are also unable to discern the distinction in perception tests (Labov 1981:289). There is a lax set and a tense set of words, as for NYC. The conditioning is not entirely phonetic, and so phonemic split is said to have occurred. Strong verbs and *avenue, wagon* behave as in NYC. Weak words do not show tensing. Also, the vowel in *manner, camera, planet* is lax, where it should be tense, and in *mad, bad, glad* is tense, where it should be lax (Payne 1980:159; Labov 1981:284,289).

3.3. Sound change process captured. Even in recent years not all sound change in progress studies have relied on spectrographic or other instrumental analysis. Sometimes only impressionistic transcriptions have been used to specify variants of variables. All sound change in progress investigations, however, have assigned values, in the forms of measurements, scores, and percentages to phones and groups of phones, speakers and groups of speakers. These are made graphic, and interpreted. The representations show variants in relations to each other for a speaker, or the range of variation across speakers. It is with this kind of account of variation in speech behavior that sociolinguistics considers linguistic questions: what the phonological god's truth is at temporal and psychological boundaries of phonemic loss and gain, for instance in cases or near merger and marginal phonemic split; or under what conditions there is lexical diffusion; or how accounts of performance can be integrated with competence-level statements.

Consideration of the social correlates of linguistic change was most prominent in Labovian sociolinguistics in the earliest work, that is, in the 1960s, in studies of both White and Black English. *The social stratification of English in New York City* (1966) is an example of a sociolinguistics study done ethnographically, in part, and for which the sample was selected randomly. Correlations with social traits were both made and interpreted. Social variables that are actually complex were treated in this work, and in Labovian sociolinguistic work in general, as simple; for instance a simple correlate of sex was used rather than a complicated one of gender, and class was equated with SES index score. Interpretations of findings were based on a stratificational model (See preceding section). Some social correlates of linguistic change were, however, identified. With some exceptions, in the American work of the 1970s and later,[9] notably in the LYS report, much less attention has been paid to these, perhaps for two reasons. One is that work has focussed on linguistic theory for phonological change, especially as this can be induced from observations of shifts and mergers, because making a theoretical synthesis of

generative and empirical approaches is by default the responsibility of the empiricists. The other may be that it becomes apparent, after social correlations have been found, that these themselves reveal little about the actual import of social structure and linguistic structure interaction; but a model for interpretation of the correlations that depends on the notion of shared linguistic and social norms, which is true of the stratificational model that Labov depends on, is limited by that notion.

The sociolinguistic study of American English vowels, which has been observation of process, has emphasized chain shifting and merger, discovering principles governing each. The chain shifting principles associate raising with peripherality and lowering with centralization, and so amount to descriptions of tensing and laxing processes; these descriptions provide as good definitions of tense and lax as ones expressed in terms of acoustic cues. The Northern Cities, and the Middle Atlantic seaboard cities of NYC and Philadelphia appear to participate to different degrees in the same process of vowel movement. There is Southern Shift influence in the seaboard cities, especially in NYC. Initiation of the rotation occurs among the low vowels; fronting and raising of (æ), that is, tensing of (æ), is the very first activity. This long-time ongoing process in (especially urban) English has not been found to always begin in the nasal environment, but presently this environment is the most common one across varieties and the most favored one in any variety showing (æ) tensing. The Third Dialect is included. San Francisco White English fits into this urban lect process. It is, then, really the treatment of (ɔ) in relation to other vowels that distinguishes the three dialects. (ɔ) and (a) remain distinct, one following the other forward in the Northern Cities Shift; (ɔ) and (a) remain distinct, (ɔ) raising peripherally in the Southern Shift and the Seaboard cities; (ɔ) and (a) merge in the Low Back Merger dialect.

Notes.

1. But Herold (1990) is a detailed study of the extension of merger from Western Pennsylvania to Eastern Pennsylvania and its completion in some communities.

2. 'The best-documented instance of reversal of a reported merger' is that of /oy/ and /ay/, reflecting ME long /i/ and /oy/ (Nunberg 1980:222). Perhaps the most controversial instance, dealt with by generative phonology (Halle 1962) as well as sociolinguistics (Weinreich, Labov, and Herzog 1968; Labov, Yaeger, and Steiner 1972; Labov 1974, 1989) is the apparent reversal of the reported merger of EME /æ/ and long /e/, reflecting ME long /a/ and /e/—the *meat-mate* case. Both these cases are part of the history of the English Vowel Shift, and both are compared with the present /oy/-/ay/ apparent merger in variation literature. The present Essex facts, as well as evidence from other cases of falsely reported merger, are held to be helpful in understanding what might have really happened in the past.

ME /oy/ had two main sets of allophones, [oy] and [uy], (not corresponding to etymological classes,) the second of which set lowered to [Λy] in the seventeenth century. This resulted in a nucleus for, e,g, the vowel in *loin,* that approximated the nucleus of the vowel in *line,* which was [Λy] < ME [i:]. In the middle of the eighteenth century the /oy/ allophones became backed, and [Λy] belonging to /ay/ lowered (Nunberg 231). Nunberg states: 'The loin and line classes passed on tangential tracks, and we will accordingly predict that, if they remained distinct in production, then the chronology of their reported merger and the reseparation will have varied according to the distribution of their allophones.' (pp.231-233) This kind of chronology is just what Nunberg finds from examining grammars, spellers, and dictionaries of the seventeenth and eighteenth centuries. Environments favoring the lowering of the lax nucleus in [uy] to [Λ>y] were following labials, palatals, and alveolar resonants excluding *r* (p.239). Records from the 1600s and 1700s suggest that this [Λ>y] , having closely passed the route of [Λ<y] belonging to /ay/,

moved back and rejoined the [oy] set of allophones as [ɔy]; in the movement the centralizing influence of the environments was lost in a certain order, that is, there is evidence of weighting of constraints (pp.232-240). Over time, the mid central phone for the nucleus gradually became stigmatized. By the beginning of the eighteenth century is was associated with lower class speech (pp.246-7). In most of British English /oy/ and /ay/ are now clearly distinct. The dialect of Essex is exceptional. Spectrographs now show that there are formant frequency differences even there between the vowels for the two historical word classes. Nunberg shows how they might well have always been distinct in this way.

Labov considers the apparent merger of of vowel from ME long /a/, as in *mate,* with the vowel from ME /æ/ (phonetically [Œ:] in EME) as in *meat.* Accepting the *meat-mate* case a of of true merger, Halle has argued that distinct underlying forms nevertheless remained, maintained not by any phonetic difference between vowels in the two classes, but by the presence of paradigms, e.g. of *break* and *breakfast, clean* and *cleanliness.* Native speakers could associated the vowel of *break* with the vowel of *clean* through the other items. There are, however, very few helpful sets of these words.

The reports of English grammarians evidence three contemporaneous subsystems for London in the 1500s, associating *meet, meat,* and *mate* in different ways (1974:278-279):

I	II	III
meet	meet	meet
meat	meat	meat
mate	mate	mate

By the seventeenth 1800s, only the third subsystem remained (p.279). Either the merger apparent in the second subsystem did not really take place, or there was a reversal of the coalescence and a new merger. Sixteenth century London speech community was as heterogeneous as an urban community today; one could expect prestige to be an influence in sound change (p.281). High status Southeasterners came into London in large numbers. Native Londoners with a three-way distinction in front vowels were confronted with a

prestige newcomers' speech that showed a two-way distinction (subsystem III, making *meet* and *meat* homophonous). Records show that the raising of historical /a/ and /æ/ was a process underway all over Southern England, including London. The raising of long a, however, was the most salient sociolinguistic variable; its realization as a front higher-mid vowel was heavily stigmatized. The most advanced speakers in this raising in London were from the merchant class, not the highest or lowest social classes (p.288). The apparent merger producing homophony between *mate* and *meat* was primarily found in the speech of Londoners who were influenced by the Southeastern model to raise the vowel in *mate* but not the vowel in *meat*. Subsystem II did not match that of an older London or of the Southeast. Eventually, in the course of the English Vowel Shift, the vowel in meat was raised (p.289). Labov and Nunberg (Labov 1989:86; Labov and Nunberg 1972:286) claim that the reversal of merger that this involved was only apparent because the merger was only apparent.

3. Some specifics about the notation are relevant to the question of rule status for the tensing of (æN) in San Francisco White English. The notation as used in Labov, Yaeger, and Steiner (1972) works in the following way. Angled brackets set off the structural change position and are also used around the lists of ordered constraints. Relative weight is shown by vertical ordering, unless there is no ordering; in this case braces are placed around elements within the angled brackets. Categoricalness is shown by an asterisk. The rules may be written employing any feature system. If the relative position of vowels along a continuous dimension of height can be predicted, for instance, one can write

[-low] ——> <yhigh>/...

in which <yhigh> must be assigned a maximum value, perhaps 3; an appended condition specifies y<4. Such a rule will eventually merge vowels. In writing rules for chain shifting the fact of vowel position preservation can be indicated by writing a variable feature on both sides of the arrow:

[yhigh] ——> <y+x high>/....

Whatever degree of height a vowel has is increased by a variable amount. At any given time, *x* is constant for all values. *y* is a variable only in the sense that it can represent various categorical units. *x* is a function of time, age, and sometimes social class, ethnic group, sex, and so on.

4. The controversy over the logic, meaning, uses, and mathematics of variable rules, which contributed largely to their demise, is found throughout the literature of the 1970s, including in Bickerton (1971), Anshen (1973), Cedergren (1973), Fasold (1973), Cedergren and Sankoff (1974), Kay (1978), Kay and McDaniel (1979, 1981), Sankoff and Labov (1979).

5. Labov also identifies this level as 'casual speech', the speaker's style 'in which he argues with his wife, scolds his children, or passes the time of day with his friends.' (1972:85). The facts that in style shifting speakers use nonstandard forms more frequently in casual speech, but that working class and lower middle class speakers use nonstandard forms more than upper middle class speakers across styles make the association of the vernacular and the sociolect of lower SES groups easy to accept, if one does consider it very carefully. The social characteristics of the lect associated by Labov with the vernacular involve the dimensions of socioeconomic and ethnic/racial group, age, urbanness, and, less explicitly but very importantly, sex. A final important characteristic of the vernacular is that it is the speech of the core members of peer groups of young males. The vernacular is the language of urban male children. What are the rest of us speaking? One problem with the Labovian concept of the vernacular is that, as defined as a dialect, it is very narrow, making the 'most systematic' speech the linguistic property of juveniles only. The other problem is that it is a concept that describes two different kinds of things: lect and style The identification of the vernacular as both lect—of young males—and style—the one in which a speaker argues with his wife—is clearly also problematic because it both includes and excludes adults and because it excludes women, whose use of innovative variants in casual

speech is important in Labovian theory. Young street males do not have wives. And women do not have wives either.

6. Since the beginning of modern sociolinguistic work in the early 1960s two claims about the role of women in the process of sound change have been common. One is that women are more standard speakers than men, and therefore are found to correct more frequently and extremely toward the standard-prestige variant of a variable (e.g. Shuy, Wolfram, and Riley, 1967; Trudgill, 1972). One can easily find studies supporting this generalization (e.g. Labov, 1966; Levine and Crockett, 1967; Wolfram, 1969; Trudgill, 1972). The other claim, supported by evidence from some studies (e.g. Labov 1972; Trudgill, 1974), is that the women of a subgroup in a community are innovative in sound change; that is, women adopt a form before men do. An alternative statement of this claim is that women lead in sound change (Labov, 1966,1972; Labov, Yaeger, and Steiner, 1972). The second formulation is not quite the same thing as the first, since one must specify at what stage of a sound change women are leading.

On first consideration it seems that both claims can be true only if sound change begins in the highest ranking status group in a speech community—in many cases, the upper middle class in American and European societies—since it is the speech of that group that defines the standard. On first consideration it seems that the two claims that women are more standard speakers than men and that women innovate or lead in sound change cannot both be true if a new form originates within any stratum except the highest. Nonstandard vernacular speech is just where linguistic innovation is often found (e.g. Labov, Yaeger, and Steiner, 1972; Eckert, 1987; Milroy and Milroy, 1978). Because of style shifting, both claims can be true if a new form originates in or enters a speech community through a lower status group. It is possible that women use innovative, nonstandard forms in one speech style, and conservative, standard forms in another. Some studies show this to be the case with regard to some variables (Labov 1972; Labov,

Yaeger, and Steiner, 1972; Milroy and Milroy, 1978). Empirically, either claim may be found to be false in particular cases.

A gender role difference in the propagation of sound change is noticeable when style shifting and hypercorrection (shown in crossover patterns) take place. SES and gender are interrelated in the social mechanism of the sound change process. The notion is that, across class, women behave like lower middle class speakers; or lower middle class speakers behave like women. That is, lower middle class women style shift more sharply than any other speakers (Labov,1970:69). It follows that hypercorrection is strongest among lower middle class females.

A comment of Labov's in a discussion of the role of women in sound change seems to be a reference to the doublecross patterns observable in many charts showing style shifting. The crossover down in casual speech is not usually noted. Labov states, 'In case after case, we find that women use the most advanced forms in their own casual speech, and correct more sharply to the other extreme in their formal speech...women are almost a whole generation further along in the raising of (eh) than the men.' (1972:301). In this way women can be said to be both innovative in sound change and more standard speakers than men, in the case of a change that originates in a lower status group. 'It seems likely that the rate of advance and direction of a linguistic change owes a great deal to the special sensitivity of women to the whole process.' (p.303) The 'special sensitivity' however, is not explained—or only one side of the evidence for it is explained, with the notion of 'linguistic insecurity', which itself needs both description and explanation. Note that the Martha's Vineyard study (1963), in which the Labovian idea of hypercorrection was first formulated, involved no investigation of women's speech. The 'second highest-ranking group' of males used the Yankee males as a reference.

A model that makes it difficult to consider conflicts of prestiges and norms and that assumes a cross-class desire for and expectation of upward mobility, such as the stratificational model underlying Labovian analysis, has difficulty with evidence that

women of the same class group behave differently and that the same individual female speakers behave differently in the extreme in different speech situations. Labovian theory has had a conflict of 'defaults' since its development. On the one hand the 'default case of prestige is the 'overt' prestige attaching to the standard variety of the language; and prestige is the social motivation of sound change. On the other hand, early observation of change in progress allowed the specification of sound change stages in which the default origin of a change is a social class somewhere below the highest status one; in this model case, hypercorrection *from above the level of social awareness* (the 'default' hypercorrection) acts on the change. The conditioning environment for hypercorrection was easily generalized; hypercorrection is expected—and found—whatever class the change spreads from first. Within the stratification-model orientation of the sound change model, reference is always to the prestige-standard speech. If prestige is the motivation of sound change, what moves change in the direction of nonstandard speech? Choices that individual speakers make within the social contexts of their daily lives spreads and accelerate sound change, which is most structural, it appears, when it originates in the speech of low status groups. Female speakers can make one kind of choice or the other; or the same individuals can make different choices perhaps because of conflicts of norms.

7. The first pattern involves the rise of peripheral front and back vowels and the centralization and fall of lax vowels, symmetrically, followed by a parallel front and back raising of newly peripheralized nuclei of the lowered lax vowels; the second pattern involves raising of front vowels accompanied by the fronting of the lowest back vowel; the third pattern entails raising of back vowels peripherally accompanied by fronting of non-low back vowels; and the fourth pattern involves front vowel raising and lowering followed by raising of peripheral back vowels. According to Labov, Yaeger, and Steiner (1972) each of these patterns is observed in urban sound change for English.

8. A city outside the US in which (æ) raising if found is Belfast. Milroy and Milroy (1978,1985) have investigated five variables in three Belfast neighborhoods, two

West Belfast areas, Catholic Clonard and Protestant Hammer, and one East Belfast area, Catholic Ballymacarrett. The variables (ɪn, ʌ, æ, ɛ, ai) show grading by age, sex, and neighborhood. For most variables, males score higher for the use of nonstandard variants than females across speech styles and in all neighborhoods. The centralization and lowering of [ʊ] to [ʌ] (the nonstandard (ʌ) variant), is a male marker (1978:.25). However, the authors suggest that in a previous generation young women introduced the centralized variant of (ʌ) into Clonard, perceiving it as carrying the status of some higher ranking community (p.26). (æ) is subject to both raising, as in northern American cities, and backing. The backing of (a), associated with casual, urban speech, is a marker or male speech, but also correlates with lose connection to social network for women. The young Clonard women who have a strong network are the female speakers who back the vowel (1985:361-2). In general, men also show more extreme values for the lowering of (ɛ) and the raising and fronting of (ai) (1978:29,33). The raising of (ɛ) is a female marker. A raised variant of (ɛ) is associated with the slightly more prestigious outer city speech; but younger female speakers are advancing the raising of the vowel most in Ballymacarrett (1985:359-360).

9. Work especially by Leslie Milroy, James Milroy, Sue Margrain, Jenny Cheshire and others in Britain has not been hampered by the stratificational model and has continued to focus as much an social as linguistic structure. Variationist work in the US and done abroad by American sociolinguists that is ethnographic, for instance work by Penny Eckert, Pat Nichols, and John Rickford has also continued to focus on the social.

Chapter 4. Procedures.

4.0. The investigation of ongoing change in San Francisco White English was designed as a Labovian sound change in progress inquiry, which would use texts collected in sociolinguistic interviews, and subject phones from those texts to spectrographic analysis. The intent is to determine the presence of sound changes in San Francisco White English, and to discover the direction and stage of the changes; and to compare these findings with those from the LAPC dialectological survey for San Francisco and more recent sociolinguistic change in progress investigations in Northeastern cities.

San Francisco is one of the two culturally most important urban centers in California, the other being Los Angeles. It is not a very large city; the population has remained at about 700,000-800,000 since the end of World War II. It is, however, one of the two main 'central places' in the Far West. Its cultural importance is comparable to that of Chicago or Detroit in the Midwest, or Boston, New York City, Philadelphia, or Washington DC in the Northeast—some of the cities for which there are reports concerning the Northern Cities Chain Shift. Investigation of sound change in progress in San Francisco adds data and analysis to that from Los Angeles (see Terrell 1975) and Salt Lake City (see DiPaulo, Faber, McRoberts 1990) in the West, and Eastern cities discussed in the preceding chapter.

The study was designed to use speech from informal interviews with white lower middle class and working class native English speakers, ranging in age from young to old, who grew up in San Francisco. The informal, sociolinguistic interviews were structured to direct the attention of the informant away from speech and the fact of the recording. One session with each speaker, though, included a segment in which more careful speech was elicited. The texts collected during the interviews provided variable tokens subject to variance analysis (see Chapters 3 and 6).

The pilot study conducted through the Linguistics Department at UC Berkeley in the spring, 1986, was a preliminary investigation of vowel change in California English. (See Chapter 1.) Results relied on transcriptions made by the six interviewers. No instrumental analysis was done. There were tentative findings of raising of front vowels, fronting of nonlow back vowels, and uncompleted merger of the low back vowels /a/ and /O/. (See Chapter 1.) The present study builds on the pilot study. An investigation of vowel variation allows comparison of findings with the tentative findings from the 1986 California English study, the results for vowel pronunciation of DeCamp's survey of San Francisco speech, and the findings for vowel change in progress in the Northern Shift Dialect of English. Also, Labov's claims (in press) about current processes in the Third Dialect can be confirmed or refuted.

From the beginning the plan was to rely on the results of spectrographic analysis of vowel phones, after preliminary transcription provided a basis for selection of a small numbers of vowel variables.[1] Plotting the frequency measurements of first against second formants (F1 = 2F2) for a particular individual's speech as produces a vowel chart for the speaker that shows relative height and frontness for the phones; the chart appears quite like a vowel chart made by plotting impressionistically transcribed phones in a traditional slant-sided box of vowel space. (See Ladefoged 1971; Petersen and Barney 1956; Pickett 1980.) The Labov, Yaeger, and Steiner (1972) quantitative study of sound change, which is principally a report on vowel change in the Northeast, is based on results of spectrographic analysis. Other recent sound change in progress studies also rely on this and other kinds of instrumental analysis (e.g. DiPaulo, Faber, and McRoberts 1990). Spectrographic analysis of the San Francisco speech material, then, facilitates comparison with sociolinguistic sound change investigation findings of the last two decades.

4.1. Data collection. California has been a center of population influx for about a century and a half. (DeCamp (1953:19-42) provides a summary history of the migration.) The state is characterized by having a large proportion of domestic and foreign

immigrants. Throughout the history of California as a state it has been usual for nonnative Californians to outnumber native ones, and this is the present situation. Americans from other states continue to come to California, in particular to the southern part of the state. Foreign immigration, especially from Middle Eastern and Asian countries, increased dramatically between the 1980 and 1990 censuses. The city of San Francisco has been and continues to be a receiving center for newcomers.

The first task of the study was to find native San Franciscans. It was decided that some of the informants should be linguistically representative not only of that portion of the City's population that grew up with other native San Franciscans but also of residents whose parents grew up with native San Franciscans. Some second and third generation San Franciscans were sought. Since native San Franciscans are not typical of the City's residents, it can be argued that this urban speech is best studied by interviewing a sample of natives and nonnatives. A dialectology bias for speakers who are themselves and whose families are long-time residents of an area has been recognized and criticized since the 1950s. In her criticism of American linguistic geography Pickford says (1956:217) 'There has been selection of the most stable element of a population which is characteristically mobile'; all of the country, but certainly the Far West, has been characteristically mobile. A related issue is the source of sound change innovation and early adaptation (Milroy and Milroy 1985). It is logically possible for sound change to be advanced first and most among newcomers of a city or neighborhood. The present study, however, was designed to inquire whether sound change has been at work among members of the stable portion of the population. Are there processes that can be traced in the phonologies of several generations of San Franciscan natives that are not directly attributable to migration?

Tract and block census information from 1980 indicated that there were areas of the City where native San Franciscans of this sort were more likely to be found than others. There are inner and outer districts in San Francisco. On the whole, lower income residents live in the inner areas, higher income individuals and families live in the less central

districts. None or the districts are suburban, where even higher incomes are the rule. There is a higher median income for households in the Haight, the Castro, and Noe Valley, though, than in the Mission or Downtown, although all are inner city districts. The Outer Sunset and the Richmond are working class and lower middle class areas with lower median household incomes than the Inner Sunset, Twin Peaks, or Bernal Heights, although all are outer districts. Because informants were wanted from a working class or lower middle class district where families have resided for more than one generation, the Outer Sunset district was selected, and a group of blocks within a tract of that district. The choice was based on census information for income, length of residence, race, number of persons per household, and number of occupants per household under 18. (See Appendix C.) The census reports affirm the Outer Sunset's reputation as a an area of stable white family residence until the recent influx of many Asian—particularly Chinese—immigrants.[2] The selected twelve-block area, one side which fronts the Great Highway at Ocean Beach, was intended to serve for first recruitment of informants, some of whom would be cross-generation relatives living in the same or nearby residences.

Using a reverse telephone directory, names, addresses, and phone numbers were obtained for all persons in the twelve block area with last names that could not be identified as Asian or Hispanic. Letters were sent first to all persons whose phone numbers had been the same for more than nine years. Later a second mailing went out to all other addresses. (See Appendix D.) Following up the letter, in which the recipients were asked to talk with the investigator about participation in the study, phone calls were made to each household. In these telephone conversations the potential informants were asked if they had grown up in San Francisco and if their first language was English. They were also asked about other members of their households and whether relatives lived nearby. The project was explained in general terms. From these calls interviews were obtained with 20 persons. Interviews with a family of four additional individuals plus a friend were secured through

referral from Outer Sunset informants. Of these 25,16 compose 6 family groups in which at least two members of different generations served as informants in the study.

Additionally, young adult native San Franciscans were approached through referrals. Nine informants were found, who live in several inner and outer City districts outside of the Sunset.

Interviewees ranged in age from 4 to 80. There are 20 women and girls and 14 men and boys. Age and SES index score for each of the fourteen informants whose speech is reported on here is given in Table 4.1. below. Socio-economic status has been assessed on the basis of residence, education, and employment for the informant and the informant's parent or parents. (See Appendix C for an account of the values assigned.)

	age	SES score
Ginger Ryan	22	8
Suzi Rockland	34	8
Meg Cork	73	10
Sharon Ryan	43	10
Carol Winter	30	10
Tracy Sawyer	29	11
Jean ORoark	45	13.5
Beth Thompson	25	14
Rachel Stone	30	14.5
Maureen Donovan	30	14.5
Jesse Austin	31	15
Barb Walsh	32	15
Marion Thompson	65	16
Nan Levine	31	18

Table 4.1 Ages and SES index scores for 14 informants.

In a socially mobile society such as this one the class identity of an individual is a matter of both present adult and past childhood economic level and social position, as well as a personal set of expectations and self-image creating attitudes. The import of class varies with other factors, such as ethnicity and gender. Class status may not be the same for a husband and wife, even when from similar backgrounds, and, of course, is often not the same for parents and adult children. (See Eckert 1990; Nichols 1980.) It should not be assumed that an adult's social class status is inherited or married into. Further, there is

upward mobility and downward mobility; and while it seems reasonable to say that upward mobility is chosen, downward mobility may be either chosen or imposed.

Of the 14 women whose speech is described here only five are married, widowed, or divorced. The nine others have not married, although all are adults; three are lesbians. All except two work to support themselves. Of these two, one woman is a housewife and mother of small children, and the other is disabled. On the whole, the degree of economic mobility available to these women is independent of the job and status of spouse or lover. Personal histories of diverse employment, struggles for health and sobriety, and changes in opportunities are typical of both younger and older women. The oldest two women experienced the Depression and World War II with the disruption they brought. Six of the ten women under thirty-five have lifestyles that are dramatically different from those of their parents; this includes difference in economic status, and the direction of the mobility has been down. The difference between the present economic reality of these women and that of their parents reflects the social and political truth that women, in particular single women, have more limited economic options than men; it is also true that these women have chosen to live differently than their parents. These fourteen women are ordinary. The most ordinary thing about them is that the economic history of each one, and in most cases of each woman's parents', is a story of irregular happenings and changes in fortune.

SES index scores reflect the social and economic status and class self-assessment of most of these individuals very crudely. (See Appendix C for an account.) The scores do provide summary numbers accounting for values attached to certain objective facts. The table above shows that there is a small break in the flow of scores between 11 and 13.5. Heuristically, speakers with scores from 8 to 11 are referred to as working class; speakers with scores from 13.5 to 18 are referred to as middle class. This happens to correspond to my sense of the class of these individuals. The lower SES score–higher SES score difference is also reflected in some phonological differences.

Each adult informant was engaged in at least one interview of 45 to 90 minutes long. Several speakers were interviewed more than once. Second, third, and in one case fourth interviews always included more than one informant. A husband and wife, or spouses and children, or grandfather, father, and children, or parent and adult child were interviewed together. At the beginning of the first interview adults were asked to read a description of the study and sign a form (given in Appendix D) stating that they volunteered to participate. The conversations took place in the informants' homes, except in one case where a workplace lounge (quiet except for refrigerator hum) was used. There was always privacy, even at the workplace. The talk was taped on TDK AD90 or TDK 90 cassettes, using a Marantz PMD 201 or 221 recorder with a Lavaliere microphone; when more than one person was interviewed a table microphone was used as well.

Most of each interview consisted of relaxed conversation in which the informant's attention was focussed on the topic under discussion and away from the fact of the recording and the stated language-oriented purpose of the study. The informant was encouraged to tell personal stories, give opinions about controversial subjects, talk about what happened during the earthquake, and tell about adventures. Danger of death stories were elicited. To the same effect, the three lesbians were asked to tell about how they came out to their families. The interviewer also made sure information about the informant's age, education, occupation, and residence history, as well as the informant's parents education, occupation, and residence history, and when and from where the family came to San Francisco, was on the tape. Toward the end of the last interview more careful speech was elicited. The speaker was asked to read a short story, then words in a word list, and finally pairs of words in a minimal pair list (given in Appendix D.) Reading the word list (word list style) focussed attention on pronunciation more than reading the story (reading style) did; and reading the list of minimal pairs (minimal pair list style) most encouraged self-conscious speech. Distribution of vowel phones in this more formal speech can be compared with distributions for tokens in the less formal, interview style speech. Also,

since the LAPC interviews were elicitations of careful speech, the findings concerning formal contemporary speech can be compared to findings based on transcription in the 1950s study.

4.2. Preliminary analysis. Interviewing proceeded without final selection of either vowel variables. Also, it had not yet been determined which informants' speech would be most finely analyzed for the present report. While data collection was still going on a preliminary inspection of the material was made upon which decisions concerning sample sizes and types were based.

All interview tapes were copied, and the originals stored. Using the copies, text was transcribed in ordinary orthography. The phonetic transcriptions of all stressed vowels were made from a sample of texts from speakers of both sexes, a range of ages, and a range of SES scores. From 10 to 12 minute sections of continuous speech were selected from the texts for each speaker. For a given speaker, perhaps six or seven stretches of speech would be chosen; the duration of the whole would be 10 to 12 minutes. No text was taken from the first five minutes of any interview. Texts were selected that seemed to show the most relaxed or, on the other hand, the most excited speech of an informant during the interview. In order to control for style or code shifts between talk with adults and talk with children, no parent/juvenile conversations were used. The text segments are chiefly personal stories—about riding in the nose cone of a crashing plane, about escaping from a rapist—and vehement expressions of opinion—about Bush and Tienamen Square, about the San Francisco police and demonstrators. (See Appendix B for text samples.)

Spectrograms were made of vowels from portions of the selected texts for eight adult speakers. A sample of vowels from the formal style elicitations for several speakers were also measured. A spectrographic analysis computer program, sadie, which runs on a Hewlett Packard, was used. The F1 and F2 values obtained for vowel phones of each variable for each individual whose speech had been subjected to the instrumental measurement were plotted against one another, using the Macintosh graphics program

MacDraw II. In this way vowel charts were produced. The relevant capabilities of each program are discussed in section 4.3.

A comparative inspection of charts indicated variation across age of speaker for the vowels (æ), (a), and (ɔ) more than for others. This preliminary finding was evidence for observable sound change in progress. These are vowels for which Labov (in press) makes claims for the Third Dialect of English and which show long-term ongoing change in the Northern Shift and Southern Shift dialects. Examination of the charts also showed distributions for (o), (ʊ), and (u) that evidence clear phonetic conditioning and some change over apparent time. Variation in the distributions of (ʌ) also reveals conditioning but not vowel change. Distributions of plotted (ɪ) and (ɛ) phones show great variation whose patterning is not transparent.

Gross phonetic conditioning was clear for the vowel variables (æ, a, ɔ, o, ʊ, u). For all of these, some or all vowel-plus-sonorant distributions were different from vowel-plus-obstruent distributions. In the cases of (æ) and (ɔ) the distributions of vowel before nasal consonant and before liquids, respectively, were strikingly different than the vowel phones elsewhere. Further, distributions for male speakers were tighter than for female speakers. For each male speaker there was little range in height or frontness for any one variable's plotted area. Distributions in charts for females, on the other hand, showed not only greater height and frontness range, but also distributional shapes that indicated assumption of direction for the variation and movement over apparent time.

It was decided to conduct the main analysis of collected speech using vowel phones for (æ), (a), and (ɔ) found in the speech of a set of adult female informants. Examination of these few variables for only women speakers limited the vowel and speaker samples in a way that allowed a responsible account in a short time. The variables are the ones for which change in progress is most evident; and these correspond to vowels undergoing change in the Northern Shift and Southern Shift dialects. The female speakers display more variation than males. It can be expected that diachronic processes will be more

evident in the speech of the women than the men, then, since change manifests through apparent time as sequential states in which variation patterns in interpretable ways. No claim is made about whether women or men are more advanced in the sound changes reported on here. Vowel charts for female speech simply show more variation, for the realizations of vowel phones for each variable, than charts for male speech. Range of sampled realizations is greater. Direction of movement is clearer. The sound changes are writ large.

Fourteen speakers were selected, eight 'main group' speakers and six 'supplementary group' speakers. Four working class speakers and four middle class speakers make up the main group of informants; that is, four of the main group speakers have SES index scores of 10 and lower, and four have scores of 13.5 and higher. The main group divides into four age-paired dyads. A working class speaker and a middle class speaker in their twenties are the youngest pair, Ginger Ryan and Beth Thompson. A working class speaker and a middle class speaker in their early thirties are the second pair, Suzi Rockland and Jesse Austin. The dyad who are in their forties are Ginger's mother, Sharon Ryan, and Jean ORoark. The oldest pair are over 50, Sharon's mother Meg Cork and Beth's mother Marion Thompson. Speech can be compared across age and class. The supplementary group speakers are all young, between 25 and 32. Two have SES index scores of 10 and 11 and so are categorized as working class. The other four have scores of 14.5 and above. Of the fourteen women, half live in or near the group of blocks selected on Ocean Beach in the Outer Sunset. The other seven speakers live now and grew up in inner or outer San Francisco districts. The parents of the two oldest main group speakers came from other English speaking countries. Suzi Rockland is also a first generation San Franciscan. For the other five main group speakers life-long residence in San Francisco (except for brief periods) goes back at least one generation past the speaker. Three of the six supplementary group speakers are at least second generation native San Franciscans.

Altogether, 8 of the 14 speakers are second or third generation natives. (See Appendix C for personal history information for each speaker.)

4.3 Analysis. When the final variables for the present study had been determined and the speakers selected, investigation proceeded with instrumental analysis and the creation of files of F1 and F2 measurements for all phones. From these files vowel charts were made and means for variable and subvariable distributions calculated. The token measurements, the charts, and the calculated means, along with SES index scores, provided the final material for phonetic and phonological interpretation.

Using the full 10 to 12 minutes of selected text from the corpus for each main group speaker spectrograms were made of each stressed token of of the variables (æ), (a), and (ɔ). About five minutes of speech from the texts for each supplementary group speaker were used. When it was found that for some environments this sample did not provide an adequate number of tokens of vowels that were both long enough and whose F1 and F2 heights could be reliably measured, additional phones were taken for measurement. Beginning with speech five minutes into a taped interview, needed tokens were obtained from text not included in the selected sequences. (Appendix B contains a table of numbers of tokens, by environment, finally analyzed for each speaker.) Additionally, items from the reading, word list, and minimal pair list elicitations were selected for spectrographic analysis. Items with (æ), (a), and (ɔ) phones in appropriate environments were chosen. For six young speakers—the four younger main group speakers and two supplementary group speakers—computer spectrograms were made of some vowels from the samples of more careful speech.

Sadie is a program that first digitizes up to 5 seconds of input speech from a direct or indirect source and then, upon command, displays a DFT spectrogram for the sample. Duration, frequency, and signal amplitude (at F0 or at any frequency above up to 5000 Hz) can be obtained. Waveform is provided. In a submode of the main mode the program will make and display calculations of fundamental frequency and formant frequencies up to F6,

providing bandwidths of the frequencies used in the determinations as well. A spectral section, that is, a cross-cut of the signal at the selected point is also displayed. Cursors can be run through the displays of spectrogram, waveform, and spectral section. In this way the calculations made with the algorithm can be roughly verified.

No vowel phone measuring less than 60 msec was used. Some originally selected tokens were discarded because duration was not great enough. Very short vowels tend to be acoustically reduced to schwa. Duration for vowels finally accepted varied from 60 msec to about 350 msec. Vowel duration was measured to include nucleus and vocalic offglide, but not the glide-like effects of vowel-coloring sonorants, in particular /r/.[3] Selection of measurement point within a vowel was made by taking the nucleus duration and marking the mid point unless the phone was less than 100 msec; in that case, a point 50 msec into the vowel was used. When no steady state was apparent for a diphthongized vowel, most instances of which had durations of more than 250 msec, a first measurement was taken for a point 50 msec into the vowel and a second for a point 25 msec before the end of the vowel. Plottings of these particular vowels, then, which show vowel beginning and end joined by an arrow on the charts, are conservative representations of the vowel height and frontness values since the actual beginning and end points have more extreme measurements.

For each token, after formant frequencies were provided several checks were made of the reading, using the cursors. The program sometimes labelled F1 as F0. If this was suspected a rough reading for F0 was manually obtained. For some sampled low back vowel phones F1 and F2 were not clearly discrete in the DFT display. This is because low back vowel quality is in large part determined by relatively high frequency F1s and relatively low frequency F2s. Inspection of the spectral section was sometimes helpful, as was a change of filter so that the spectrogram, which has appeared to be a 'wide band' appeared instead as a 'narrow band' spectrogram. If the program's calculations could not be roughly verified, the token was discarded from the sample. For some phones the

display was simply very messy. Bands of frequencies did not seem to collect as clear, particularly amplified bundles. Again, if the calculations could not be roughly verified by eye and hand, or if the reading made no sense, the token was discarded. Finally, if bandwidth for the formant reading was greater than 300 Hz, the number was suspect. It had been determined using a rather wide range of frequencies and so was an uneasy compromise. All algorithm compromises, however, must correspond in some way to decoding decisions made by hearers for such vowels. Tokens with formants determined through use of wide bandwidths were not automatically discarded. If the DFT display showed clear overtone groups, and these could be measured by using the cursor, the tokens were retained if the algorithm results corresponded to the manually obtained measurements. Otherwise the token was thrown away.

Accepted formant results for vowel phones for each speaker were then plotted in charts in MacDraw II, an object-based graphics program that allows the creation of layered files. The layers of a file can be displayed together as a series of 'transparencies' on the screen. This facilitates comparison of one distribution with another, for example, the distribution of (æN), plotted on one layer of a speaker's (æ) file, with the distribution of (æS), plotted on another layer of the same file. The charts of all sampled vowels in less and more formal speech (with the exception of a few tokens of (ær), (æl), and (ɔ#)) for each speaker are provided in Appendix A. Each plotted point is labelled with the item in which the phone appears. In addition, charts were made for each main group speaker displaying the distributions as outlined areas, without token points but with distribution center points. These are found in Chapters 5 and 6. The center points are centroids for the distributions. Each one is the mean of F1 measurements for a variable, or for the variable in a particular environment, plotted against the mean for F2.

After the formant frequencies were plotted vowel charts for the 14 speakers were examined and compared for evidence of both gross and fine phonetic conditioning, change in distribution patterns over apparent time, variation by class, overlap of variable

distributions, evidence of possible lexical conditioning, and so on. Several questions were addressed with tests for difference in means, following normalization of distributional ranges, so comparison across speakers could be made.[4] Because the speaker sample was not random statistical test results are valid only for the sample.

Notes.

1. Spectrograms provide reliable information about vowel duration and quality. Associated with the fundamental frequency of a given vowel sound, F0, are particularly amplified collections of overtones which differ, depending on vowel quality. These are formants, resonances in the vocal tract. Reflexes of these resonances in voice prints are also referred to as formants. The spectrographic first formant, F1, is higher in frequency the lower the vowel is, that is, the F1 of [a] is higher than the F1 of [i] or [u]. The spectrographic second formant, F2, is higher in frequency the fronter the vowel is, so [æ] has a higher F2 than [ɔ]. To some extent, the actual frequencies of the centers of formants vary from individual to individual, depending on length of pharyngeal-oral tract and selection of pitch (roughly, fundamental frequency). An F1 measurement can be plotted against an F2 measurement.

2. Advice was also sought from the Department of Sociology at UC San Francisco and from a knowledgeable and experienced cab driver, Lindsay Smith Welcome.

3. For some diphthongized vowel a nucleus could not be determined. That is, no steady state was apparent. For these phones the whole vowel appears to be glide, and so it makes no sense to speak of onglide or offglide. Also, for some tokens of vowels followed by r-constriction the initiation of the /r/ segment, appearing as a glide that raises F2 and lowers F3, could be clearly discerned following a vowel nucleus. In other cases the effect of the constriction, 'coloring' the vowel, could be seen to begin very early in the vowel, so early that the vowel could not be said to have a nucleus in a steady state, free of the gliding effect of the consonant. The centers of these tokens, however, did not measure as central vowels for the speakers and cannot be regarded as instances of syllabic *r*. Further, impressionistically they are not phonetically instances of syllabic *r*, nor do the underlying representations allow for this.

4. Across individuals vowel charts can be directly compared for impressions of relative distribution, compactness, direction and extension of range, relative positions of environmental variants, etc. Because the ranges of F1 and F2 measurements for collections of tokens of a variable will not be the same for any two speakers, means found for the distributions based on those measurements can not be directly compared across speakers. Means were made comparable by finding a percentage of range for each token for an informant in a dimension—frontness or height. Then a percentage mean could be obtained.

Chapter 5: (æ) in San Francisco English

5.0. Labov (in press) regards the low front vowel position, occupied by /æ/, as one of the two pivot points of American English (See Chapter 3). In the Third Dialect, he claims, the phoneme is realized as a low vowel in most environments, raising and tensing only in 'the most favored, phonetically defined environments: most typically, /æ/ is raised before all nasal consonants' (p.42). The present study confirms this claim and traces the fronting and raising of (æN) through apparent time. I do not treat /æ/ in San Francisco speech as a vowel participating in a chain shift, but trace its division into allophones /æ/ and /æN/. The distribution of the phones of /æ/, and change in this distribution, define (æ) and (æN). Vowels with following obstruents are treated as tokens of variable (æ); vowels with following nasal consonants are tokens of (æN). Subvariable distributions reveal fine conditioning. Vowel phones before alveolar stops, labial stops, velar stops, and fricatives of any place are noted as (æT), (æP), (æK), and (aS), all distributions within (æ); vowels before /n/ are (æn), etc. (See Appendix E.)

When /æ/ splits, as is observed in Philadelphia (Labov 1981; Payne 1980), a residual collection of phones remains as /æ/ in low position as a lax vowel in the subsystem of short vowels; tense /æh/ becomes a long, ingliding vowel. In the change in progress in San Francisco White English /æ/ is realized in two areas in vowel space, a lower, backer area and a fronter, higher one. The low area phones, noted as the variable (æ), while showing environmental conditioning in their distribution, represent one of two allophones of /æ/ in the current phonology. This alternant accounts for the phoneme's relationship to the other low vowels, most importantly /a/. (æ) in informal speech occupies an area contiguous or overlapping with the area of (a); through apparent time it continues to interact with (a) but interacts less and less with the area of (æN) which represents that other allophone.

Following consonants are the principal determiners of vowel frontness and height here. (æ) is the distribution of vowel phones before obstruents, with the vowel followed by a fricative occupying a low, back place within the total distribution. (Variation involving /æ/ before liquids is not considered in this study because in the corpus there are too few tokens to do more than observe simply that the historical residue of/ær/ has, of course, risen, and /æl/ is backed variably.)

The high area phones compose the variable (æN). /æ/ in the nasal environment is now almost complementary to /æ/ elsewhere. Observation of the drift of (æN) in apparent time shows the development of an allophone from a point in apparent time near the inception of the movement forward and up to a point near the completion of separation of /æN/ from the rest of /æ/.

The establishment of complementarity is a phonological matter not identical to the tensing of (æN). (æN) may continue to rise peripherally, but /æN/__[+nas] is now phonetically distinct from (æ) for most speakers under 35. The distribution of (æN) for younger speakers reflects complementation of /æ/ and /æN/. Further tensing of (æN), if it occurs, will take place in reference to a degree of frontness and a degree of height advanced beyond the frontness and height of (æ). The speech of informants in their twenties and early thirties evidences the last stage in a transition from a process that could be stated by one kind of rule, a variable rule with simple constraints, to a process that could be stated by two kinds of rules, a categorical rule for the allophony and, if tensing continues, a variable rule for that.

The tensing of (æN) involves the social variable of class. (See Chapter 4 for a discussion of assignment of SES for these informants.) The fronting and raising of (æN) began for lower SES speakers from an area lower in each individual's vowel space than for higher SES speakers. Middle class speakers also diphthongize both (æ) and (æN) more than working class speakers do.

In more formal speech the frontness and height difference between the distributions of (æ) and (æN) increases. It seems likely that this exaggeration of the separation of the two areas reflects the phonological reality of an allophonic distinction. Formal speech, thought not to reveal phonology as acquired in early years, does in this case reveal that a subphonemic change has occurred which is still reflected imperfectly in less formal speech. (See Chapter 3.)

Modern English /æ/ reflects a residue of Early Modern English /æ/. The bulk of the items now in the /æ/ class derive from OE words also having a low, front vowel phoneme. Borrowings into Middle English having French /a/ joined the /æ/ class (Labov in press p.16). In the English Vowel Shift the vowel in open syllables, that is, when long, was raised to /e/. The residual /æ/, appearing mainly in closed syllables, has lost yet more of its lexicon in varieties of American English. Kurath and McDavid (1961:6-8) summarize the historical developments as revealed through the LAMSAS survey and other early American dialectological work. Informants were elderly and would have acquired their phonology before the turn of the century. Although there was almost no variation among regions in the number of contrasts found for front vowels—/æ/ contrasted with two mid vowels and two high vowels, but in Eastern New England there was also front /ar/—there was variation in the number and kind of contrasts found for low vowels. Conservative speech showed /æ/ contrasting with one, two, or three other distinct low vowels. Except in Eastern New England, the low vowel phoneme closest in vowel space to /æ/ was, and of course is, /a/ as in *top, got, stock,* whether or not this was distinct from /ɔ/ or from /ar/. That is, /a/ before obstruents represents the collection of phones nearest /æ/. In all dialect areas of the Eastern North and South /ær/ long ago moved back and phonemicized as a central vowel or joined /a/. In most of the North and South /wæ/ moved back, rounding in some items, joining either /a/ or /ɔ/, as in *wasp, wash, water.* /æ/, then, has had a history of lexical attrition.

Since the Vowel Shift, with the exception of residual /ær/ in items like *marry, carry,* the sound changes involving /æ/ have been splits in which the vowel in some environments has moved back among the low vowels. There is one other historical backing process: /æ/ in some items, in which the vowel is before a voiceless fricative or before /n/ plus a nonback obstruent, backed to /a/, as in *ask, aunt, bath, branch, calf, dance, France, glass, laugh.* This process involved both lexical and phonetic conditioning. It was apparently an incomplete change in most American English varieties, although it was observed in all regions of the East except Western Pennsylvania. And apparently it has reversed itself in most regions. The '*ask* words' now generally have /æ/ in American English.

Of the forty-four diagnostic traits that DeCamp used to related San Francisco speech of the 1950s to Eastern English varieties, only two involved /æ/: /æ/ varied with /E/ in *married,* etc; /æ/ varied with /a/ in *calf, dance,* etc. Both of these represent loss of lexicon for /æ/. Labov (in press p.16) remarks that the residue that makes up /æ/ after the Vowel Shift is itself fronting and raising peripherally in many dialects of English under different conditions.

In Section 5.1. the distributions of (æ) and (æN) in informal speech are described. Section 5.2 is a consideration of the variables in formal speech.

5.1. (æ). The low variable, representing the distribution of /æ/ phones before obstruents, shows principal conditioning by manner. Variants followed by stops occupy an area in vowel space that centers to the front of and higher than those before fricatives for most speakers. The fricative area is gradually backing. There is further conditioning by voicing. Place of articulation of the following consonant interacts with voicing for even finer phonetic conditioning. Both the centers and the spreads of distributions will be discussed. A comparison of distribution centers for a speaker or of relationships among centers across speakers concerns mean points for F1 and F2. Spreads, or whole

distributions, concern the shape and extent of areas in vowel space of plotted vowel tokens of variables or subvariables. (See Chapter 4.)

5.1.1. (æ) before stops. The tokens of (æ) before stops occupy a range of low vowel space positioned between that of (æN) and (æ) before fricatives. (æT), (æK), and (æS) distributions center in front of and higher than (æS) for the majority of the main group speakers. The two oldest speakers, however, show distributions centering (æT) (Meg Cork) or (æK) (Marion Thompson) to the back of (æS). Also, the youngest working class informant, Ginger Ryan, Meg Cork's granddaughter, centers (æK) to the back of (æS). And Meg Cork has (æK) lower than (æS). For each speaker, however, a center for the whole stop environment distribution is between that of (æS) and (æN).

Before stops (æ) ranges back and low, front and high, while centering between the nasal and fricative environment areas. Some back and low tokens of (æP), (æT), (æK) are backer or lower than some, and for several speakers most or all, of the tokens of (æS). The front portion of the stop environment distributions overlaps slightly with (æN) even for three of the four main group younger speakers. The stop environment delimits the upper edge of (æ).

An inspection of the relative placement of centers for the distributions of (æT) and (æK) for the eight main group speakers, summarized in Table 1, reveals that (æT) is favored for frontness and height. (æK) is lower and backer. It is not useful to include (æP) because there are enough tokens in this environment for means to be obtained only for four of the eight main group speakers. (æP) is observably low within (æ) but shows no pattern across the four speakers for frontness.

Age of speaker is a factor, as is class. The younger main group speakers show frontness and height orders T>K. This is true for older middle class speakers as well. It appears that a distribution-internal realignment has taken place for working class speakers. Formerly (æK) positioned in front of and higher than (æT), but now the opposite is true. A table of means for F1 and F2 measurements is found at the beginning of Appendix A.

For Table 5.1 and other frontness and height order tables in this chapter differences between various pairs of means that underlie the relative ordering are not necessarily statistically significant; significant differences of means are noted in the discussion.

	working class speakers		middle class speakers	
	frontness	height	frontness	height
oldest	K>T	T>K	T>K	T>K
	K>T	KT	T>K	TK
	T>K	T>K	T>K	T>K
youngest	T>K	T>K	T>K	TK

Table 5.1. Relative frontness and height of stop environment centers for eight speakers, oldest pair to youngest pair. (If no > separates symbols, there is less than 10 Hz difference between F1 means or 20 Hz difference between F2 means.)

There is a pattern for front realizations of the variable in the voiced stop environment. The low percentage of voiced environment tokens among fronted vowel items is due to the relative paucity of these items in the corpus. There are five instances of (æg) in *tag, bag, mag* in the speech of main group informants. The three speakers who produced *tag* and *bag* front the vowel in these words; and the vowel in *mag* is a front token within Sharon Ryan's (æK) distribution, although (æd) tokens distribute still fronter. Supplementary speakers Barb Walsh and Rachel Stone front the vowel in *daggers* and *bags*. There is no instance of unfronted (æg).

There are many instances of unfronted (æd). Of 72 tokens of (æd), 37 are fronted. Three items account for 48 of the 72 tokens: *had* (29), *dad('s)* (14), and *bad* (5). Two of these frequently used words are frequently fronted: 20 instances of the vowel in *had* are fronted; four of the five instances of the vowel in *bad* are fronted.

5.1.1.1. Summary of observations. The distribution of tokens of (æ) before stops associates with (æ) before fricatives, in the sense that the stop environments are always overlapping with the fricative, for all speakers but *centers* to the front of (æS) and to the back of (æN). A following alveolar stop conditions a fronter realization than other stops. (æP) and (æK) center lower than (æT); (æK) also centers to the back of (æT). Voicing interacts with place. (æ) is fronted more often before voiced than voiceless stops.

(æg) consistently fronts across speakers; (æd) fronts variably. Lexical conditioning may be involved. The fronting of (æg) and (æd) shows no evidence of increasing over apparent time.

5.1.1.2. Informal speech vowel charts. Charts for the 14 informants, with all measured vowels plotted, each vowel identified by lexical item, are found in Appendix A. Charts showing the center points and the spreads of distributions for (æ) and for (æN) are found below. Examination of evidence from the main group of speakers proceeds from the charts of the oldest informants of both classes to the charts of younger speakers; consideration of the charts of supplementary group speakers follows that.

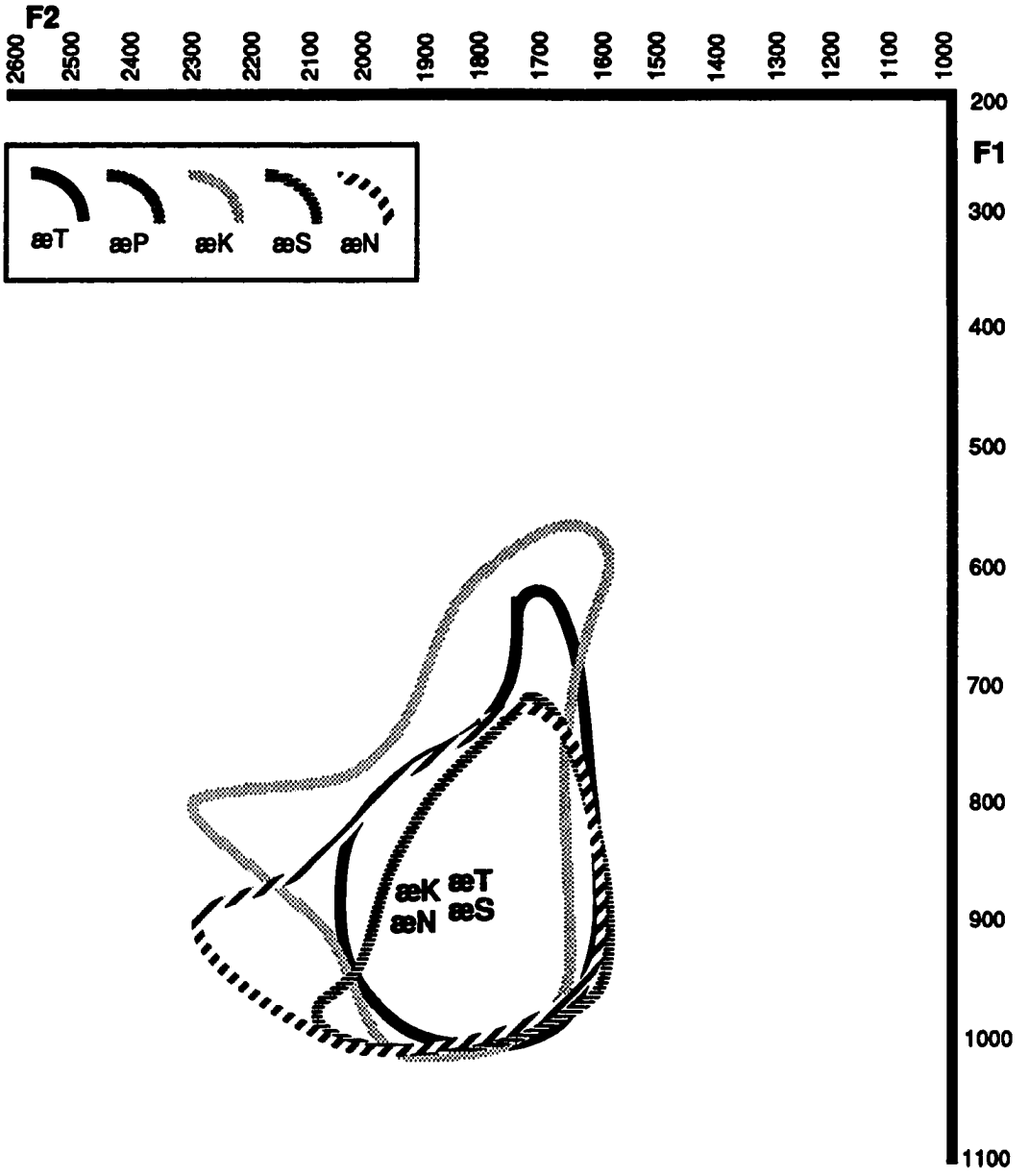

Figure 5.1. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Meg Cork, 74, working class.

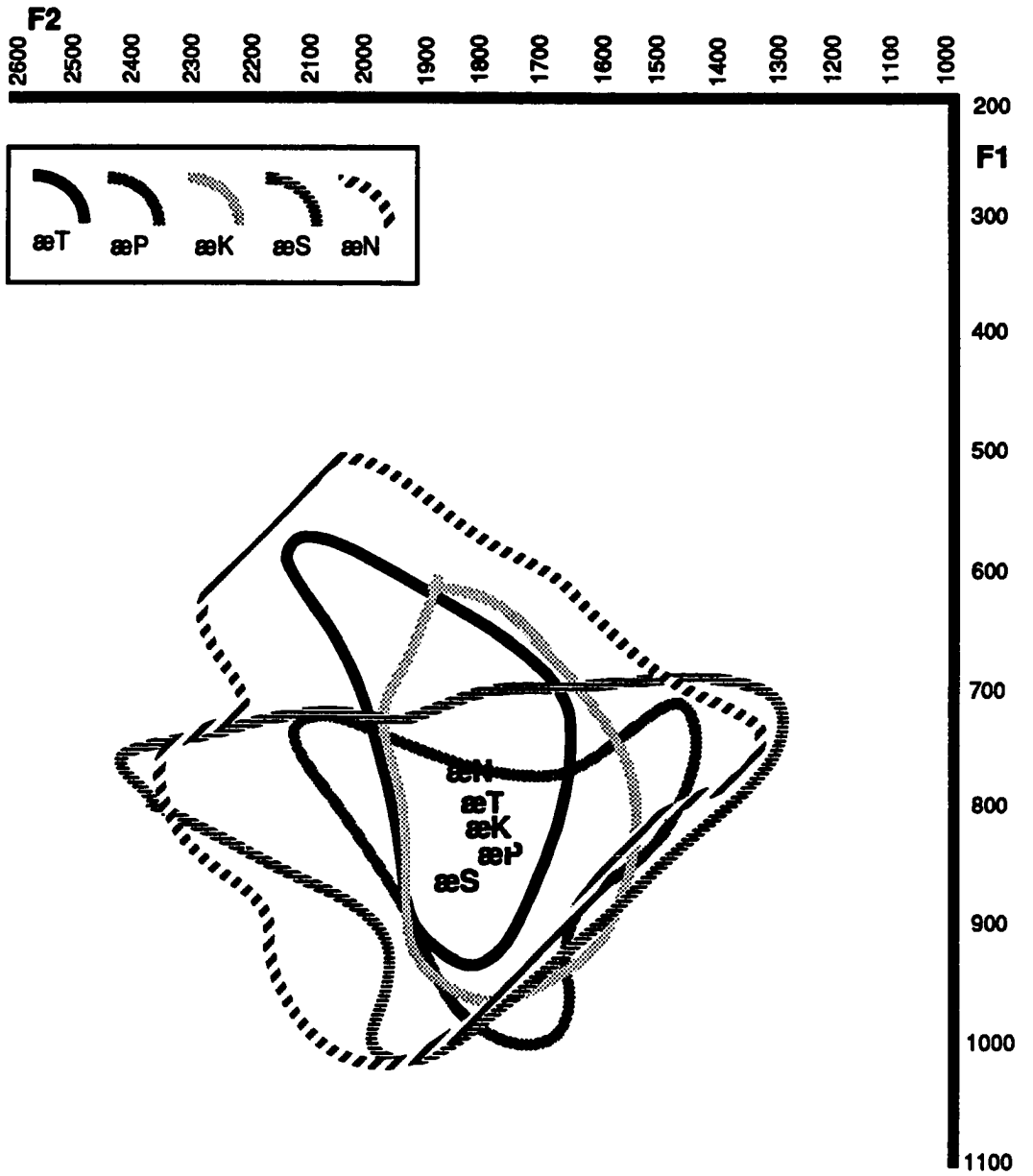

Figure 5.2. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Marion Thompson, 65, middle class.

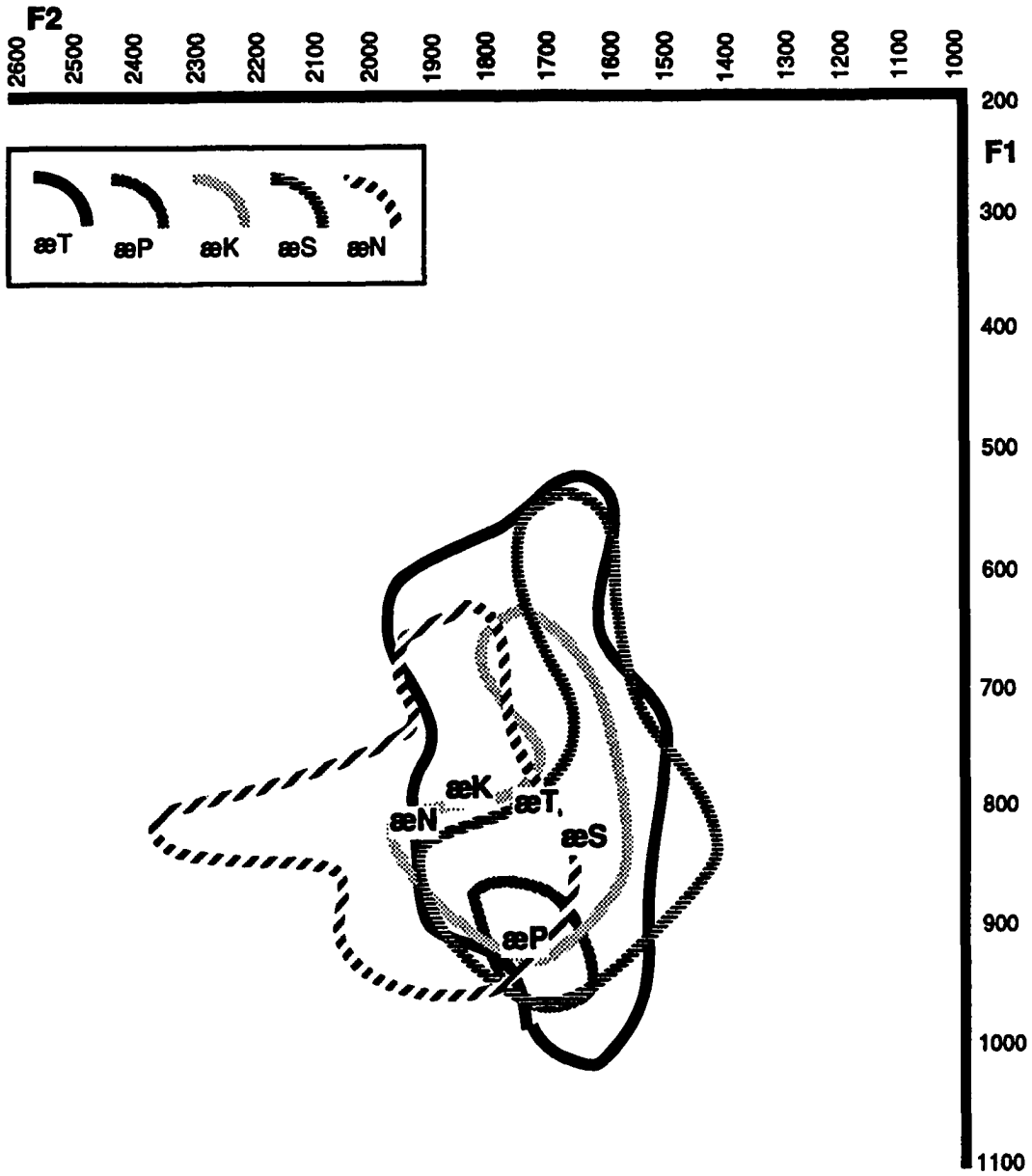

Figure 5.3. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Sharon Ryan, 45, working class.

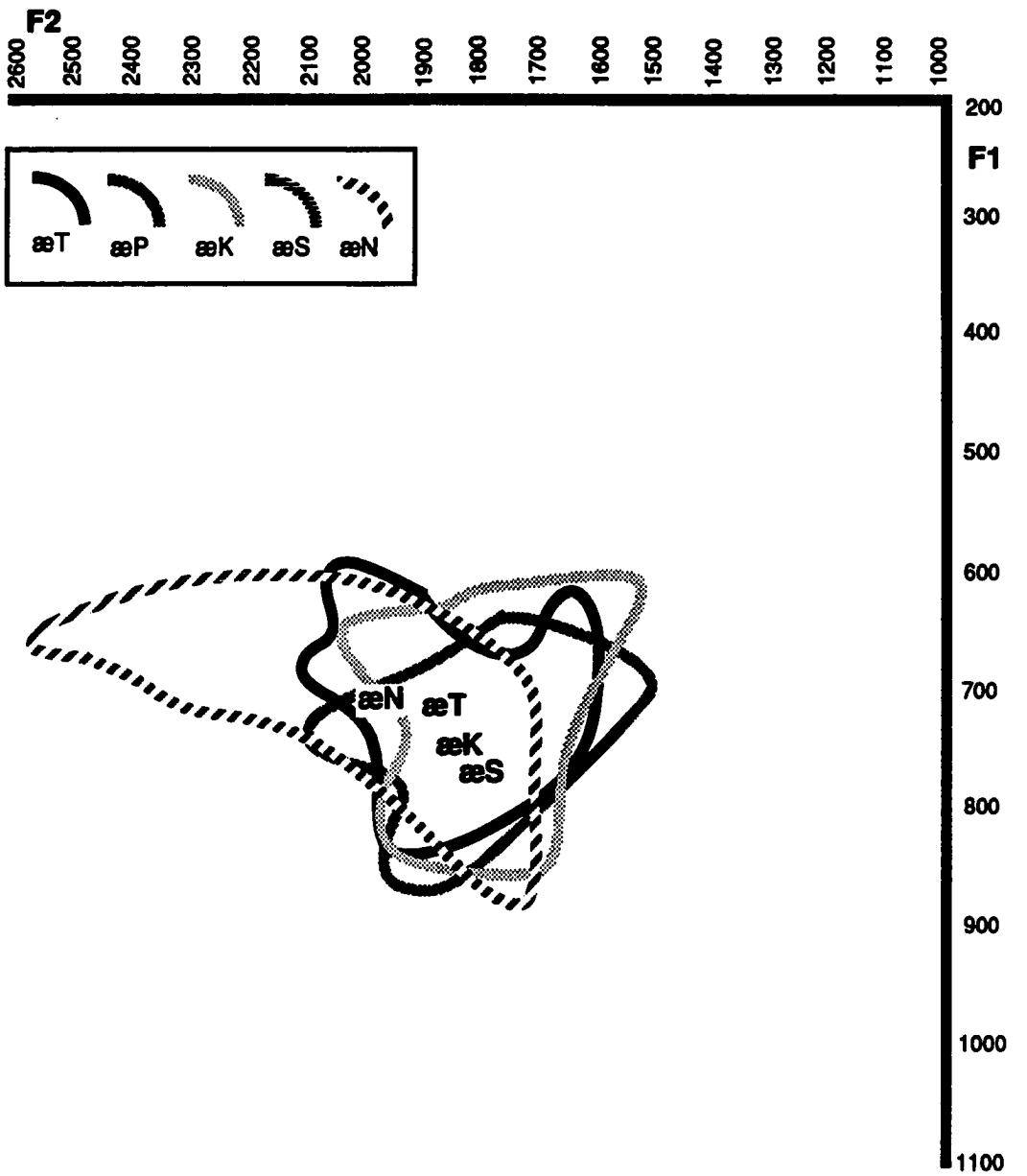

Figure 5.4. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Jean ORoark, 43, middle class.

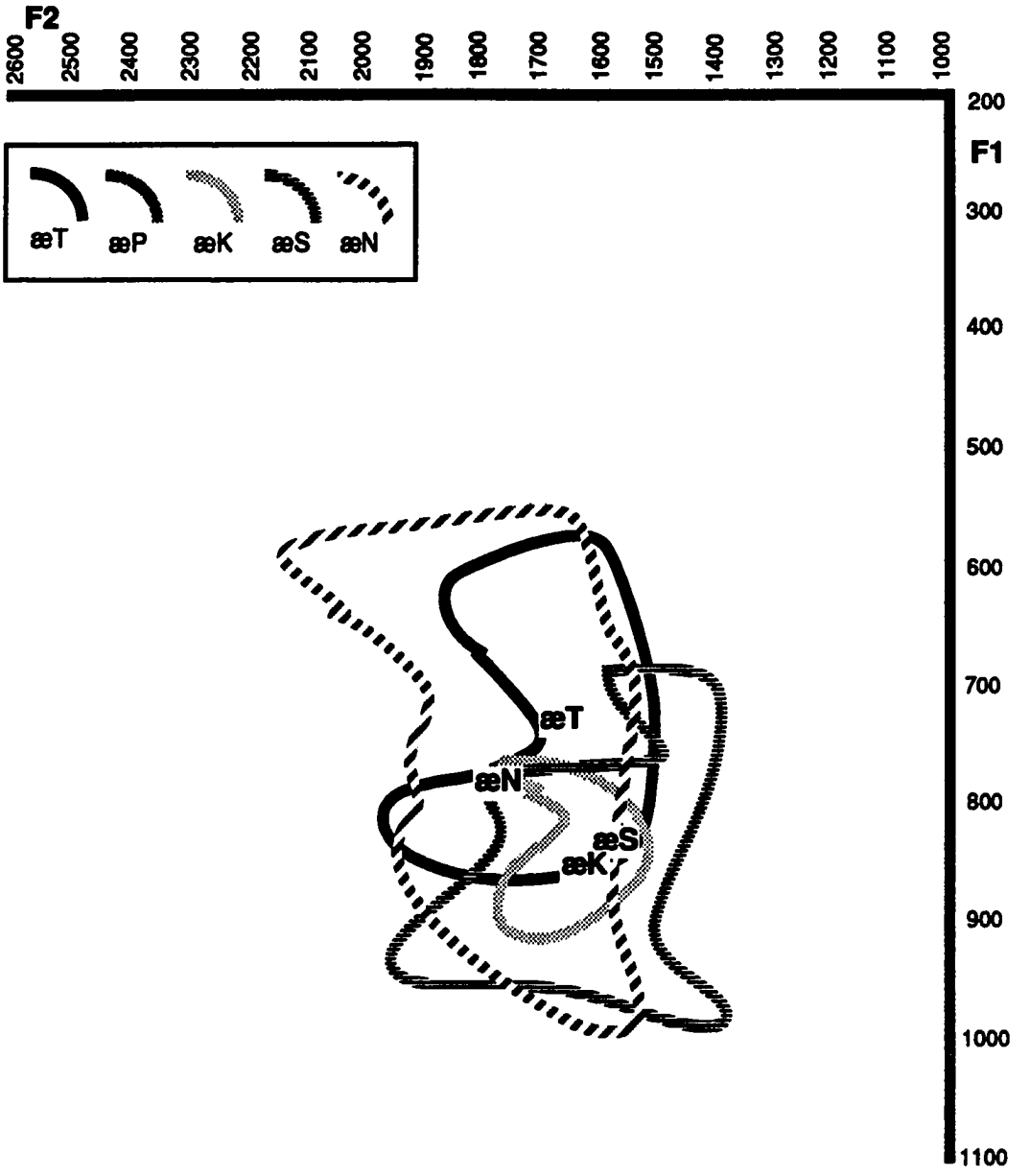

Figure 5.5. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Suzi Rockland, 34, working class.

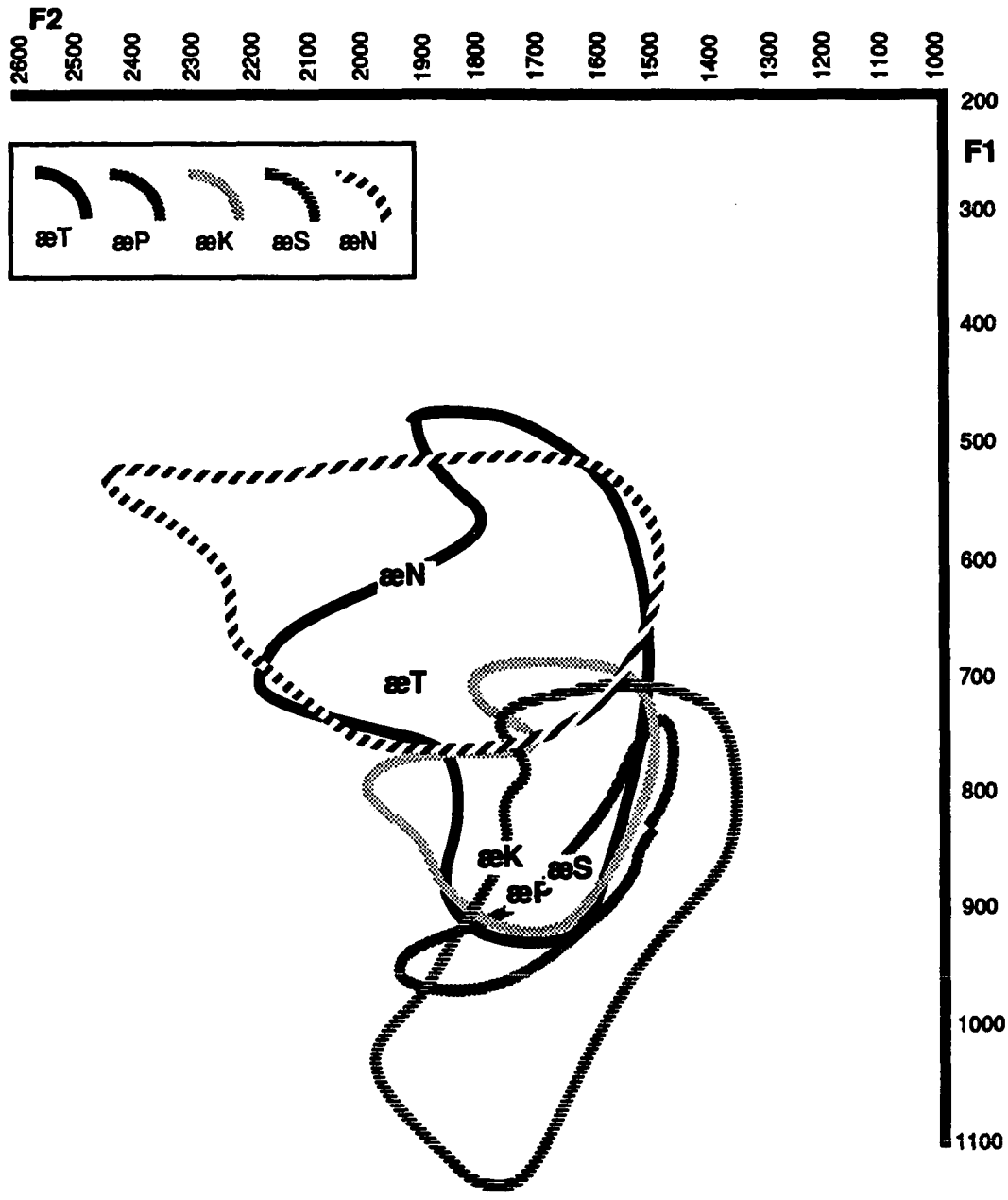

Figure 5.6. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Jesse Austin, 32, middle class.

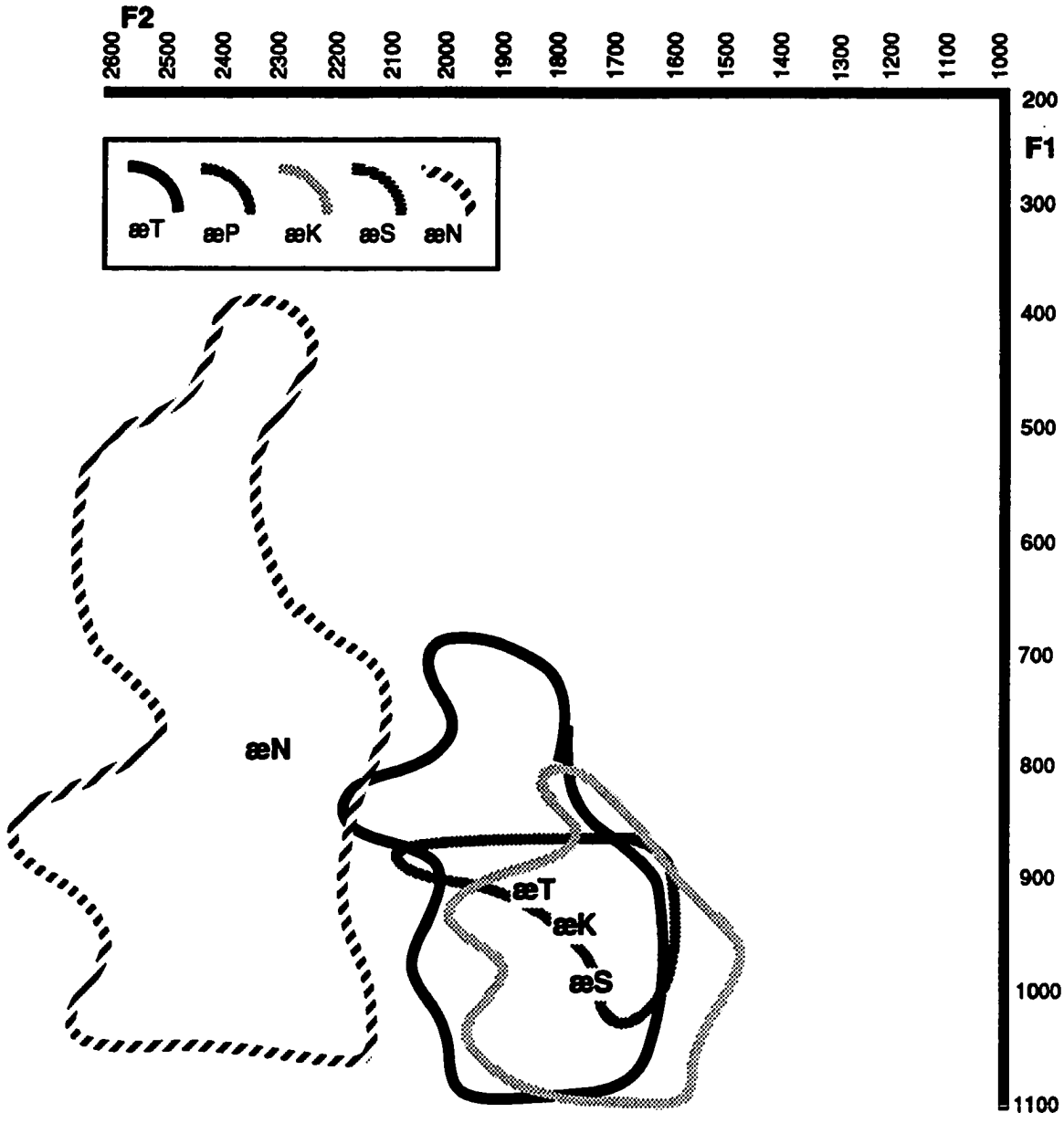

Figure 5.7. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Ginger Ryan, 22, working class.

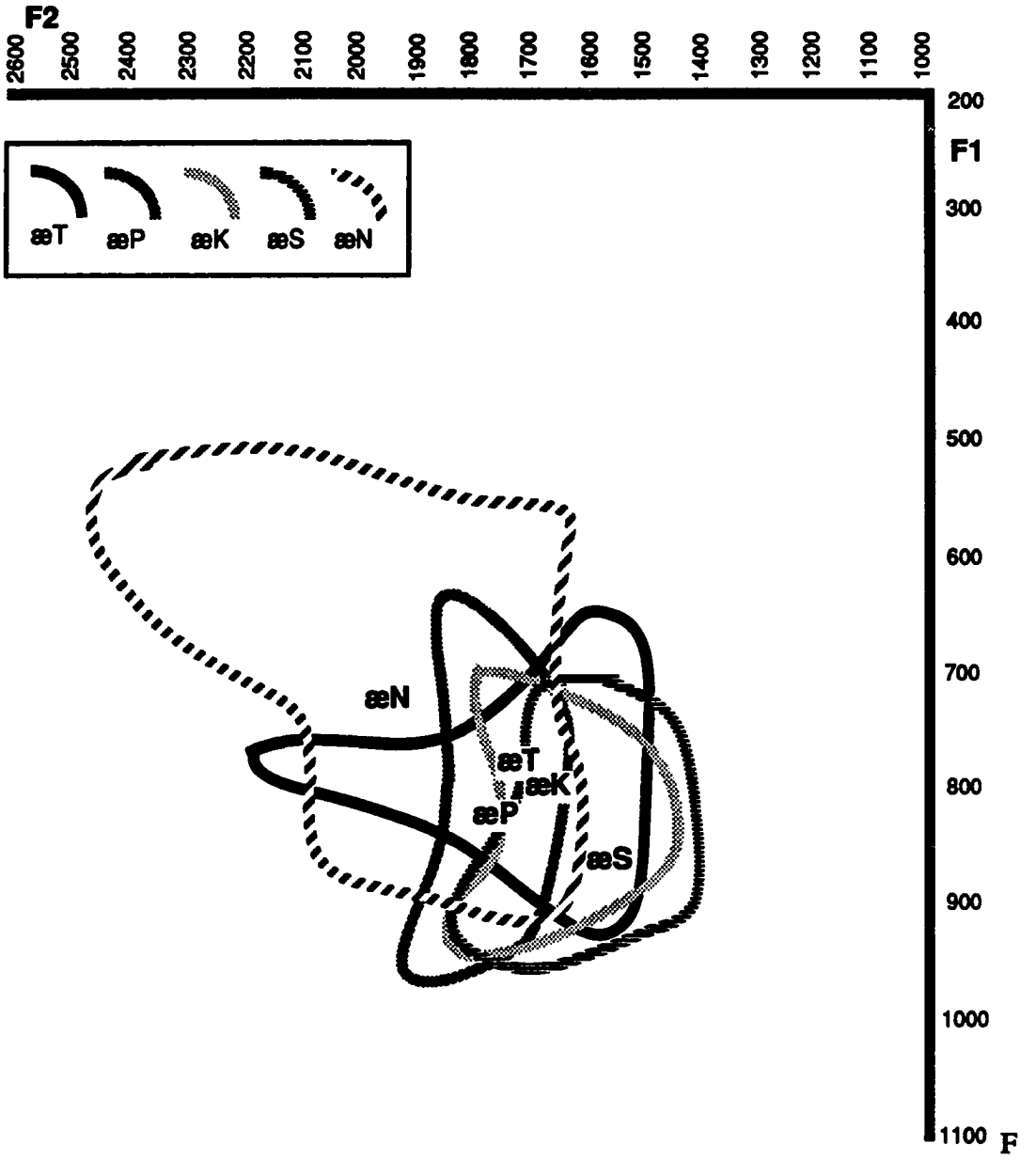

Figure 5.8. Distributional spreads and mean points for F1 and F2, for (æ) and (æN), Beth Thompson, 25, middle class.

The oldest informants are Meg Cork, 74, and Marion Thompson, 65. Meg Cork's (æ) and (æN) distributions, given in Figure 5.1, are almost completely overlapping. The whole is a rather tight distribution, with (æK) ranging as far forward as (æN). The most forward (æK) token is in *back*, with an F2 almost 300 Hz higher than for the next most forward tokens, both of *tag*. The vowel is diphthongized in *tag*, gliding in and up. All tokens of (æk), other than in the one in forward *back*, are less peripheral than the vowels in the voiced environment. Tokens of *that's* account for the higher area of (æ). Meg Cork and the other speaker of the oldest pair both center (æT) farther back than (æS); for Cork, (æK) centers forward of (æT). Cork's (æ) and (a) overlap. Numerous instances of (aT) in *got, not, lot* overlap with (æ) in the stop environments.

Marion Thompson's (æ) shows a rather dispersed distribution, with four or five notable outlying tokens: *bad, grabs* (both fronted); and *happened, hatch* (both backed). She also fronts the vowel in *adding, had*. Vowels in *hatch* and *slaps* are both quite low; the vowel in *hatch* is the lowest in her entire vowel chart. (æ) and (æN) for this speaker range lower than (a) even without *hatch*. The shapes of and centers for the distributions are shown in Figure 5.2. Just as for the other oldest speaker in the sample, Thompson's (æN) and (æ) overlap almost completely. The area of (æ) before stops is delimited at high front, high back, and low back points by vowels in nonvelar environments, the outliers *bad, happened, hatch*. The nucleus of *bad* is followed by a glide moving down and in. The glide ends at the center of the vowel-plus-stop distribution. Centers for (æP), (æT), and (æK), practically in the same place, are all to the back of and higher than the center for (æS). Note that both fronted tokens are in voiced environments. There is overlap between (æ) and (a) that includes the stop environments for both. Vowels in *got* and *had*, in *god* and *had, happening*, and in *got* and *actually, practically* have virtually identical F1 and F2 measurements; vowels in *Mac* and *blacked* are slightly backer than in *god*.

Sharon Ryan, 43, Meg Cork's daughter, and Jean ORoark, 45, are the middle-aged speakers. Sharon Ryan's (æ) and (æN) territories are partially but not largely overlapping,

as can be seen in Figure 5.3. The high and low points of the distributions of (æ) before stops are marked by vowels in *that*. All tokens at the front edge of the (æ) area are in voiced stop environments, with the exception of a vowel in *after*. Among these front phones are vowels in *sad* , *dad, had, mag*. The selected texts for Ryan have instances of words involved in lexical diffusion in the Northern Cities Shift, two of *sad* and four of *mad, madder*. (See Chapter 3.) (æ) is fronted in *madder* but not in the three instances of *mad;* the vowels in both *sad* tokens are relatively high and front. The variable in the stop environment is more dispersed than in the fricative environment.

Jean ORoark also has only partially overlapping (æ) and (æN) areas. Figure 5.4 includes the labelled token *tag,* which has a relatively peripheral vowel. Her (æd) distribution, represented only by numerous instances of the vowel in *had,* centers fronter than (æt) does; she fronts six out of nine tokens in the item *had.* The lowest vowel for (æ) is in *jacks*. The centers of distributions in the stop environments center forward of (æS) and above it. There is some phonetic overlap between (æ) before stops and (aT) in *got.* A single token of (ar) in *park,* completely isolated from ORoark's other (ar) vowels, intrudes into the (æ) area.

Suzi Rockland, 34, and Jesse Austin, 32, are two of the younger speakers. There is overlap of Rockland's (æ) and (æN), but the areas occupied by these variables are more separate than overlapping, as seen in Figure 5.5. (æT) centers well above (æK). The highest (æT) tokens are in two instances of *that's;* the vowel in *bad* is fronted, gliding down and in. For this speaker the vowel in *happen* is back of (æ) center but is not extremely backed. *Got, not,lot* have vowels that intrude into the (æT) and (æK) areas, although only slightly. Centralized tokens of (ar) also interfere with (æT).

Jesse Austin's dispersed distribution of (æ) is partially overlapping with (æN), but most of (æ) ranges back of and lower than (æN). Figure 5.6 shows an (æ) in stop environments for this speaker with high ranging (æT), mid (æK), and low (æP). The distribution of (æT) seems to move up and front from a target area, while (æK) seems to

extend down from a target area. The highest vowel is in *had*, the lowest vowels in a stop environment in *smack, action*. Note low, unfronted (æ) in *bad*. This speaker does not front the vowel before voiced alveolar. Austin uses no glides for (æ). (at) in *got, lot* intrudes into the area of (æT) and (æK).

Ginger Ryan, 22, Sharon Ryan's daughter, and Beth Thompson, Marion Thompson's daughter, are the study's youngest informants. Ryan's (æ) and (æN) distributions are entirely separate. A fronted token of (æd), in *had*, is the only (æ) token intruding into the (æN) area. Numerous fronted tokens of (aT) in *got, not* overlap with (æ)'s area, including with relatively front (æT). Her frontest vowels are in two tokens of *had*, the highest in tokens of *dad* and *that('s)*. These items also occur with backer and lower vowels. For this informant the centers of (æd) and (æt) are equally front. Some tokens of (æ) before stops are as low as the lowest tokens of (æS).

Beth Thompson shows overlap of (æ) and (æN) distributions, but the number of (æN) tokens with nuclei within the (æ) area is small. Thompson's (æ) distribution is rather compact, but there are four outlying vowel tokens, all of (æ) before stops, in *bad, wrap, clapped,* and *Patrick*. *Bad* marks the front extension of (æ), and *that* provides a very low token. There is no backing glide on the fronted vowel in *bad*. A second instance of *bad* has an unfronted vowel. *Clapped* , *imagine,* and *Patrick* mark the high edge of (æ). The vowel in *wrap* is the lowest in this speaker's chart, lower than vowel phones before voiceless fricatives. Two instances of *happened* have low vowels. (æd) centers well to the front of (æt). None of the measured tokens of (a) quite intrude into the (æ) area, as delimited by the measured tokens of (æ), with the exception of one vowel in *got*.

There is evidence from a majority of these informants of a position for (æ) before stops that is intermediate between (æS) and (æN), but ranges well forward and back of stop environment centers, and shows favoring of relatively front positions for vowels before voiced stops. This supported by data from supplementary group speakers. Refer to charts in Appendix A. For these six informants (æ) followed by stops always distributes to

the front of (æ) followed by fricatives. Further, these young informants all show separation of (æ) and (æN) distributions. The highest, frontest (æ) vowel for Carol Winter is in *had;* but she has much backer, lower vowels in *bad, sad, glad.* Tracy Sawyer fronts (æ) in *had;* but *sadness* contains vowel that is also her lowest one. *Happen* occurs with a low (æ). Like Winter, Nan Levine has (æ) before voiced stops unfronted. The vowel in *happening* is relatively low. In Barb Walsh's speech (æ) before voiced stops in *glad* and *vocabulary* are among the higher tokens but are not fronted. (æg) in *daggers* is extremely fronted, almost overlapping with (æN) in *and.* Walsh's rather dispersed distribution is marked at the highest point by a vowel in *glad,* the frontmost point by the vowel in *daggers,* and the lowest point by the vowel in *interaction.* There is also a very low vowel in *back.* The front of Maureen Donovan's (æ) territory is defined by (æd) tokens in *had.* Interestingly, Rachel Stone appears to have two (æ) areas, a fronter one for the variable before voiced stops and a backer one for (æ) before voiceless stops and fricatives. One token of (æd) is found in the backer area, but the other voiced stop environment tokens, in *bags* and two instances of *bad,* make up the fronter area.

5.1.2. (æ) before fricatives. The vowel before fricatives is the variant that behaves most like a low vowel among low vowels. The distribution of (æ) before fricatives makes up the back and low areas of (æ) for most of the main group informants. The most centralized tokens of (æS) largely or wholly define the back wall of (æ) space and the low periphery of front and central vowel space in chart after chart. For most of the speakers the center of (æS) is farther from the center of (æN) than the center of (æ) before stops; and the distribution of (æS) tokens overlaps less with that of (æN) than (æ) before stops. The distribution of tokens of the variable (æS) represents suballophonic conditioning by manner. Two processes are discernible. Over apparent time (æS) is gradually backing. There is also a rule governing lowering of (æ) when followed by a fricative or a stop-plus-fricative.

There are some differences between individuals for the frontness and height orders of obstruent environment centers. Table 5.2 below shows that neither of the two oldest speakers has (æS) backest among obstruent environment distributions, and of these two speakers only middle class Marion Thompson has it lowest. All the speakers under 50 put the centers of (æS) both backest and lowest within (æ), with the exception of Suzi Rockland, whose (æK) area centers slightly lower than (æS). It appears that a realignment internal to (æ) had taken place in the phonology by the time the now forty year old speakers acquired language. (æS) became established as the backest and lowest environmental area for /æ/; somewhat later a front position for (æT) before (æK) became established across class of speaker.

	working class speakers		middle class speakers	
	frontness	height	frontness	height
oldest	K>ST	T>KS	STK	TK>S
	KTS	KT>S	T>K>S	T>KS
	T>K>S	T>SK	T>K>S	T>KS
youngest	T>K>S	T>K>S	T>K>S	TK>S

Table 5.2. Relative frontness and height of obstruent environment centers for eight speakers, oldest pair to youngest pair. (If no > separates symbols, there is less than 10 Hz difference between F1 means or 20 Hz difference between F2 means.)

For all the the main group speakers (æS) spreads farthest to the back. That is, all the speakers including the oldest ones have a range for (æS) tokens that extends farther back in low vowel space than ranges for other obstruent environments. This can be seen in Figures 5.1-5.8, showing centers and spreads for the variables (æ) and (æN), but is not revealed in the table above, which gives information only for centers, not ranges, of distributions.

Of the supplementary group informants, Carol Winter has (æS) backer and lower than the rest of (æ), but four other speakers show some tokens of (æ) before stops occurring lower than any (æS) tokens, although (æS) accounts for most or all of the backest vowels. The sixth supplementary group speaker, Rachel Stone, who appears to

have almost a complementary distribution of /æ/ before nasals, /æ/ before voiced stops, and /æ/ before other obstruents, actually distributes (æS) to the front of (æP) and (æK).

5.1.2.1. Conditioning involving frication. There is evidence from overall distributions of (æ) that backing of (æS) overall has become favored over lowering. While all speakers under 50 center (æS) below (æ) before stops, younger speakers are not more extreme in this than middle-aged informants.

The treatment of (æ) as two different distributions, one having the vowel before stops, the other before fricatives, is justified by the discernible tendency for vowel phones before fricatives to be lower and/or backer than phones before stops. The conditioning at work that results in this, however, involves stops as well as fricatives. The presence of frication immediately following the vowel or at a distance conditions lowering. Lowering does not entail backing. Some but not all of the same conditionings are involved for both movements, and the relative weightings of constraints are different.

Over apparent time centralization of (æS) has increased. Percentages of backing within the whole (æ) range for (æS) for the four age group dyads of the main group speakers, calculated after normalization of F2 means across speakers, are as follows:

20s: 71% 30s:63% 40s:47% over 60:47%

That is, an average of F2 measurements for (æS) for the youngest dyad is 71% of the way along a line representing back to front range for (æ) as a whole; for the informants in their 30s, 63% of the way; for the dyad in their 40s, 47% of the way; and for speakers over 60, also 47%. Together, the oldest main group speakers do not back (æS) within (æ), although stop environments may center more forward; together, the youngest main group speakers do back (æS), and they do so more than speakers in their thirties do. A test for difference of means comparing youngest with oldest dyads shows significance at better than .001. It is worth noting that this difference in means can not be easily seen in inspection of vowel charts. The change over time is not as dramatic as the tensing of (æN), to be discussed below.

Percentages of lowering for the four age group dyads are as follows:

20s: 57% 30s:57% 40s:57% over 60:57%

Lowering is not increasing.

Prevocalic and postvocalic /l/ conditions both lowering and backing when the vowel is also in a fricative environment. The presence of /r/ impedes lowering but enhances backing. Across speakers lowering and backing percentages within (æS) are as follows in fricative environments when either /l/ or /r/ is also found:

lowering in presence of /r/	35%
lowering in presence of /l/	73%
backing in presence of /r/	70%
backing in presence of /l/	72%

(æ) followed by a fricative and a vowel is most likely to be low; then (æ) followed by a fricative and word boundary or a stop; then (æ) followed by stop-plus-fricative; lowering percentages are 66, 60, and 57. The vowel is most likely to centralize when followed by a fricative and word boundary; backing in this environment is 62%.

Within the general backing of (æS) there is weighting for both relatively back and relatively low realization. Although lowering is not increasing there is a set of ordered constraints governing vowel height.

There is some evidence of lexical conditioning. Tokens of the vowel in *that's* are never found low within the (æ) distribution as a whole, although a stop-plus-fricative combination does condition lowering to some degree for the vowel in other items. In *that's* the vowel tends to be realized high within (æ). (æS) in *class* has a backing mean greater than is expected for the vowel preceded by /l/ and followed by fricative and word boundary. These two factors condition centralization; the backing percentage is 62. The vowel in *class* has a backing mean placing it 79% of the way along a line representing the front-to-back range of (æS).

Ask, half, and *laugh,* three (æS) items for which there are tokens in the sample used here, are *ask* words. In several American English varieties the vowel in these words has a history of variability, alternating between [æ] and [a]. A fourth item in the corpus, *rather,* having its own history, has a vowel that has also alternated between [æ] and [a]. The background of variation for /æ/ in these words is not reflected here. Although a list of the backest several vowels in the fricative environment for each individual—*asking, class(es), hassles, have, last, laugh, passed, plastic, rather, traffic*—includes three of the four words showing alternation in some American English varieties, there are a number of other words with just as extreme vowels. Further, in the total (æS) distributions *ask, half, laugh* and *rather* tokens do not have relatively back vowels more often than other (æS) words. For San Franciscans lexical conditioning for a low back realization of /æ/ in a voiceless fricative environment seems to have nothing to do with the history of *ask* words.

5.1.2.2. Summary of observations. A change appears to have taken place in the pattern of fine phonetic conditioning for /æ/ more than 40 years ago that resulted in a favoring of low and back positioning for (æS). Speakers under 50 have a (æS) area that is lower and backer than areas for (æT) or (æK). Backing is increasing over apparent time; lowering is not. Relative weightings of constraints can be discerned for both backing and lowering processes. The presence of /l/ encourages both lowering and backing; /r/ encourages centralization, but not lowering. Outside of the liquid environment, a vowel is most likely to be lowered if it precedes a fricative and another vowel. (æ) is most likely to be backed if it precedes a fricative and word boundary. Lexical conditioning for relatively back vowels in *ask* items is attested in the history of /æ/ but is not found to play a part now in variation in San Francisco White English. Rather, the word *class* conditions backing of (æ).

5.1.2.3. Informal speech vowel charts. Figures 5.1 and 5.2, above, show the environment centers and the ranges of distribution by environment within (æ) for Meg Cork and Marion Thompson. For Cork (æS) ranges slightly more toward the center of her

vowel space than the vowel before stops, but does not range as low as either (æK)—represented by *back, plaque*—or (æN). Her lowest (æS) token is before a consonant cluster in *passed*. Stop environments, particularly (æK), range much farther forward than (æS); (æS) occupies no low, front space. The back wall of the (æ) area is defined by the vowels in *last* and *have*. Cork is one of the few speakers producing (æ) before voiced fricatives in items other than *have: Avenue, travelled, travelling*. This speaker's (æS) before voiceless fricatives centers almost at the same point as her (æS) before voiced fricatives. While there is overlap between (æ) in stop environments and (aT), most of the overlap between (æ) and (a) is found between (æS) and (aT). The most forward tokens of (aT) have F2 heights that put them in the very same area as the bulk of the (æS) distribution.

Marion Thompson's (æS) is not nearly as contained as Meg Cork's. (æS), centering lowest within (æ), also distributes low (although (æT) distributes almost as low) as well as to the front and the back of her total (æ) and (æN) area. There is no relatively high range for (æS). Her lowest vowel is in *afternoon*. Other very low vowels are in *past, blasted, passing, gathering, slaps,* and *hatch*. Consonant clusters containing fricatives provide the environments for the five lowest vowels in her entire chart. Thompson diphthongizes the vowel in *past, gasp, after*. The backing, lowering glides in *past* and *gasp* bring the vowels to the central cluster of tokens; the inglide in *after* raises the vowel somewhat. The nucleus of the vowel in *past* is the frontmost instance of (æS). Thompson's most centralized nuclei are in *mask* and *rather*. Note the extreme position of the vowel in *rather* for this speaker. Although there is overlap between Thompson's (æ) and (a) when (æ) occurs before stops there is almost no overlap of (æS) and (aT).

Sharon Ryan and Jean ORoark are the oldest speakers in the sample to center (æS) both to the back of and lower than stop environment centers. Figures 5.3 and 5.4 show the centers and spreads. Ryan's (æS) distribution clusters low, closely around the environment center; the only two outlying vowel tokens are relatively high vowels in *after*

and *Ashbury*. The distribution of (æS) overlaps with (æN) less than (æ) before stops does. Only a fronted vowel in *after* is within the (æN) range. The back wall of (æ) is defined by tokens in *have, plastic,* and the *ask* word *laugh*. For Ryan the consonant cluster environment does not favor lowering or backing of the vowel. *Plastic* has the backest vowel; but tokens in *after, Ashbury, asked,* and *basket* are not relatively back or low. There is overlap of the low range of (aT) with the low and back area of (æS).

Jean ORoark's (æS) ranges farther back than other environments but not lower. Backest tokens are in *have* and *class*. There are also unbacked vowels in instances of *have,* but the vowel in *class* is always relatively back for this speaker and others. The prevocalic /l/ favors a centralized realization. There is some overlap between (æS) and (aT).

Suzi Rockland's and Jesse Austin's (æS) distributions are shown in Figures 5.5 and 5.6. Suzi Rockland's (æS) centers to the back of her (æT) and (æK) mid-points. (æS) also ranges well back of and lower than (æ) in the stop environments. A low, back point for the vowel is found in *hassles*. There is little overlap with the (æN) range, but the vowel in *family* is as low as, although fronter than, the vowel in *hassles*. (æS) tokens in *ask* are not low or back. In *glasses* (æ) is lowered but not backed, in spite of the /l/. Also note the front token in *harassing*. There is a great deal of overlap between (æS) and (aT). (æ) distributes lower than (a) for this speaker, as for most others, but the higher back portion of the area of (æS) overlaps with most of the distribution of (aT).

Jesse Austin's (æS) is marked at its low point by a vowel in *hassled,* just as Rockland's is marked by (æS) in *hassles*. The back of (æ) space is marked by (æS) in *class*. (æS), centering below (æT) but almost at the same height as (æK), distributes generally low and back within (æ). Austin centers (æT) above (æP) above (æK). Below these she centers (æS). There is virtually no overlap with (æN) and little with (æT). The front portion of the area for (aT) overlaps with the backest, highest part of (æS), represented by vowels in *after, class, last.*

Ginger Ryan and Beth Thompson center and distribute (æS) low and to the back of the rest of (æ), as shown in Figures 5.7 and 5.8. Ryan, the youngest informant in the study, has very low tokens of (æ) in *after, asshole, class,* and *passed,* as well as in *Japanese* and *paddled.* The backest vowels are in *have. Have* also occurs twice with an unbacked vowel. The vowel in *asking* is low and back once but not in two other instances. Clusters containing fricatives favor low or back realization of the vowel variably. No part of Ryan's (æ) distribution overlaps with (æN), but the area of (æS) is separated from (æN) more than the rest of (æ) is, since (æS) does not range to the front at all. Overlap between (æS) and (aT) is great.

The center of (æS) for Beth Thompson is more extremely placed in relation to the rest of (æ) than for any other main group speaker. It is much lower and backer than centers for (æT) or (æK). This is due to the occurrence of numerous tokens of the vowel in *class,* in which the liquid favors backing and lowering. Because of this item, and a single vowel token in *passed,* Thompson's (æS) also extends back of and lower than (æ) in stop environments. An overall low back distribution for (æS) relative to (æT) or (æK) is evidenced by vowels in the items *asked, nasty, laughing.* These and the vowel in one instance of *class* mark the front of (æS), and it is in back of the forward areas of the stop environments. There is very little overlap between (æS) and (æN). Further, there is almost no overlap between (æS) and (aT). For this speaker (æ) hardly extends lower than (a).

Appendix A shows charts of (æN) and (æ) for the six supplementary group speakers. Carol Winter's vowels in *Afro* and *half* are notably low and back; she also has an unlowered vowel in *have.* Note low, centralized vowels in *laugh* (Tracy Sawyer) and *asking* (Barb Walsh). Walsh also has backed vowels in her several tokens of *class(es).* Maureen Donovan's lowest token of (æS) is in *collapsed;* the vowels in *after* and *passed* are higher. For these five speakers (æS) clearly distributes more centrally than (æ) before stops although there is overlap between areas. For Rachel Stone (æS) distributes to the

back of (æ) before voiced stops; there is almost complete separation of the areas. Voiceless stop environments, however, appear to favor slightly more centralized realizations of (æ). Stone's lowest (æ) tokens all occur before consonant clusters: *after, bags, Blacks, facts, task*. There is a single higher vowel token in *after*. None of these speakers diphthongizes (æS).

5.1.3. (æ) before nasals. When followed by a nasal consonant /æ/ fronts and raises. Fronting is more consistent than raising. An increase in both kinds of movement is observable through apparent time. This section traces the apparent phonetic course of a subphonemic change that has been producing the allophone /æN/. Complementarity has been established. The tensing process, however, may continue. The variation observable across speakers of different ages and among informants of approximately the same age is subject to linguistic and social constraints. These are considered separately.

5.1.3.1. Phonetic course of the development of an allophone. (æN) represents the distribution and movement of part of a phonologically low front vowel phoneme. The variation that defines (æN) involves tensing of /æ/__[+nas], which, by bringing some of /æ/ forward, brings the lower front edge of vowel space forward for San Francisco White English. Vowel tenseness is a phonological phenomenon. It is not a matter of the presence or absence of one phonetically defined feature, nor a difference in degree of any one acoustic cue or articulatory gesture on some scale. Several cues are involved. The one with apparent priority is peripherality. (See Chapter 3.) The importance of peripherality is obvious in English phonology. Tense vowels are fronter than lax front vowel counterparts and backer than lax back vowel counterparts. A difference in syllable weight is also associated with a tense-lax difference. Vowels with glides or long nuclei are tense relative to simple short vowels. (See Labov, in press, pp.7-8, 14-16, for brief discussions of vowel tenseness.) Chomsky and Halle (1968) state that the feature [±tense] is mainly definable as a difference in degree of supraglottal muscular

effort; tense sounds are made with more effort. The claim is controversial (see, e.g. Catford 1977:207-208) and need not be debated here.

Labov (in press; also Labov, Yaeger, and Steiner 1972) treats vowel tenseness versus laxness, or relative peripherality versus nonperipherality, as a feature chiefly distinguishing vowels involved in contrary movements in chain shifts: peripheral nuclei rise; non-peripheral nuclei fall. (See Chapter 3.) In chain shifts distinctions are maintained as whole phonemes move within rotations, or new distinctions are created through split, as is claimed for English in Philadelphia. A tense collection of vowel phones has split from a lax collection for /æ/, resulting in /æh/ versus /æ/; the separation is marginally phonemic and not simply allophonic because it is not simply phonetically conditioned. (See Chapter 3.) In San Francisco White English a collection of phones has been separating from a lax collection for /æ/; the result is complementarity rather than contrast at this time because the phonetic conditioning is clear. The speech of younger informants shows that adults in San Francisco already have, or almost have, a complete allophonic distinction between /æ/ and /æN/.

The distribution of tokens of (æN) represents the only portion of /æ/ that has separated from (æ) to produce complementarity. (æN) accounts for that portion of /æ/ that distributes as a peripheral vowel. There are low front variants, but these are within a distribution that ranges front and up from low vowel space. A point near the end of a process of change in phonological status for the variable (æN) can be observed in the speech of younger informants. A point that appears to be near the beginning of a sound change can be observed in the speech of informants who acquired their phonology more than half a century ago. Through apparent time variation involving (æN) can be seen to assume direction, carrying the nasalized vowels more and more forward and further and further up within front vowel space.

Two movement rules are involved; the fronting rule has priority. For all ages of speakers, centers for the (æN) distributions are consistently higher for middle class

speakers than for working class speakers, as discussed in 5.1.3.2. As long as 60 years ago or more the phonology of middle class white San Franciscans realized nasalized /æ/ higher than working class speakers. When tensing began, it began as a fronting movement, with some raising, across class of speaker. It would be good to state the process with one tensing rule in which a fronting movement is given priority over raising, but no formalism allows for separate statements of structural change, with different weightings of these, within the same rule, although tensing as a unity can be expressed as a matter of degree. Labov, Yaeger, and Steiner (1972:pp.48-49) solve the problem of this formal limitation by writing a tensing rule that is actually a rule for increasing peripherality, followed by a raising rule that is fed its structural description by the tensing rule. (See Chapter 3, note 3.) The important thing is that raising depends on and follows from fronting. This observation about diachronic process in the first and third dialects of English corresponds to the acoustic fact that peripherality is the main cue to phonological tenseness.

In the speech of the two oldest informants in the main group of speakers there is some fronting of (æN); but (æS) ranges just as far forward; in fact, (æN) overlaps greatly with all of (æ). For the middle-aged speakers (æN) fronts more, overlapping less with (æ); (æS) does not range forward of (æT). For speakers in their early thirties (æN) is clearly in the process of separating from (æ), but there is still overlap between the areas. This is also the situation for 25 year old Beth Thompson. For twenty-two year old Ginger Ryan (æN) has completely separated from (æ). All six of the supplementary speakers, in their early thirties, show separation of (æN) from (æ). Figures 5.1-5.8 and charts for (æ) and (æN) in Appendix A show the process.

5.1.3.1.1. Fine phonetic conditioning. Within the distribution of (æN) across age of speaker finer phonetic conditioning is found. The most extreme tensing—that is, fronting and raising together—is favored overall by a following alveolar

environment. There are different fronting and raising orders, however, for variants in several environments, as shown in Table 5. 3.

	Working Class		Middle Class	
oldest	fronting	raising	fronting	raising
	nT n#	n# nT	ŋ nT n# m	n# nT m ŋ
	n# nT m	n# nT m	nT n#	nT n#
	nT m n#	nT n# m	nT n#	nT n#
youngest	nT/n# m	n# nT m	ŋ nT	nT ŋ

Table 3. Fronting and raising orders for (æN) in several environments for the eight main group speakers, oldest to youngest by class. (n# = (æn#); nT=(ænt/d); m=(æm); ng=(æng).)

Not every speaker produced enough tokens of the nasalized vowel in each environment for environmental centers to be calculated. Table 5.3 shows gaps for environments in the orders given for certain speakers; the placement of gaps presumes that the more complete orders for some speakers would hold for other speakers; it is possible that a larger sample of measured vowel tokens would show this to be false.

Given the orders of the centers above, it can be seen that (æn#) varies with (ænd)/(ænt) for highest position across age of speaker. One speaker, Suzi Rockland, shows a higher center for (æm) than (æ#); her high center for (æm) is largely dependent on vowel in three tokens of *grandmother,* and the underlying alveolar plosive may have influenced the vowel height. Marion Thompson centers (æm) higher than (æŋ) Two of the main group speakers for whom (æng) centers were not plotted do each have one token of (æŋ). Jean ORoark's vowel in *thanked* is higher than her vowel in *slam.* Suzi Rockland's stressed vowel in *language* is lower than her center for (æm). The relative heights of (æm) and (æŋ) are not certain.

(æm) is least favored for fronting. The four speakers for whom (æm) centers can be found keep the vowels relatively unfronted. Jean ORoark and Beth Thompson give single unfronted vowel tokens in *slam, cramming.* Jesse Austin produces her frontest, and nearly highest, token of (æN) in *Hampshire;* this is also the only vowel that she

diphthongizes, drawing the vowel back and down with an inglide that ends almost at the back wall of her (æN) space.

It may be that the velar nasal encourages fronting the most, while keeping the vowel relatively low. The velar plosive conditions fronting for (æ), so two constraints, place of articulation and nasality, are probably at work. Two speakers center (æŋ) in front of (ænT). It is not certain that (æng) is most favored for fronting across speakers, but there is no contrary evidence.

Environmental constraints for fronting and raising have not reordered over time. The following ordering generalization can be suggested:

fronting	raising
æŋ æn æm	æn æm æŋ

(æm) is favored for neither fronting nor raising. (æŋ) tends to be front, but it is also kept low. (æn) is both fronted and raised; this makes it the most favored for tensing in general.

The orders given above are for environment centers. The most fronted and raised tokens (æN) for a speaker may not be in the same environments as the most forward or highest environment centers. The most extreme fronting of (æN) is found, for speaker after speaker, in the environment before /n/ and particularly before /nt/ or /nd/; the exceptional speaker is Beth Thompson with fronted (æŋ) nuclei that glide even farther forward. That is (æn#) and (ænT range forward of the distribution of (æŋ). Items in which the vowel is extremely fronted for more than one person are *can't* and *hand(s)*. These are also frequently used words, occurring in the sampled speech of half or more of the main group speakers. (æN) in *hand(s)* is particularly fronted for four of the six speakers who use the word, including one supplementary group informant. Fronting happens across class and age. The vowel before alveolar nasal and plosive is extremely fronted in *sand* for Sharon Ryan, *understanding* for Suzi Rockland, and *understand* for Carol Winter.

Extreme raising of (æN) relative to a total token distribution for a speaker is found in the alveolar environment more than in the labial or velar ones. The vowel in *can* shows extreme raising in the speech of Suzi Rockland and Ginger Ryan. Supplementary group speaker Tracy Sawyer has three extremely high tokens of (æN) in *can*. The vowel in this word is once raised within the (æN) area for Jean ORoark and twice unraised. In the same environment the vowel shows extreme raising in *Ann's* for Meg Cork, *Japan* for Marion Thompson, *San* for Sharon Ryan and *Jan* for Barb Walsh.

There is no evidence of lexical diffusion. The tensing of (æN) has been a swift sound change in San Francisco. Lexical conditioning is observed for more gradual changes, such as the backing of (æS) and the fronting of (aT).

5.1.3.1.2. The (æN) change process. The process of increased tensing of (æN) through apparent time is the progress of a subphonemic sound change and therefore a process that results in the change of status for a rule (or rules). (æN) fronts and raises variably. Finally complementarity is established. A variable rule (or variable rules) accounting for the fronting and raising movements is either replaced by or exists alongside a categorical rule stating that before a nasal consonant /æ/ becomes tense, that is, /æN/ is both fronted and raised relative to /æ/ elsewhere. It is not clear that the tensing process is finished phonetically; it is not clear that a variable tensing rule is 'dormant'—(æN) can be further tensed. Tensing itself, however, is predictable. Vowel charts for informants in this study reveal that, on the one hand, part of (æN) is and has been isolated in a low peripheral corner of front vowel space and, on the other hand, part of (æN) has moved up and probably continues to move up a peripheral track; this raising necessarily decreases the phonological space between (æN) and the distributions of nonlow front vowels.

For most of the main group speakers the range of (æN) includes a fronted area that is as low or nearly as low as the lowest portion of (æ). Some tokens of (æn) and (æng) are found particularly low and front: *antsy, can't, San, Spanish; angle, gangs, hanger, tangling*. The youngest speaker in the sample, Ginger Ryan, who separates (æN)

completely from (æ), maintains a very low (æN) area, the front limits of which are marked by vowels in *hand* and *antsy*. Beth Thompson fronts a low vowel in *gangs* and her vowel in one instance of *angle* glides forward and down. The end of this glide and the vowel in *gangs* show the forward limit, within her sample, of lowest vowel space. Her mother Marion Thompson marks the same edge with vowels in *tank, tangling, hanger; hanger* contains the lowest vowel in her chart. The quite low front area for part of the range of (æN) means that speaker after speaker has a vowel chart with a long flat bottom edge. English vowel space has been said to be unusually square because of the the maintained contrast of /æ/ and /a/. Without reference to a particular language, vowel space has long been regarded by phoneticians as triangular, with a large acute angle just above and just back of the highest, backest vowels, and a hypotenuse formed by the front periphery that slants out as its line extends up. No vowels are produced near the lowest angle of the triangle, which is simply formed by projection of front and back lines. (See Labov, Yaeger, and Steiner, Ch. 2, for discussion of triangular vowel space.) The bottom edge for any particular phonetic chart will be more or less flat for a certain length. A collection of low front vowel tokens extends the flat edge forward. The more the base is extended forward or back, the squarer the chart appears. San Francisco English vowel space has been square and remains square in spite of the tensing of (æN); in fact, over apparent time the vowel space has become squarer, as (æN) has fronted. This will change if /æ/ continues to rise before all nasals including velar ones.

The tensing of (æN), resulting in allophony, manifests a separation of (æN) and (æ). For younger speakers /æN/ is now maximally separated, phonetically, from /æ/. No back vowel for any speaker shows or could show separation in vowel space between a distinct vowel in one environment and the same vowel in another environment that /æ/ is now maintaining between its realizations in the nasal environment and elsewhere. (æN) may continue to tense but, as far as securing the allophony goes, further fronting and raising would be inefficient. There is more room for expansion in front vowel space than

in back, and (æN) has made use of it. Martinet's (1955) margin of security between distinct vowels is equivalent to Nunberg's (1980) area of confusability plus any vowel space between areas of confusability. (See Chapter 3.) A margin of security, or safety margin, is a concept that has had reference to the maintenance or collapse of *phonemic* distinctions. Here the principle that it is functional to maintain a safety margin seems to be operating subphonemically, for the development of allophony.

Conditioning for the development of allophony is purely phonetic. Even fine phonetic conditioning by place of articulation of the nasal is discernible. The word class involved remains intact; no items are subtracted, no items are added. Differences in rule application for speakers under 35 suggest that the change has been an intact wave, modeled as the second set in Figure 3.1. Within the tensing rule, in both its categorical and variable forms, there are differently weighted constraints determined by place of the nasal following the vowel. This phonetic variability interacts with socially governed variability. Class of speaker controls the height of the nasalized vowels before tensing and the use of glides, detailed below. Further, level of formality affects vowel realizations; this is considered in section 5.1.4.

5.1.3.2. Class correlate of tensing. Correlation of phonetic behavior and SES index score of speaker is most apparent for the pronunciation of /æ/ in the nasal environment. Two features are involved: vowel height; and diphthongization. From the beginning of modern sociolinguistic work class differences have been found to correspond to differences in use of one linguistic trait or another. In San Francisco White English the tensing of (æN) has been effected in such a way that it has been unnecessary for either class to change the realization of the nasalized vowels exactly in the direction of realization in the speech of the other class. It will be seen that an original higher position of (æN) for middle class speakers, along with prioritizing of fronting over raising, makes this so.

For convenience, the spread of SES index scores, given as part of Figure 4.1, is repeated here.

Ginger Ryan	8
Suzi Rockland	8
Meg Cork	10
Sharon Ryan	10
Carol Winter	10
Tracy Sawyer	11
Jean ORoark	13.5
Beth Thompson	14
Rachel Stone	14.5
Maureen Donovan	14.5
Jesse Austin	15
Barb Walsh	15
Marion Thompson	16
Nan Levine	18

Vowel charts for the dyads of elderly and middle-aged speakers show that class has determined a height difference for (æN) for many decades. (See Figures 5.1-5.4.) The height difference was certainly established well before extreme fronting of (æN) began. The two middle class speakers center the (æN) distribution above but not in front of the obstruent environment distributions. For the working class speakers (æN) centers lower than some of the obstruent centers, as well as slightly in front; the center of (æN) has about a mid height position within the total low front vowel distribution. The front position for (æN) for working class speakers may indicate that fronting began first among lower SES speakers. For all four speakers some movement of the vowel in the nasal environment is clear, but for the lower SES speakers the forward extension of (æN) is quite low, while for the higher SES women it is relatively high. Since tensing is primarily a fronting movement in a diachronic as well as a synchronic sense, Marion Thompson and Jean ORoark do not extend (æN) down and front, Meg Cork and Sharon Ryan do not extend (æN) up and front. Speech within one class is not adjusting to a position for (æN) determined by the speech of another class. Rather, the tensing rule, primarily a rule for peripheralizing (æN), applies in the phonology of all speakers.

From decade to decade fronting proceeds, accompanied by some raising. The raising appears to be processually secondary. That is, whether the tensing is viewed diachronically or synchronically, raising follows upon fronting. Younger speakers all

show (æN) centers to the front of the obstruent environment centers. (Refer to Figures 5.5-5.8.) Raising is found across class, but for middle class speakers this results in a further height separation of nasalized and nonnasalized vowel distribution centers, while for working class speakers a center for (æN) higher than for areas within (æ) is quite recent. Extension of the distribution of (æN) up from a center increases over time. The two speakers in their twenties, Ginger Ryan and Beth Thompson, show the highest extension of (æN) relative to the whole (æN) and (æ) areas. For working class Suzi Rockland and Ginger Ryan, however, there remain quite low areas of (æN). It is mainly the working class speakers who have long, flat bases on vowel charts, that is, square shaped vowel spaces. The periphery of vowel space is pushed forward in the low area. Across class (æN) has moved forward and up, while keeping some of its distribution relatively low. The low area is lower for young working class speakers; also, the high area for (æN) is higher for young working class speakers. There is a greater height range for (æN) for lower SES speakers.

Given the SES scores listed above, there is a break in the continuum on the class spread between Tracy Sawyer and Jean ORoark, as discussed in Chapter 4. Regarding the women with scores 8—11 as working class, and those with scores from 13.5—18 as middle class, it can be seen that middle class individuals are more likely than working class ones to diphthongize phones of the low front phoneme. This tendency is observable with (æ) as well as (æN), but since diphthongization is favored much more for tokens of (æN), it is here that the class difference becomes most apparent.

In the sampled speech of the six working class women there are only seven instances of diphthongization for (æN). The vowels in *hand* and *understand* glide back and slightly up for main group speaker Suzi Rockland and supplementary group speaker Carol Winter. Rockland's glide is quite short, the vowel hardly deviating from a steady state. Main group speaker Ginger Ryan has a lowering inglide on the vowel in a particularly front instance of *Tam.;* she also diphthongizes the vowel in *hand* twice. Her grandmother, Meg

Cork, attaches a glide to (æN) in *hand* also. The alveolar environment is favored. There are no instances of diphthongized vowels before a velar nasal for the working class speakers. The speakers who diphthongize do not attach glides to the majority of their sampled vowels in either the alveolar or labial environment.

Seven of the eight middle class women diphthongize some of the vowels before nasals. Main group speakers Jean ORoark and Jesse Austin have lowering inglides on vowels in *can, and;* supplementary speakers Rachel Stone, Barb Walsh and Nan Levine on *panic, and, Jan;* Levine has a raising inglide on the vowel in *hand.* All of these are glides of some length, lowering F2 by 500-1000 Hz; and the vowels are quite long, in no case shorter than 300 msec. Stone, Walsh, and Levine diphthongize vowels in the alveolar environment about half the time, which greatly exceeds the gliding behavior of the working class women who do it at all. Stone, Austin, and main group speaker Marion Thompson also attach glides to vowels in *family, Hampshire.* Beth Thompson only diphthongizes vowels before velar nasal, and she is the only speaker to do so. Of her eight tokens of (æN) before the velar, six have fronting glides; five of these are upglides.

There are 13 instances of diphthongization for (æN) for middle class speakers and only six for working class speakers. Across speakers of both classes, diphthongization is favored in the alveolar environment. More of the middle class speakers use glides than working class women, and the middle class women who diphthongize do so for a greater portion of their sampled vowels in the alveolar environment than working class women do. Glides are found in two nasal environments for the lower SES group and in three for the higher group.

The difference between middle class and working class behavior is subtle. Since a higher, slightly backer center for the distribution of (æN) in middle class speech than in working class speech was already established before extreme fronting began, (æN) is fronted higher, across apparent time, for speakers with higher SES scores than for those with lower index scores. Also, although young working class speakers employ a greater

height range for (æN), their (æN) centers are still lower than centers for young middle class speakers. Middle class speakers diphthongize the nasalized vowel more frequently, in a wide range of environments, and more extremely than working class speakers.

5.1.3.3. Summary of observations. An examination of the vowel charts for main and supplementary group speakers shows the course of the development of complementarity, insofar as plotted F1 and F2 measurements reveal degree of frontness and height for vowel tokens. The (æN) distributions suggest that /æN/ behaves more and more over time as a member of the subsystem of front vowels and participates little in low vowel activity; /æN/ has nothing to do, for instance, with the interaction of /æ/ before obstruents and the nearly merged /a/ and /ɔ/. A quite low, peripheral distribution of some of (æN) in the speech of the young, working class women, however, does affect low vowel space. For speakers with a low, front portion of (æN) the vowel chart is particularly squarish. A look at the charts for main group speakers shows fronting and raising for (æN), with some fine phonetic conditioning by place of articulation of the nasal. It is also observed that the tensing process began for middle class speakers from a higher original (æN) center than for working class speakers; and that middle class speakers are much more likely to use glides.

5.1.3.4. Informal speech vowel charts. The environment centers and the ranges of distribution by environment within (æN) for Meg Cork and Marion Thompson are given in Figures 5.1 and 5.2, above. Cork centers (æN) just to the front of (æK) and lower than (æT). Her distribution extends forward, low. (æK) ranges as far forward as (æN), but does it higher. Cork uses one glide, diphthongizing in *hand*. Her range for (æN) is tidy; no token appears with the higher tokens of (æS) or (æT). By contrast, Thompson's range for (æN) is quite large, overlapping with the whole distribution of all subareas of (æ). She uses one glide which brings the vowel in the labial environment back to the point of the backest (æS) token. The frontest and highest tokens are before alveolar nasals, and the lowest ones before velar. The low, front periphery of her vowel space is

marked by vowels in *tank, tangling, hanger*. Thompson's (æN) center is above (æ), but not forward of that area. For both speakers, the most striking thing is the complete overlap of (æN) and (æ) areas.

The (æN) distributions of the middle aged women Sharon Ryan and Jean ORoark extend farther forward than those of the older women. Figures 5.3 and 5.4 show that Ryan's (æN) centers forward of the (æ) area centers, but not above them; ORoark has a center for (æN) just barely directly above the center for (æT); the centers are virtually at the same point. It is striking that ORoark's (æN) range extends forward high and Ryan's lower, relative to the whole of the (æN) and (æ) areas. For these speakers there is a great deal of overlap of (æN) and (æ) territories, but less than for the older women. (æN) can be seen to be pulling away from the back wall of low vowel space; this is particularly noticeable in Ryan's chart. Ryan uses no glides on the vowels before nasals. Her frontest and highest vowels are in the alveolar environment; the backest and lowest in the labial. ORoark diphthongizes two vowels before alveolars. The ingliding vowels end as far back as the vowel in *slam,* which contains her backest (æN) nucleus. An outlying fronted vowel is found in *can't*. ORoark's one velar environment token is high, not low, one of the highest of her nasalized vowels.

The amount of overlap of (æN) and (æ) distributions for Suzi Rockland and Jesse Austin is noticeably less than for the middle-aged women. Rockland's (æN) and (æS) overlap is very slight, Austin's nonexistent; see Figure 5.5 and 5.6. Rockland centers (æN) forward of the (æ) area centers, but much lower than (æT). Austin has a high (æN) center, well above and somewhat to the front of (æT). Rockland's (æN) distributes to the front of her low vowel area, ranging in height from as low, with the vowel in *family,* as the lowest of the (æS) tokens to as high, with the vowel in *can,* as her highest (æT) tokens. The frontest vowels are in the alveolar environment, in *hand, can't, understanding;* the backest in the labial environment, in *grandmother, family*. The vowel in *hand* has a short, backing glide. As mentioned in section 5.1.3.1, the vowels in *grandmother* that are

relatively high may be so because of the underlying alveolar. Austin extends her (æN) distribution forward in a mid vowel rather than low vowel area. The front portions of her (æS) and (æN) areas mark a periphery for the front of vowel space that clearly slants outward as it rises. The vowel in *Hampshire* is the highest and frontest along this line. Austin uses two glides, one on the vowel in *Hampshire,* one on the vowel in a token of *and.* The longer downglide is in *Hampshire,* bringing the vowel back to the back edge of (æN); F2 lowers about 1000 Hz. There is no steady state for this vowel. Although I have treated the initial part of the vowel as the nucleus, it would be just as accurate to say that the middle or end represented the nucleus. The long glide provides the vowel a much lower, backer realization for most of its duration than the initial measurement indicates. *Hampshire* is the only word in which the vowel has a labial environment for this speaker.

The pulling away from (æ) continues for (æN) in the speech of the young women in their twenties. Figure 5.7 shows that there is still overlap in the speech of Beth Thompson. As seen in Figure 5.8, Ginger Ryan has complete separation of (æN) and (æ) area, reflecting the achievement of complementarity. Thompson centers (æN) above and to the front of all (æ) centers. She extends the range forward and up. The front extension of (æN) is achieved, however, through the use of fronting upglides on the vowel before velars. When these are eliminated her distribution appears rather conservative, since the overlap of (æN) and (æ) areas is great. Her one labial environment token is low and back. The highest vowel nuclei are of vowels before alveolar nasals. The frontest are before velars. Two of these are relatively high, the other five are in the lower half of the (æN) distribution. Thompson's (æN) ranges up and down the front edge of her vowel space, centering far forward of (æ) area means and above them. The youngest main group speaker is the first working class main group speaker to center (æN) above means for (æ) areas. Her extremely high vowels in tokens of *can* and *brand,* along with some other high (æN) tokens, bring the mean of the distribution up. *Can* and *brand* have F1 measurements between 300 and 400 Hz. They appear to be high vowels. Formant measurements for

Ryan's nonlow front vowel phonemes, not considered in this study, confirm that *can* and *brand* have vowels within the high, front vowel distribution. This extreme raising is relatively new behavior, not found for any speaker over thirty-five, but apparent in the speech of some supplementary group informants, discussed below. Ryan's frontest vowels are in tokens of *hand* and *antsy*. The alveolar environment accounts for the front and high areas. There are no velar environment tokens. Vowels in two instances of *family* are low and back. The vowel in *Tam* begins front, but glides back, dropping about 900 Hz in F2. The vowel ends within the (æ) distribution. Ryan has the greatest height range for (æN) of all the speakers. She maintains a very low front vowel space, giving her chart a long, flat base. The low front tokens are in *antsy, can't family, and.* Ryan's (æN) distribution is quite dispersed, taking up a very large area. No one of the other variables investigated for this speaker shows a distribution even half the size of the distribution for this variable, which represents not an entire, distinct vowel, but only an allophone. The fact that there is more room in the front of vowel space than in the back allows this, but the process of sound change motivates it. The dispersed distribution, manifesting variation in the same environment in Ryan's speech, reflects sound change in progress.

The supplementary group speakers, all in their early thirties, have no overlap of (æN) and (æ) areas. Appendix A shows the placement of (æN) tokens for these six women. Four of them, Carol Winter, Rachel Stone, Barb Walsh, and Nan Levine diphthongize some vowels before alveolar nasals. Stone also attaches a glide to the nucleus of the stressed vowel in *family*. Because of this glide the vowel ends farther back than vowels before obstruents, although it begins as the most forward vowel in her chart. The speakers most advanced in raising are Tracy Sawyer, Rachel Stone, Maureen Donovan, and Barb Walsh. Except for Stone, these speakers also have dispersed distributions. Note the high position of vowels before alveolars for these three, in *can, slanted, Jan,* in contrast to the low and front positions of vowels before velars, in *anger, hanging*. The velar environment vowels are not always low and front, however, as seen in the charts for

Winter, Stone, and Levine. Sawyer's vowel in *lamps* is relatively low and back, as expected before the labial, but Stone's stressed vowel in *family* glides from front to back, as mentioned. The most striking thing about the (æN) distributions for these informants is the complete separation of the variable from (æ). The only exceptions to this general observation are the slight overlaps seen for Winter and Donovan, due to fronted vowels in *had* and *daggers*. (æ) before the voiced velar stop always fronts, and variable fronting in the voiced alveolar environment has been noted.

5.2. (æ) in formal speech. Formal style speech was elicited from informants at the end of the final interviews for each individual. Reading, word list, and minimal pair list formal styles were obtained. (Forms are given in App. D.) F1 and F2 measurements were taken for selected tokens from the speech of six young women. (See Chapter 4.) As discussed in Chapter 3, Labovian synchronic and diachronic studies have used the results of formal speech elicitations mainly to establish direct correlation between an increase in formality and an increase in group SES. Traits characterizing more formal speech are associated with higher social status. It has been observed that the fine phonetic conditioning found in less formal speech is not reliably found in more formal speech. This observation underlies the claim (Labov 1972:79-87) that the more casual the speech, that is, the less attention the speaker pays to speech, the more surely phonology is revealed. In any investigation of phonemic inventory variance analysis relies on distribution of tokens of a variable. Contrastive analysis relies on apparent differences between lexical items to establish distinctions. Contrastive analysis, with history in both structural linguistics and (particularly American) dialectology, has gathered data through elicitations of more formal speech styles—in narratives, word lists, minimal pair lists. Distinctions established in this way, and inventories constructed from them, have been regarded in sociolinguistics as unreliable accounts of the phonology of a language variety.

In San Francisco speech correlations between an increase in formality and an increase in SES index score can be seen. It is also true that there is less evidence of fine

phonetic conditioning in formal than in informal speech. A certain level of phonology, however, is better revealed in speech in which more rather than less attention is given to pronunciation. The categorical status of the tensing rule describing the only allophony for /æ/ is more apparent from reading, word list, and minimal pair list speech than from interview style speech.

The formal speech charts for the six speakers considered here are characterized in general by lack of evidence of fine phonetic conditioning within variable distributions that reflect historical and present phonemic distinctions and by separations of these distributions from each other. (o), (ʊ) and (u) distributions are plotted to show the low vowels in the context of some other vowels. Discrete separation of one variable area from another never characterizes the informal speech vowel charts of any of these speakers or others. Of the distinct vowels reflected in plottings of F1 and F2 measurements, /æ/, represented in distributions for (æ) and (æN), is most clearly kept apart from other vowels, specifically from /a/ and merging /ɔ/. Further, the area of the formal speech charts showing phones reflecting /æ/ is characterized most strikingly by separation, in several cases complete, between the areas of (æ) and (æN). Except that the distributional difference is wholly due to phonetic conditioning, the separation could be thought to show phonemic split. The separation of (æ) and (æN), evidencing complementarity, is more extreme than distributional differences manifesting phonemic contrasts between other vowels. This is true across styles and across individuals.

Within (æ) some conditioning by manner and voicing is found. (æS) phones congregate relatively back, although there are some particularly fronted (æS) tokens; and fronting and/or raising of (æg) and (æd) is seen. In informal speech, within (æ) there is fronting of (æg) and less of (æd); and (æS) tokens have relatively low and/or back positions. In formal speech (æg) is only fronted half the time. Class is not a factor. The rule fronting (æ) before velar stops is applied variably, depending on level of formality. Fronting of (æd), expected particularly in *bad*, is infrequent in formal style also. The

vowel is both raised and fronted in *bad* by Rockland, raised by Austin. Both these speakers have high (æd) in other items as well. The other speakers show some tendency to put the vowel in this environment relatively front and/or high. Ryan has particularly fronted tokens in *glad, mad.* It may be that a variable fronting rule for (æ) before voiced stops, in which the velar environment is more heavily weighted, reflecting greater salience, induces some hypercorrection in that environment but none in the alveolar one. Four of the six speakers show fronted (æS) tokens, in *bath* (2) and *glass*. Given the increase in (æS) backing, this contrary behavior in formal speech may be hypercorrection.

Within (æN) place of articulation of the nasal plays some part. For several speakers (æ) and (æN) phones cluster in different areas than in informal speech; that is the distributions are higher or lower, fronter or backer than in interview style speech of an individual. A probably related fact is that for several speakers reading (R) style speech phones cluster higher within the individuals' vowel space than word list or minimal pair list style phones do.

The following sections will present findings for formal speech styles in relation to class of speaker and to individuals' informal speech behavior.

5.2.1. Class and formal speech characteristics. Four traits are observed to correlate with an increase of SES index scores. Table 5.4 presents the correspondences.

	glides on (æN)	separation of (æ) & (æN)	frontness and height match between styles	no overlap between (æ) and back low Vs
G Ryan				
S Rockland	X			
B Thompson	X	X	X	
M Donovan	X	X	X	X
J Austin	X	X	X	X
B Walsh	X	X	X	X

Table 5.4. For six speakers, listed in order of increasing SES index scores, presence or absence of four features in the (æ) and (æN) distributions in formal speech charts. (scores: Ryan, 8; Rockland, 8; Thompson, 14; Donovan, 14.5; Austin, 15; Walsh, 15.)

While diphthongization of nasalized vowels is much more characteristic of middle class speech than working class speech in less formal style, all but one of the speakers listed above use glides on vowels when followed by nasals in formal speech. Ginger Ryan, who does not diphthongize in formal speech, has the same SES index score as Suzi Rockland, who does. In the six charts, glides are found only on nasalized vowels, with the one exception of a backing glide on the vowel in *bath,* in Donovan's speech. There are three measured (æN) tokens for each speaker, in *cans* (R), *pan* (WL), and *drank* (MP). Some increase in frequency of use can be detected as SES increases. The three lower scoring speakers use three glides, the three higher, eight glides; or, the two working class women attach glides twice, the four middle class women, nine times.

In less formal speech only Beth Thompson used glides on the vowel before velar nasals, but four of the six speakers in this sample glide the vowel in *drank* forward. While the vowel before the velar glides front, the vowel before the alveolar glides back. In one case only the backing glide brings the end of the vowel within the (æ) distribution; the working class woman Suzi Rockland attaches a long glide to the vowel in *pan,* ending it at the back edge of the (æ) area. Otherwise, the backing glides terminate vowels at points higher than the individuals' (æ) distributions.

The four middle class women in this sample are the ones showing complete separation of (æN) and (æ) distributions. Ryan and Rockland each have one of three (æN) tokens within the (æ) area. Thompson shows clear separation, but the variables' distributions are just barely discrete. In the speech of the three higher scoring women there is a wide area in vowel space between the (æ) and (æN) territories. The vowel in *drank* is backer than the vowel before alveolar, and tends to be lower as well. For Walsh it is inexplicably high.

These same four women show a fair correspondence of frontness and height for (æ) areas and (æN) areas. Thompson positions (æ) in the same area of vowel space in informal and formal styles. Her nasalized vowels distribute slightly higher and to the front

of vowels before obstruents in both styles. The same sort of correspondence is found for Donovan, Austin, and Walsh. For the two lower scoring speakers there is some difference between styles in terms of what position of vowel space is occupied. Ryan has an extremely peripheralized (æN) distribution in informal speech, but does not front (æN) (although she has one very high (æN) token) in formal speech. Rockland's distribution is altogether more dispersed in formal speech than informal, showing extremely low (æS) tokens, some extremely centralized vowels, and so on. In this way middle class speakers style switch less severely than working class speakers. They do not make frontness or height adjustments in formal speech for either of the two major environmental areas for /æ/. It may be that this indicates a difference in linguistic security between them and the lower scoring speakers. We expect to find lower middle class speakers making the greatest adjustments. It is also true, however, that speakers labelled 'upper working class' in some sociolinguistic studies (e.g. Labov 1972:60-63) engage in style shifting as much as lower middle class speakers. The behavior has been interpreted as manifesting linguistic insecurity and has been associated with socio-economic insecurity and some aspiration for upward mobility.

Ryan, Rockland, and Thompson, the three lower scoring speakers, group tokens of (æ) in R style higher within the formal speech distribution than tokens in WL or MP styles. For Rockland and Thompson it is the R style distribution that best matches the (æ) distributions in interview style. It appears that these women engage less in style switching, in terms of F1 and F2 adjustments, in R style, which calls for less attention to pronunciation, than in WL or MP styles, which call for more attention. The three higher scoring speakers show a match of frontness and height between formal and informal styles, and also fail to show a tendency to group R style tokens higher within formal speech distribution for (æ).

Only the three women with the highest scores do not overlap (æ) and (a) areas in formal speech. In informal speech some overlap is found for all speakers. There is not

simply lack of overlap between (æ) and (a) distributions for Donovan, Austin, and Walsh; there is in each case a wide area of vowel space between (æ) and (a), a large safety margin between the distributions representing distinct vowels. Even for the three lower scoring speakers the interference of (æ) with (a) or (a) with (æ) is slight. It should be noted that in informal speech the great majority of (aT) tokens, which are responsible for much of the overlap of (a) and (æ), are in items *got, lot, not.* None of these items was included in the formal elicitation material. *Cot,* minimally different from *got,* is not particularly fronted in formal speech by most speakers, but does account for the slight overlap of distributions in the speech of Beth Thompson. Even if the vowels in *got, lot, not* were eliminated from the informal speech sample, however, there would still be overlap in that style. Perhaps more important, the two distributions would still be contiguous; by contrast, there is never a margin of security in informal speech.

5.2.2. Summary of observations. For the six speakers, the two most striking characteristics of the combined distributions of (æ) and (æN) involve the new allophony. Across the formal speech sample, increase in SES index score correlates best with increased separation of the variables (æ) and (æN) and increased use of glides. The more solidly middle class the speaker, the more clearly her formal speech reflects the categorization of /æN/ as complementary to /æ/ elsewhere. Speakers know that /æ/ before a nasal is tenser than /æ/ elsewhere and can—or even should—be diphthongized. The speech behavior of more middle class speakers displays this better, in formal speech, than the speech of less middle class speakers. The three speakers with the highest SES index scores leave safety margins between (æ) and (a) distributions, which reflect /a/ and low /æ/. Again, categorization is better shown in the speech of more middle class women. Both complementarity and contrast are more clearly seen in vowel charts accounting for more formal rather than less formal speech; and both the reflection of the categorical rule and the categorical distinction are most extremely displayed in the formal speech of middle class women. Ginger Ryan, the most advanced tenser in informal speech, and one of the two

women with the lowest SES scores, least displays knowledge of the categorical rule for allophony in formal speech, and least reflects, in her (æ) and (a) distributions, the phonemic distinction between /æ/ and /a/. At the same time, the more middle class speakers style shift less than more working class speakers, at least insofar as comparison of frontness and height for distributions in each style show shifting.

5.2.3. Formal speech vowel charts for individuals. The vowel charts for the six individuals show the increasing use of glides, separation of (æN) and (æ) areas, match of frontness and height between styles, and decreasing overlap of (æ) and (a) as SES of speaker rises. The charts also show the presence or absence of suballophonic conditioning.

Ginger Ryan's formal style (æ) and (æN) distributions are mainly to the back of her informal distributions. The one high token of (æN) in formal speech, in *cans,* is higher but more central than her highest (æN) tokens in interview style speech, in *can, brand.* In informal speech she separates (æN) from (æ) completely, and is the only main group speaker to do so, but in formal speech there is some overlap. She uses no glides in either style. On the whole, her formal distribution is higher than her informal. In interview style she has many (æ) tokens with F1 heights above 1000, indicating quite low vowels, but in formal speech there is not one. In informal speech her frontest and highest (æ) vowels are in the alveolar environment. In formal style her frontest tokens are in *glad* and *mad.* The vowel in *bag* is slightly fronted; it is fronted much more in informal speech. The two instances of *bad* show no fronting. In informal speech Ryan produces no fronted tokens of (æS), but her formal speech chart has one fronted vowel in *have.* Several speakers have fronted (æS) tokens in formal speech. A number of (aT) tokens in *got, not,* overlap with (æ) in informal speech. In formal speech the overlap is a matter of intrusion of vowels in *wasp* and *on* into (æ) space, and of vowels in *sad, sack,* into (a) space. This sort of fronting of (a) and backing of (æ) does not correspond to anything in her informal speech.

Suzi Rockland's dispersed distribution for (æ) and (æN) in formal speech contrasts with her rather compact distributions in interview style. Her (æN) area overlaps with all (æ) areas in informal speech, and does not range above it. Rockland was one of two working class speakers who diphthongizes at all, attaching a very short glide to the vowel in *hand* in interview style speech. In formal style two of three (æN) tokens have glides. The extremely forward nucleus of the vowel in *pans* glides down and back to within the (æ) area. The backed nucleus of the vowel in *drank* is followed by a fronting, lowering glide. In both styles Rockland fronts the vowel in *bad;* but note that she also produces one much backer instance of (æd) in *bad*. She particularly disperses her (æS) tokens in formal speech, whereas in interview style they cluster backer and lower than vowels in the stop environments. The vowel is fronted in *bath,* backed in *glass,* and lowered in *glass, half*. These last two vowels have F1 heights above 1100 Hz. In informal speech vowels in *glasses* are not extreme. In interview style Rockland has a good deal of overlap between (æ) and (a), due to fronted vowels in *got, god, lot, not*. In formal style a slight overlap is caused by backed vowels in *sack* and *glass*. The backed vowels are in keeping with the general dispersed distribution of (æ).

Beth Thompson shows both complete separation of (æ) and (æN) and almost complete separation of (æ) and (a) in her formal speech chart. This rather conservative speaker overlaps the (æN) and (æ) areas more than any other speaker under 35 in informal speech. In informal speech Thompson shows very little overlap of (æ) and (a) areas; she matches this in formal speech; one token of (a), in *cot,* barely intrudes into the back portion of the (æ) area. Otherwise, there is a wide margin of security between the two variables' distributions. Thompson, with the lowest SES score among middle class speakers whose formal speech is sampled here, shows marginal behavior. In formal speech the two lower scoring speakers overlap (æ) and (a) more than she does. The three higher scoring women do not overlap at all. Thompson just barely overlaps, with a vowel in an item minimally different from *got*. In interview style she is the only informant to diphthongize the vowel

before velar nasals. She also does this in formal speech, as do others. She does not front vowels in *bad, bag,* or in any other item. Rockland and Thompson both have portions of formal style (æ) quite low, lower than any part of their (æ) in interview style. The lowest tokens are vowels before fricatives. Otherwise, Thompson's formal distributions more or less match the frontness and height of her informal distributions for both (æ) and (æN), including the placement of (æN) nuclei and the direction and duration of glides on (æng).

In informal speech Maureen Donovan nearly separates (æ) from (æN). In formal speech the separation is extreme. All three (æN) tokens are diphthongized; she uses no glides in interview style. Frontness and height of the formal and informal distributions match, except that informal tokens of vowels in *had* and *that,* items in which the vowel tends to be high across speakers, are higher in informal speech than any (æ) tokens in formal. In formal speech she does not front the vowel in *bad,* but does so in both *bag* and *bath.* Her vowel in *bath* glides down and back. Other tokens of (æS) are back, as they are in interview style. Donovan does not overlap (æ) and (a) in either style.

In informal speech Jesse Austin overlaps (æN) and (æ) areas somewhat, but does not in formal speech. A backing downglide on the lowest (æN) vowel nucleus, in *cans,* brings the vowel to an end at the back of but above the (æ) area. Austin diphthongizes all three tokens of (æN). Her higher (æ) area is occupied solely by tokens of (æd), in *bad, mad, sad, glad;* and there is a lower token of the vowel in *bad* which has virtually the same F1 and F2 heights as a token of the vowel in *bad* in her informal speech. The vowel in *bag* is unfronted. In interview style Austin shows the clearest differences among (æ) subarea distributions; (æT) ranges high, (æS) quite low, with (æK) between. In formal speech she shows clearer separation of stop and fricative environment areas than other speakers, although the vowels in *sack* and *bad* are both within the fricative territory. Further, almost all instances of the vowel before voiced stops are higher than before voiceless. Austin has one fronted (æS) token, in *glass;* similarly, in interview style she fronts the vowel in *last.*

Her fronted vowel in *glass* is the only one in the formal distribution that does not fall within an area matching frontness and height for distribution in informal speech. In informal speech she overlaps (æ) and (a) distributions slightly. In formal speech there is a wide safety margin between them.

Barb Walsh barely separates (æN) from (æ) in interview style speech. In formal speech there is a wide separation. Vowels in *cans* and *pan* glide down and back, ending well above the (æ) area. Frontness and height of distributions match between styles. Walsh fronts the vowel in *bag;* in informal speech she fronts (æg) in *daggers*. The vowel in one instance of *bad* and in the two instances of *sad* are relatively front vowels within (æ). The vowel in *glad* is not extreme in the formal chart, whereas in informal speech two tokens of *glad* have relatively high vowels. In both styles (æS) is back and relatively low. In informal speech (æS) and (aT) overlap. In formal style speech there is a wide separation.

5.3. Conclusion. The development of complementarity between /æ/ before nasals and /æ/ elsewhere can be traced over apparent time. (æN) separates from (æ), becoming fronter and higher; the fronting movement has priority. Within (æN) the vowel before /a/ is favored for tensing. The categorization of /æN/ as complementary to /æ/ elsewhere is more evident in formal rather than informal speech for younger speakers, on the whole. Also, in more formal styles the allophonic difference between /æ/ before nasals and in other environments is clearer in the speech of middle class informants than working class informants. There is correlation between the SES of a speaker and both the height of the vowel nucleus before nasals and the use of glides.

Within (æ), (æS) is backing. There is also a lowering rule for the vowel before fricatives, but lowering is not increasing. Lexical conditioning is evident; the vowel in *class* is advanced in the gradual backing of (æS). The following frontness and height order can be extracted:

(æN) (æT) (æK) (æS).

Chapter 6: (a) and (ɔ) in San Francisco English

6.0. Geographically the Third Dialect of English is a collection of American speech communities, mostly in the Far West, where low front /æ/ remains intact, except under conditions described in the preceding chapter, and the low back vowels /a/ and /ɔ/ coalesce. For several hundred years there has been 'an unstable relation' between these two distinct vowels, which represent the second pivot point for vowel rotations in current American English (Labov, in press:17). Labov regards the contrast as one largely of vowel length, with /a/ phonologically short and /ɔ/ long. The instability of the opposition has been resolved either by 'increased differentiation by unrounding and lowering of the short vowel with raising and overrounding of the long vowel; or merger.' (p.17). Merger of /a/ and /ɔ/ is the process mainly defining the Third Dialect.

Observation of the merger of /a/ and /ɔ/ in San Francisco, now well advanced, involves discerning major environmental distributions for both /a/ and /ɔ/ and tracing change in the relation both between the whole distributions for these historically distinct phonemes and between subphonemic distributions for each. Phonological merger entails reorganization of an inventory at a high level within a hierarchy of categories. The phonological truth of recategorization of the two distinct vowels as one at the level of phonemic contrast, although reflected in both less and more formal speech styles, is more evident in formal elicitation samples in the San Francisco study. Detailed inspection of vowel charts, comparing formal with informal speech, reveals that the achievements of recategorization and general, complete phonetic overlap of the two formerly distinct vowels /a/ and /ɔ/ appear to cooccur. Phonological merger also entails phonetic neutralization within environments. Inspection of informal vowel charts for individuals shows that environment by environment coalescence has been proceeding slowly over apparent time and is not yet completed.

Environment by environment neutralization, found in interview style speech, is accomplished a generation later than phonemic recategorization as shown in formal speech. A front position for (aT) reveals environmental conditioning of high priority. There is lexical conditioning in the case of *got*, a very frequently used (aT) item. Other relative frontness and height positions for (a) before obstruents and nasals reflect less heavily weighted constraints. Through apparent time the whole distributions of (a) and (ɔ) come to occupy the same area of vowel space; finally environment by environment coalescence is observed. The merger involves /a/ and /ɔ/ before obstruents and nasals and perhaps before /l/.

Vowels with following obstruents or nasals are treated as tokens of variables (a) and (ɔ). As with (æ), subvariable distributions reveal fine conditioning. Vowel phones before alveolar stops, velar stops, fricatives of any place, and nasals are noted as (aT), (ɔT), (ak), (ɔK), (aS), (ɔS), (aN), (ɔN). Each of these represents a distribution within (a) or (ɔ). (See Appendix E.)

In this study (ar) and (al) are treated as separate variables, although their distributions overlap with that of (a) for many speakers. (ɔr) is considered separately from (ɔ). Unlike (ar) in relation to (a), tokens of (ɔr) rarely overlap with those of (ɔ). Merger of /o/ and /ɔ/ /__/r/ is a fact of most American English varieties. (ɔl) is also treated separately. (ɔl) shows a distributional relationship with the rest of (ɔ), but there is nearly complementary distribution between historical /ɔ/ before /l/ and elsewhere; (this is noted here without any claim concerning status as allophone of the historical phoneme /ɔ/)

The vowels /a/ and /ɔ/ have been gaining and losing lexicon to each other throughout the history of the language. The sources of /ɔ/ in present day English are Early Modern English /aw/, /a/, and /o/. Under some conditions /aw/ monophthongized. The vowels in *hawk, law,* reflect this process. /a/ backed and rounded before dark l. /ɔ/ in *talk* and *all* derives from this change. /o/ became /ɔ/ in the presence of historical velar fricatives that had labialized. /ɔ/ items spelled with ough, such as *cough, bought,* have

this history. Some of short /o/ became /ɔ/. This subclass includes *dog, fog, cross, lost, long*. The vowel in other items, whose spelling also signals the former short /o/, became /a/ instead: *got, cot, rock*. Further, backed historical /æ/ /w__ gives items like *wasp, water,* and *wash* in which there has been variation between /a/ and /ɔ/ in American English for a long time.

From each of the sources for /ɔ/ there are now items in which the vowel is followed directly by an obstruent. Some of the obstruent environments for /ɔ/ are the same as environments for /a/. Contrast is maintained in many English varieties, although there are few minimal pairs. /ɔ/ and /a/ both occur before voiced and voiceless alveolar and velar stops—*cot, caught, cod, cawed, chock, chalk, goggles, fog*. Both vowels occur before alveolar fricatives—*hospital, positive, Ozzie* and *cost, across, gauze*. Both /a/ and /ɔ/ are also found with the same following sonorants: before /n/—*wan* and *lawn*—, before /l/—*doll* and *tall*, —and before /r/—*part* and *port*.

There are environmental restrictions, however, for both /a/ and /ɔ/ in dialects maintaining distinction. /a/ can be syllable final—*positive*—but not word final except in a very few items such as *ma, pa, rah-rah, blah*. Before a velar nasal only /ɔ/ occurs except in a few items showing sound symbolism, like *ding dong, King-Kang* (/a/ ~ /ɔ/) and some place names, like *Congo, Hong Kong* (/a/ ~ /ɔ/); before a labial nasal, only /a/ occurs. In front of labial stops there is /a/—*cop, cob*—, but not /ɔ/; there are a few exceptions, e.g. /ɔ/ in *daub*, and, in some dialects, in *crop* formerly. In general, following voiced fricatives are the environments for /a/—*avocado, father, nozzle*—, while voiceless fricatives are the environments for /ɔ/—*off, author, moss*. In dialects with the distinction, there is more lexicon with /a/ before these voiced consonants, /ɔ/ before the voiceless; but there are exceptions to the pattern, in particular in the alveolar and alveo-palatal environments—*Osh Kosh B'Gosh*, /a/, *pause, clause* /ɔ/. It is in the coronal environments that both /a/ and /ɔ/ are found and are most likely to be in long standing variation in some varieties that maintain a distinction; so /a/ varies—or varied in earlier decades—with /ɔ/ in items like

god, water, wasp, lozenge, gosh, wash, on. in some eastern regions. The vowels in the liquid environments participate in this variation less, but there is alternation in items such as *forest, orange.*

The following table summarizes the postvocalic environmental restrictions, not all absolute, applying to /a/ and /ɔ/.

	[+ant, -cor]	[+ant, +cor]	[-ant, +cor]	[-ant, -cor]
[-cont, -son, -vd]	/a/ cop	/a/ cot /ɔ/ caught	/a/ botch /ɔ/ watch	/a/chock /ɔ/chalk
[-cont, -son, -vd]	/a/ cob	/a/ cod /ɔ/ cawed		/a/ goggles /ɔ/ fog
[-cont, +nas]	/a/ mom	/a/ want /ɔ/ gone		/ɔ/ long
[+cont, -son, -vd]	/a/ avocado /ɔ/ off	/a/father /a/nozzle /a/ author /ɔ/ moss		

Table 6.1. Postvocalic consonant environments permitted /a/ and /ɔ/.

In the sample of informal speech in the present study the majority of vowel phones representing the variables (a) and (ɔ) are before coronal nasal and obstruents, in items such as *got, bought, father, across, want, gone.* There are also items in which the vowels are in environments in which they do not contrast, such as *prom, along.* Environmental restrictions limit the evidence used to determine how far the merged has advanced.

Within the traditional American dialectological scheme, which does not include the Far West, the eastern subregions Eastern New England and Western Pennsylvania are the only ones lacking an /a/ and /ɔ/ distinction (Kurath and McDavid 1949). LAUS survey workers also noted variation in South Midland and South Carolina-Georgia Low Country areas. In his list of diagnostic lexical item sets DeCamp (1953) included few that involved the /a/ and /ɔ/ variation. (See Chapter 2.) Only three sets contain words in which the vowels alternate in nonliquid environments, and for these three the historical vowel is Early Middle English short /o/. There is vowel variation by region for *on.* Diagnostic items *hog,*

log, fog, and *crop, god* help distinguish Eastern New England and Western Pennsylvania dialects from others. While there are several sources for /a/ and /ɔ/ that account for the current contrast, historical short /o/ has provided the majority of items in which each vowel occurs in the same preconsonantal environment as the other.

The following two major sections of this chapter contain description of the behavior of (a) and (ɔ) separately. The observation of the process of their merger is then considered in detail in Section 6.3.

6.1. (a) and (ar) in San Francisco English. A first inspection of vowel charts across informants, in order to discover distributional patterning in various environments, reveals that /a/ before liquids behaves differently than (a) in other environments. In a consideration of the relation of (ar) to (a) relative height is important. Younger working class speakers maintain high distributions for (ar), but middle class speakers place (ar) lower, mainly within the territory of (a). Within (a) relative height does not show pattern across informants, except for the position of (aN). For (a) degree of frontness is the basis for distributional differences found to pattern across speakers. Chiefly, (aT) fronts. The different behavior of (a) and (ar) distributions, which legitimates the establishment of separate (a) and (ar) variables, and the observation that (aT) positions forward within (a), are the main findings concerning historical /a/.

A secondary finding is that vowels before velar stops and before fricatives distribute differently for speakers of different classes. Working class speakers center (aS) in front of (aK). Middle class speakers show the opposite frontness order for distribution centers. Additional patterns are discernible for (aN) and (al). While an (aP) area within (a) can be isolated for each speaker, there is no clear pattern across speakers. (aP) does not position consistently in relation to other obstruent environment areas and is not included in frontness order tables for environment centers here.

6.1.1. (a) before obstruents. Relative frontness and height orders for the distributional centers of (a) before alveolar stops, velar stops, and fricatives are given

below. Means for F1 and F2 measurements for the distributions are found at the beginning of Appendix A. For this and other frontness and height order tables in this chapter, differences between various pairs of means that underlie the relative ordering presented here are not necessarily statistically significant.

	working class speakers		middle class speakers	
	frontness	height	frontness	height
oldest	ST>K	SKT	T>K>S	S>K>T
	T>S>K	S>K>T	T>K>S	T>S>K
	T>S>K	TKS	T>K>S	T>K>S
youngest	T>S>K	K>TS	T>K>S	S>KT

Table 6.2. Relative frontness and height of obstruent environment centers for eight speakers, oldest pair to youngest pair. (If no > separates symbols, there is less than 10 Hz difference between F1 means or 20 Hz difference between F2 means.)

There is no discernible patterning by height. As for frontness, a following alveolar stop provides the heaviest constraint. Figures 6.1 through 6.8, given in Section 6.1.5., and vowel charts in Appendix A illustrate distributions from which the means were obtained that allow the derivation of the orders given above. Across age and class speakers center the distribution of (aT) to the front of centers for vowel phones in other environments. The only exceptional speaker is the oldest, Meg Cork, for whom (aT) and (aS) compete for front position. Unlike (æN), which has fronted and raised, (aT) is not entirely distributed in front of other (a) tokens even for young speakers. While (aT) distribution centers are in front of centers for (aS) and (aK), (aT) is not entirely separate from the rest of (a); there are many nonfronted tokens. The distribution does not reflect a categorical rule; the fronting constraint for (a) before /t/ or /d/ is simply the weightiest by far for the variable. The relative orders for obstruent environment centers are more reliably defined for main group speakers than for supplementary group speakers. The relative positions of centers for (aT), (aK), and (aS) distributions were assigned values: 3 = front position; 2 = middle position; 1 = back position. Since 13 out of 14 speakers front (aT), this subvariable receives a fronting score of 41 out of a possible 42.

(aK) scores 22, (aS) 21. From this it would appear that there is no fronting order for (aK) relative to (aS). Two frontness patterns do emerge, however, for main group speakers, and are confirmed by the vowel distributions for the six supplementary speakers: (aT) (aS) (aK) for speakers with lower SES index scores; (aT) (aK) (aS) for speakers with higher status. Working class speaker Suzi Rockland has largely overlapping (aT) and (aS) areas. (aK) is contiguous with the back edges of the stop areas, but not overlapping. Middle class speaker Jesse Austin, Rockland's age dyad partner, on the other hand, has an (aK) distribution mostly contained within (aT). Her tokens of (a) before fricatives, in *bothered* and three instances of *father*, distribute to the back of this, delimiting the lowest portion of the back wall of her vowel space; the presence of the preceding labial may be influential. Carol Winter and Tracy Sawyer, the two supplementary group speakers with the lowest SES index scores, 10 and 11, have the frontness order T>S>K. Supplementary group speakers with higher scores, from 14.5-18, have the order TKS.

The center for (aT) has slowly extended into central and front low vowel space over apparent time. (aT) has pulled away from the back of vowel space. Meg Cork's (aT) area extends back farther than her distributions for the rest of (a). Sharon Ryan's does not. The two younger working class speakers, Suzi Rockland and Ginger Ryan, have back walls for (aT) that end at about the center of the total (a) distribution. It appears that (aT) has moved forward. This movement is more a compression than a simultaneous retraction from the back and extension forward. Although younger speakers overlap (aT) and (æ) more than older ones, the increase in overlap is not great. As discussed in the preceding chapter, (æ) itself has not fronted. The low, central position of (æ) discourages further fronting of (aT). (aT) is presently maintained as a central vowel space area, extending up the center from a low to mid range for some speakers, contiguous but not greatly overlapping with (æ). Over apparent time the mean frontness position of (aT) has increased. Percentages of fronting within the whole (a) range for (aT) for the four age

group dyads of the main group speakers, calculated after normalization of F2 means across speakers, are as follows:

20s: 74% 30s:66% 40s:66% over 60:60%

This means, for instance, that an average of F2 measurements for (aT) for the youngest dyad is 74% of the way along a line representing back to front range for (a) as a whole, for the informants in their 30s, 66% of the way, etc. A test for difference of means comparing youngest with oldest dyads shows significance at better than .05.

Items *got, lot, not,* account for the bulk of (aT) tokens for each speaker. Few other items occur in the sampled speech in which (a) is in the alveolar stop environment: *body, bodies, bottles, bottom, cotton, forgot, god* (7), *goddamn, hot, pot, Scotland, shot, spot, spotted.* Across speakers these other items are generally not the ones in which the most forward vowel phones are found. The most fronted vowels are in *got,* although not all instances of this item have fronted vowels. Sharon Ryan's vowels in *bottles* and *spot,* for instance, are her backest (aT) tokens. Her vowels in three instances of *got* are her most forward. For the main group speakers for whom (aT) appears in words other than *got, not, lot,* the F2 mean for (aT) in *got* is forward of the F2 mean for (aT) in other items and of course for (aT) as a whole. The vowel is usually far back in *lot* and in infrequently used items; the prevocalic /l/ encourages a back realization for *lot.* Percentages of fronting within the whole (aT) range for vowels in *got, not, lot, god,* and other (aT) items, calculated after normalization of F2 means across speakers, are as follows:

got: 69% *not:*51% *god:*46% *lot:*29% other items:28%

That is, an average of F2 measurements for vowels in *got* is 69% of the way along a line representing back to front range for (aT) as a whole, and so on. Tests for difference of means comparing *got* with *god* and then *got* with *lot* and collected infrequently used items (*cotton, Scotland,* etc.) show significance at better than .001 level of confidence in both cases. The vowel in *got* is significantly forward of the vowel in *god;* and forward of the vowel in other items aside from *not.* The vowels in the minimal pair *got* and *god* can be

expected to have different average durations; *got* will often be shorter, due to the following voiceless stop. Correction was made for this.

There is lexical conditioning. (aT) is fronting. The vowel in *got* is advanced in fronting within (aT).

6.1.2. (a) before nasals. (aN) distributes in the same general area of vowel space as (a) before obstruents for all speakers. An inspection of charts for centers and spreads for distributions within (a) shows that (aN) is always distributed toward the back of the (a) area for most, and particularly older, speakers. Meg Cork, Marion Thompson, and Sharon Ryan center (aN) in back of all obstruent environment centers. Jean ORoark centers only (aS) to the back of (aN). For informants with the lowest SES index scores (aN) is low as well. All four of the working class main group speakers center (aN) lower than other (a) area centers, and farther back than (ar) or (al) as well. Marion Thompson's (aN) distributes up and down the back wall of her (a) space, and, in fact, her low back vowel space. Her backest (a) token is in *constantly*. The lower area of Suzi Rockland's (aN) also marks the back of her (a) area. Backest and lowest vowels are in *mom* and *predominantly*. Some fine conditioning by place of articulation of the nasal can be seen. (am) and (ang) tokens tend to be low and back, like Meg Cork's vowels in *palm* and *conked,* Sharon Ryan's in *mom* and *concrete*. (There are a few relatively high tokens of (am) also, however.) There is further conditioning from preceding /w/. (aN) in *want* tends to be relatively high or front. The vowel in /wa/ sequences generally reflects a historical low front vowel.

On is an item in which there is longstanding variation between /a/ and /ɔ/ in American English. One or two stressed tokens of the vowel in stressed instances of *on* have been included in the samples for several speakers and plotted with (aN) tokens. An inspection of vowel charts shows that the vowel in this item that isolates (a)—or (ɔ)—in the nasal environment distributes with other tokens of (aN). Since there has been some neutralization of (aN) and (ɔN) in San Francisco White English for many decades,

discussed in section 6.3, it is also true that the vowel in *on* distributes with (ɔN). When the (aN) and (ɔN) distributions are considered without tokens of (ɔN), the overlap between them, revealing neutralization, remains.

6.1.3. (ar). For some speakers (ar) associates with (a), in the sense that (ar) distributes in the same area of vowel space as (a), but for others (ar) tokens position higher, sometimes not even overlapping with (a) space. There are many fewer tokens of (al) than of (ar). (al) distributes to the back of the (ar) area for the speakers for whom there are (al) samples.

Of the working class main group speakers, the oldest, Meg Cork, shows overlap of about half of her (ar) area with (a). Her daughter, middle-aged Sharon Ryan, appears to have two target areas for (ar), one low within (a), one much higher, overlapping with the highest portion of the distribution of (a). Thirty-four year old Suzi Rockland has a high centered (ar) territory which overlaps only with the higher part of (a). Like Sharon Ryan's, Rockland's (ar) can be viewed as a split distribution. The youngest speaker, Ginger Ryan, shows an (ar) distribution that is contiguous but not overlapping with (a); she has (al) tokens within the highest back portion of (a). This pattern allows the suggestion that (ar) is rising. Two (ar) areas for Sharon Ryan and Suzi Rockland could reflect phonetic abruptness at one stage of the process. There is no sign of an associated lexical gradualism, though. It is not the case that some items have low r-colored vowels for Sharon Ryan while other items have high vowels. Both *started* and *bars* appear with low and high vowels for Ryan; *are* appears with low and high vowels for Rockland. The distribution can be regarded as one quite dispersed area instead of two areas. These distributions may simply manifest an extension of the range of (ar) upward. A dispersed distribution is characteristic of early sound change.

The same sort of movement is not found through apparent time for middle class main group speakers. Marion Thompson's (ar) overlaps completely with (a). Jean ORoark shows a concentration of (ar) tokens high within the (a) area; and there is one low

token. Just as for Sharon Ryan, this distribution can be viewed as one dispersed (ar) area or two separate areas. These two older middle class speakers behave like the two older working class speakers. For the younger middle class speakers, however, there is little sign of continuing rising. For both Jesse Austin and Beth Thompson (ar) is largely contained within (a). Thompson's (aN) actually centers higher than her (ar).

It is tempting to suggest that (ar) had begun to rise, and that originally class was not a factor. Then about 40 years ago the raising became inhibited for middle class speakers. If this were true, differences would be apparent in the charts of the supplementary group speakers. Speakers with low SES indices would show high (ar) areas and those with high SES scores would show low (ar) areas. This is not the case. Low SES scoring Carol Winter distributes (ar) high, but so do high scoring Maureen Donovan and Barb Walsh. Low scoring Sawyer and higher scoring Stone and Levine contain (ar) within (a).

There appear to be two treatments of (ar) for speakers under 35. (ar) can be high, separated from the territory of (a); or (ar) can be contained within (a). Some younger speakers treat (ar) in one way, some in the other. Only the oldest speaker, Meg Cork, exhibits any degree of r-deletion, and r-less tokens of (ar) are not included here. The vowel is strongly affected by a following liquid. The increased height of F2 that marks the presence of /r/ immediately after the vowel nucleus is equivalent to an offglide. The rising of the second formant harmonics takes the vowel from one steady state to another. It also lengthens the vowel. The presence of /r/ distinguishes (ar) from /a/ in other environments as clearly as tensing or diphthongization would even for speakers who allow the same height and frontness range as (a). The difference in behavior through apparent time for (a) and (ar) justifies treating (ar) as a separate variable.

Centers for (al) were established for Rockland, ORoark, Austin, and Ginger Ryan. (al) occupies an area overlapping with back portions of both (a) and (ar). Austin and ORoark have only (aS) centering farther back than (al); Ryan places (al) backest of all environment areas for the vowel before obstruents, nasals, or liquids. (al) tends to be high

relative to (a). ORoark, Rockland, and Ryan have high centering (ar) areas. (al) is low in relation to (ar) for them, but high in relation to (a). That is, (al) seems to be an area toward the back of the total vowel space involved, but mediating between (a) and (ar). Interestingly, however, Austin, with a lower centering (ar) that greatly overlaps with (a), has an (al) centering high in relation to both. (al) relates to (a) as a higher, backer area whether (ar) is high or not.

6.1.4. Summary of observations. The alveolar environment is heavily favored for fronting. (aK) and (aS) center in back of (aT); and their spreads are not as forward as the spread of (aT). Speakers with lower SES index scores position (aS) in front of (aK); speakers with higher scores do the opposite. (aN) is a back area within (a), in particular for older speakers, and a low area for working class speakers. The fronting of (aT) has increased over apparent time. Vowels in the very frequent item *got.* are advanced in this fronting of (aT). Further fronting of (aT) is hampered by the stable low, unfronted position of (æ).

Evidence from older speakers suggests that a raising of (ar) began many decades ago. The two middle aged informants and thirty-four year old Suzi Rockland have (ar) distributions that can be seen as single dispersed areas or as separate areas in each case. There is no evidence of lexical conditioning. No one speaker younger than Rockland treats (ar) in this way. There appear now to be two treatments of (ar): distributions of vowels representing this variable can be as low as (a) for some speakers and contained within (a); for other young speakers (ar) is higher than and separated from (a). Motivation for the choice of treatment—positioning (ar) high in relation to (a) or not—is unclear.

6.1.5. Informal speech vowel charts. Figures 6.1-6.8 show distributional spreads and center points for the eight main group speakers. Appendix A contains charts with all tokens plotted for both main group and supplementary group speakers.

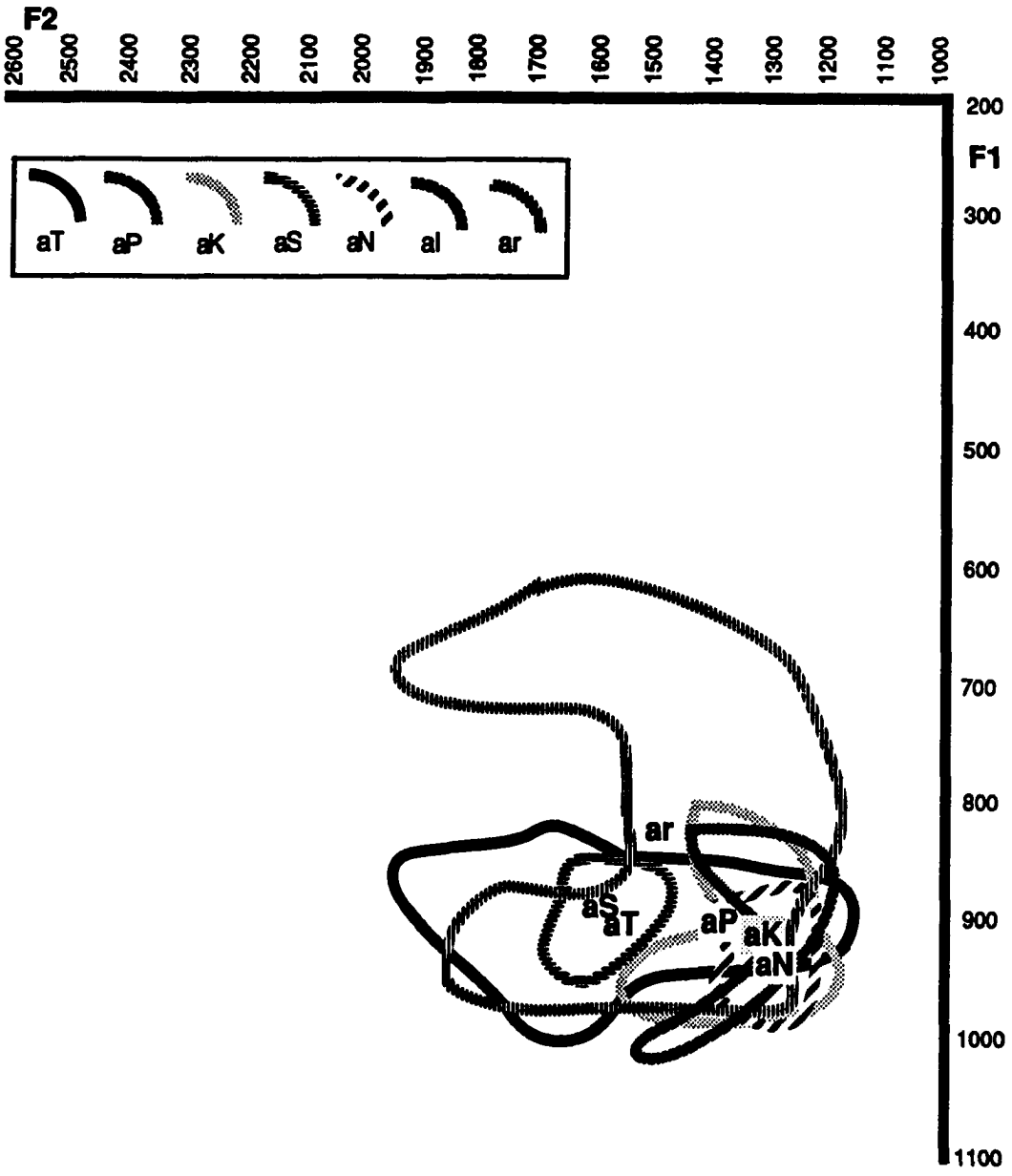

Figure 6.1. Distributional spreads and mean points for F1 and F2, for (a) and (ar), Meg Cork, 74, working class.

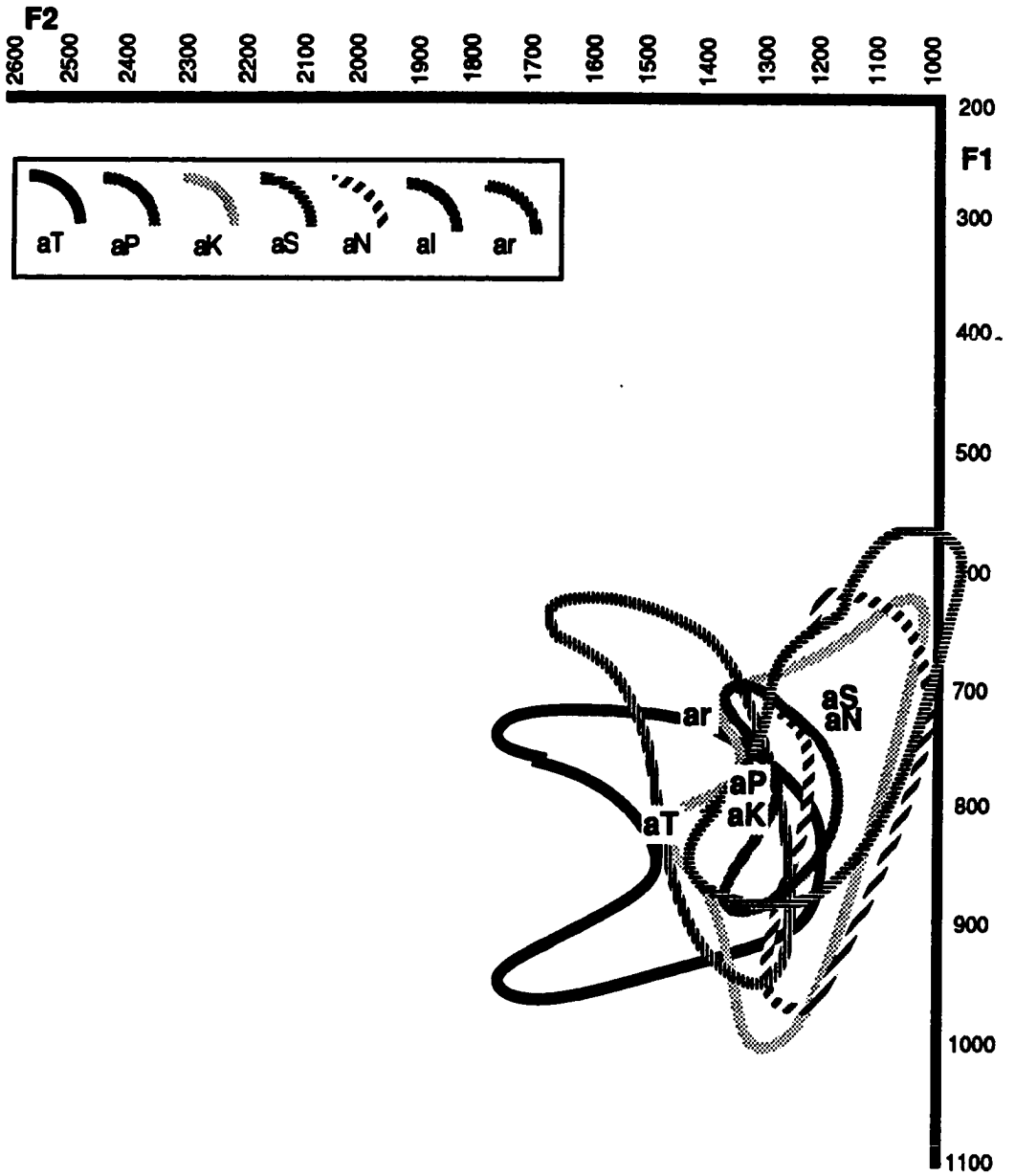

Figure 6.2. Distributional spreads and mean points for F1 and F2, for (a) and (ar), Marion Thompson, 65, middle class.

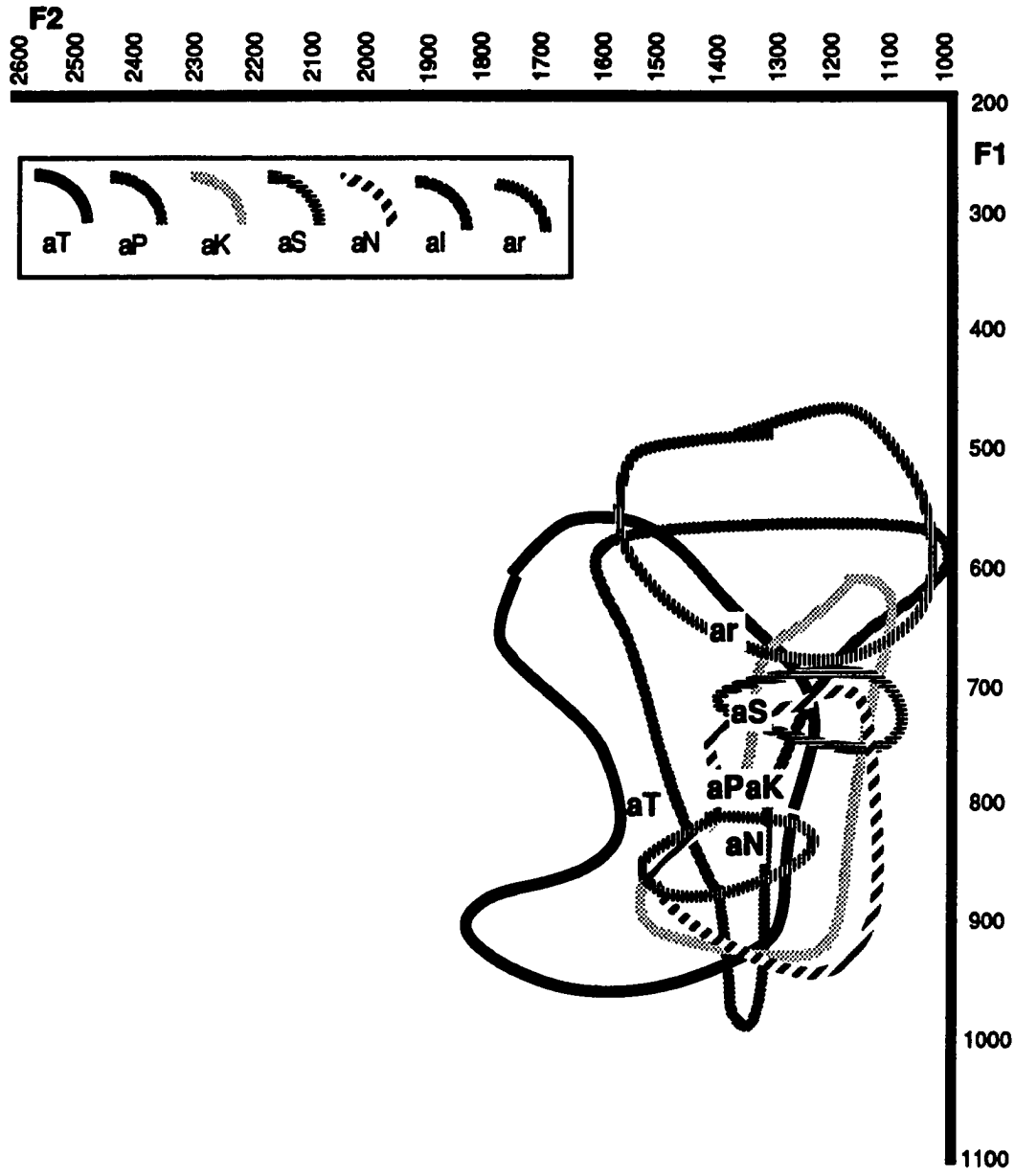

Figure 6.3. Distributional spreads and mean points for F1 and F2, for (a) and (ar), Sharon Ryan, 45, working class.

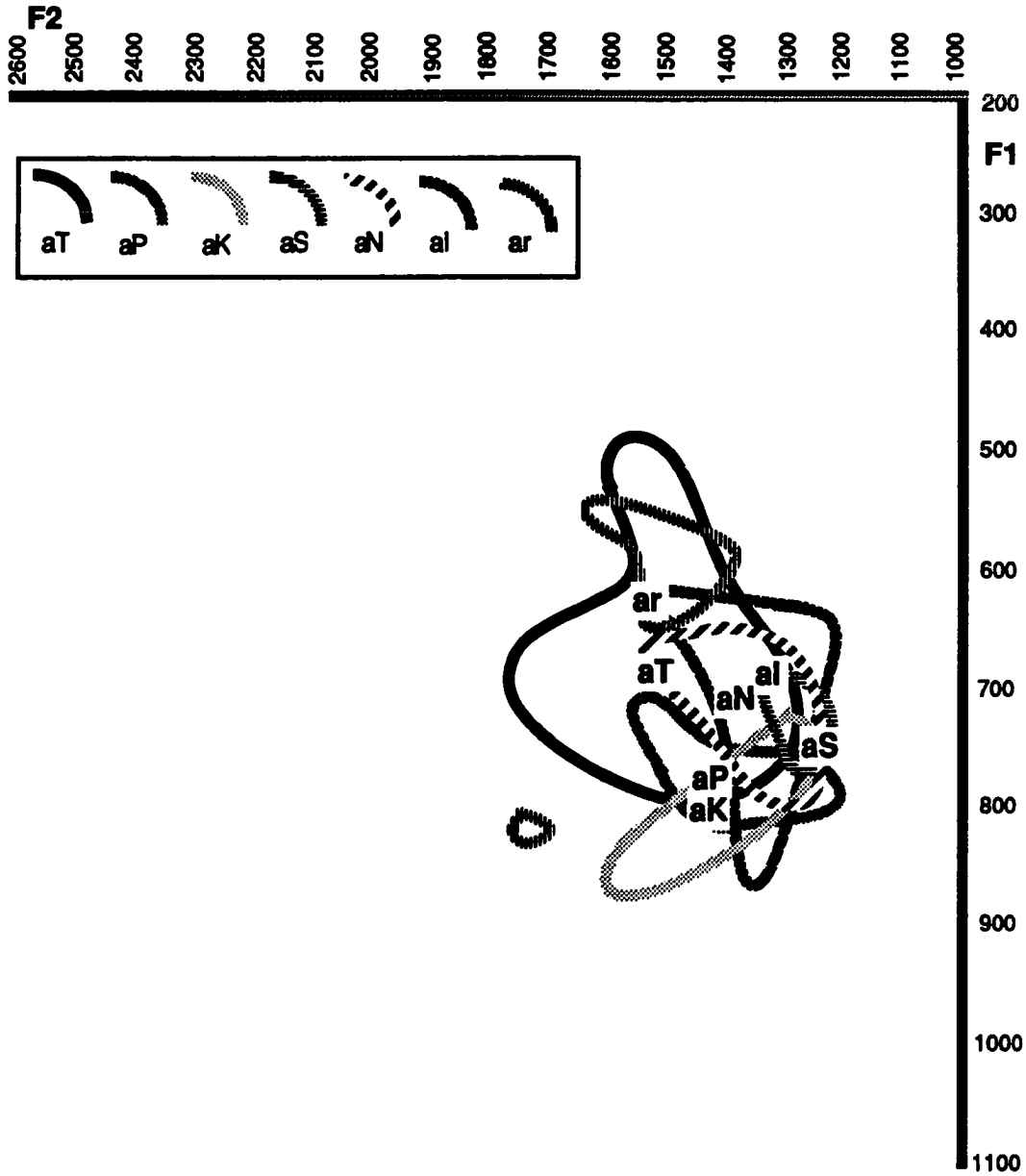

Figure 6.4. Distributional spreads and mean points for F1 and F2, for (a) and (ar), Jean ORoark, 43, middle class.

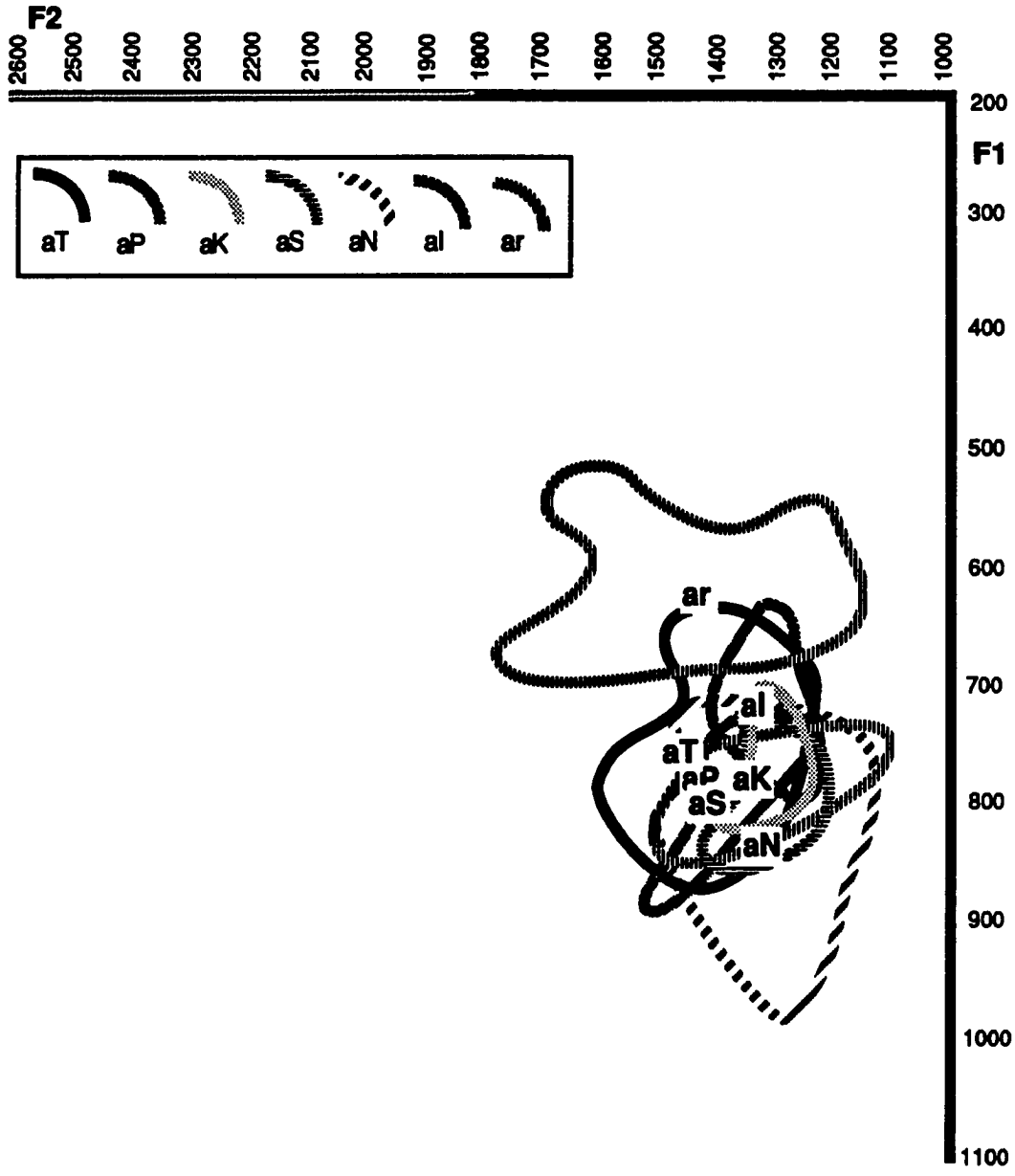

Figure 6.5. Distributional spreads and mean points for F1 and F2, for (a), (al), and (ar), Suzi Rockland, 34 working class.

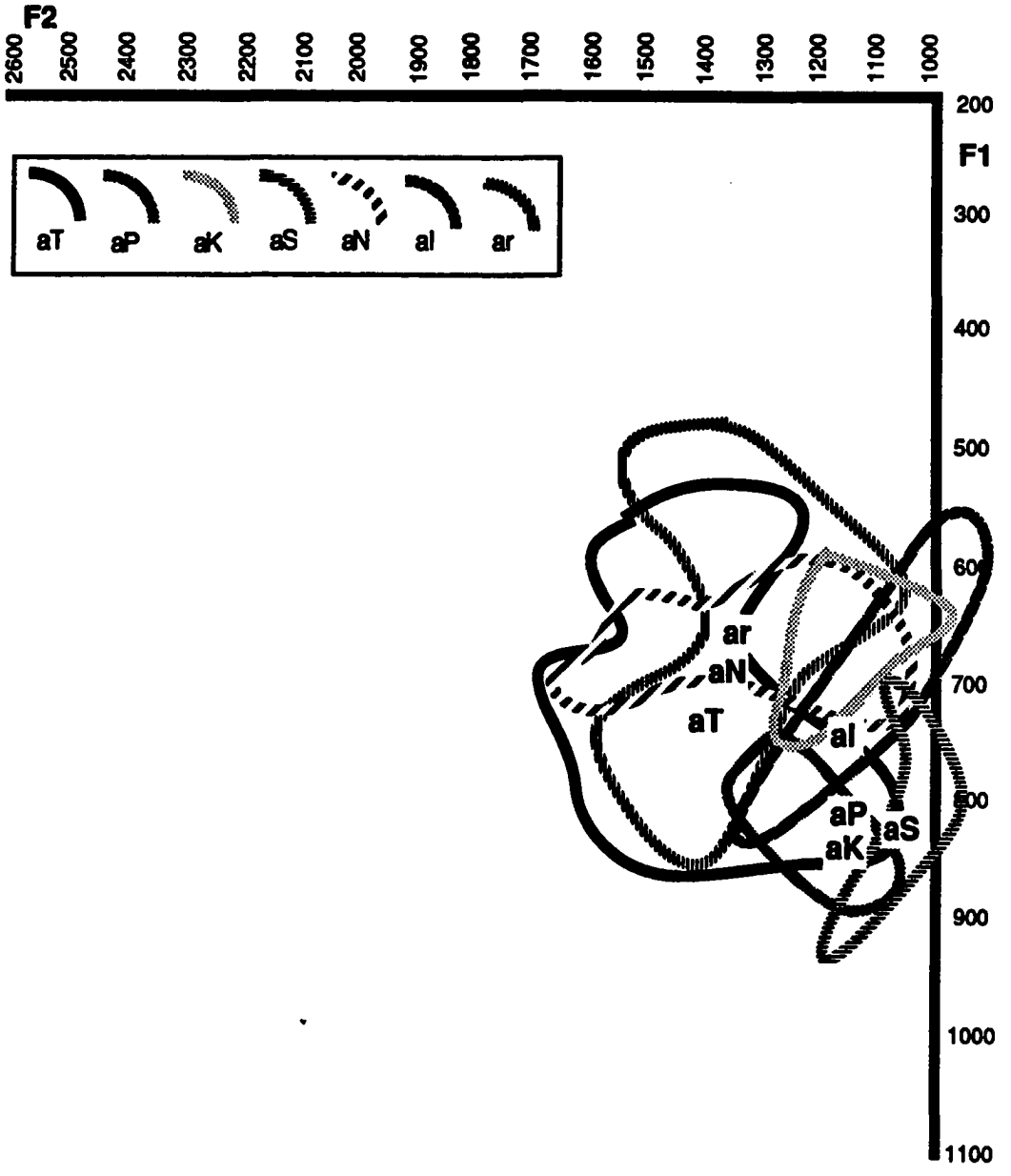

Figure 6.6. Distributional spreads and mean points for F1 and F2, for (a), (al), and (ar), Jesse Austin, 31, middle class.

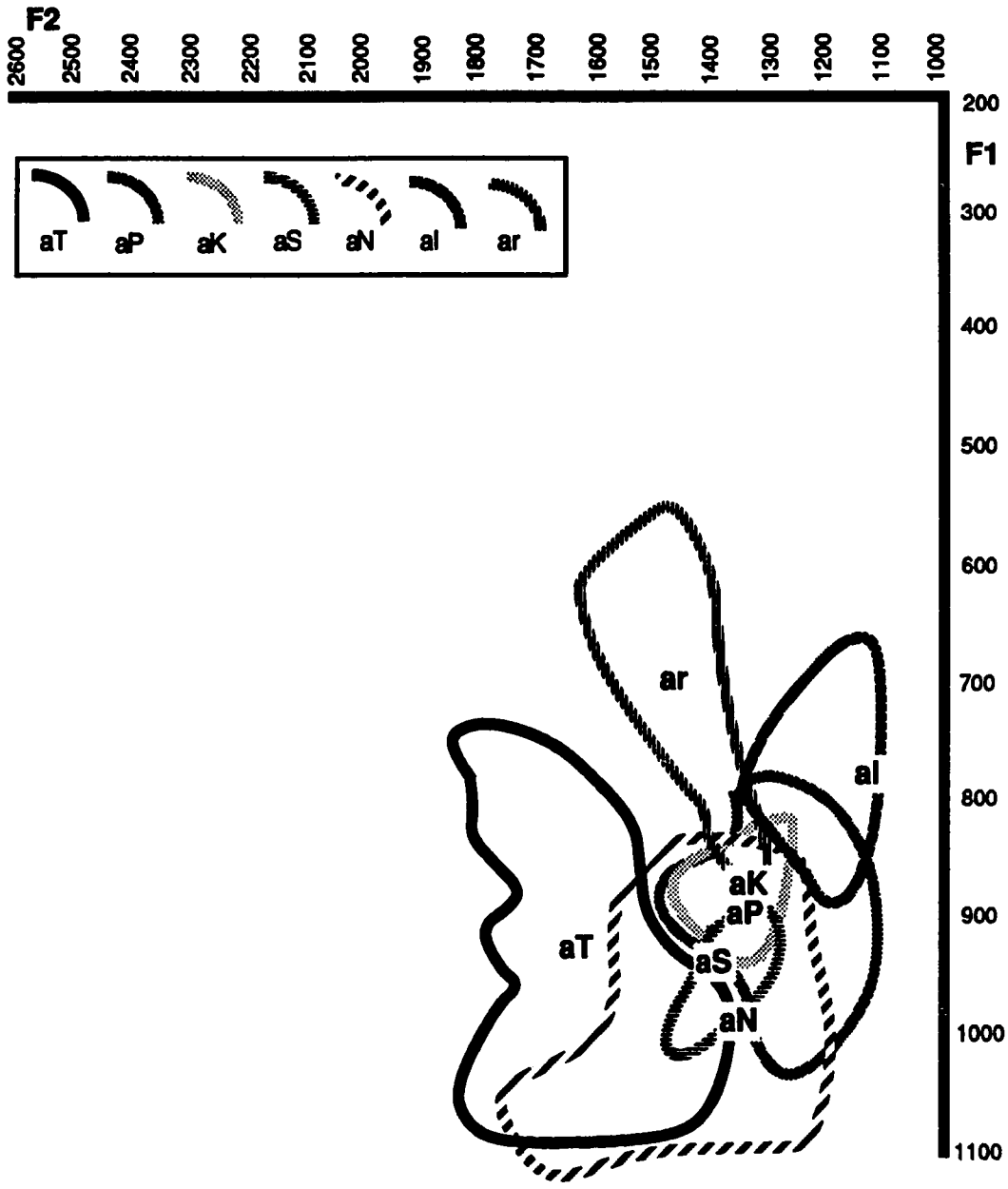

Figure 6.7. Distributional spreads and mean points for F1 and F2, for (a), (al), and (ar), Ginger Ryan, 22, working class.

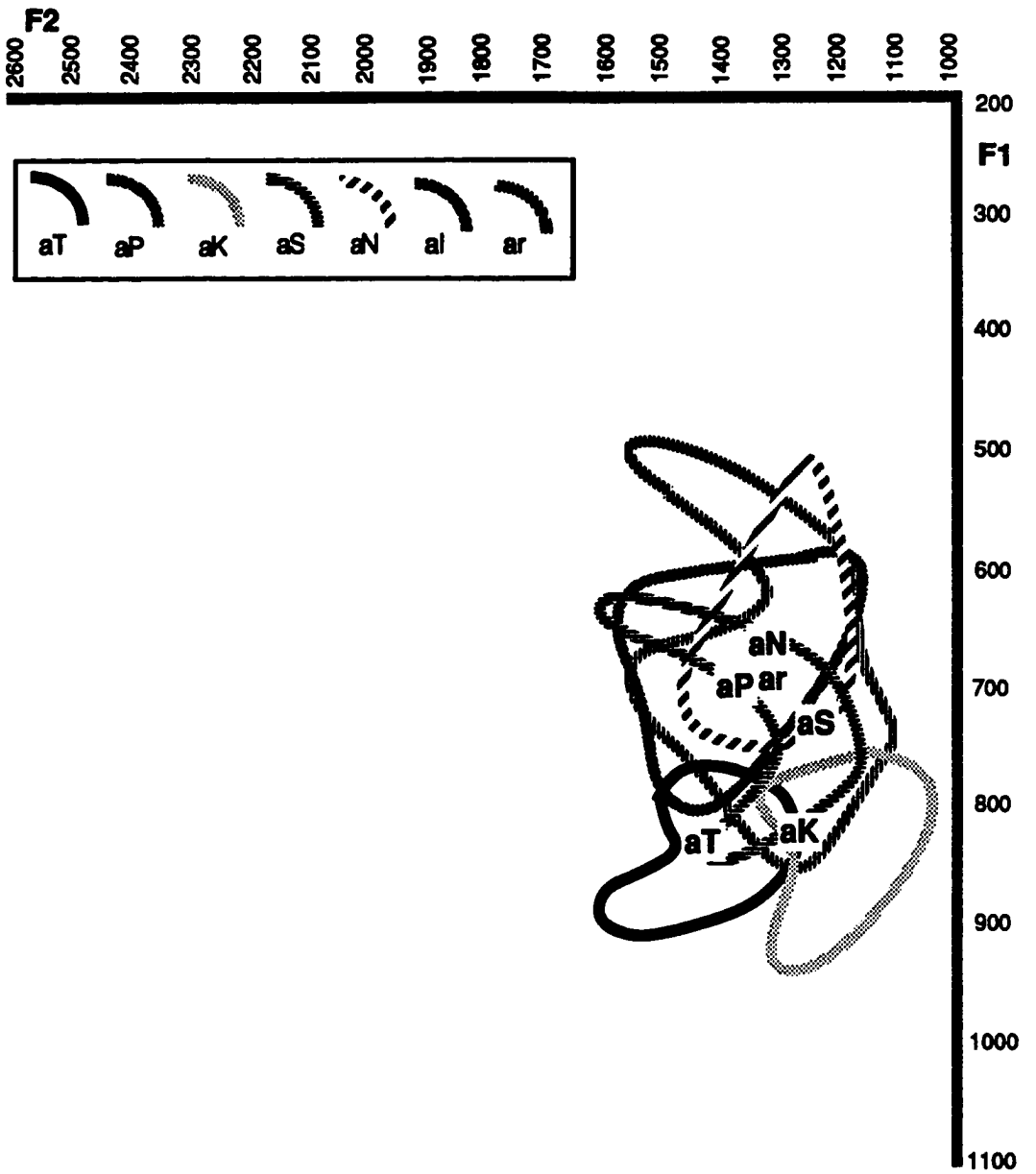

Figure 6.8. Distributional spreads and mean points for F1 and F2, for (a) and (ar), Beth Thompson, 25, middle class.

The oldest speakers, Meg Cork and Marion Thompson, each extend both (aT) and (ar) into the central areas of their total vowel spaces. See Figures 6.1. and 6.2 for the centers and spreads of their distributions. For Thompson the centralized (aT) area is lower than the centralized (ar) area. For Cork there are both low and high central extensions of (ar), the lower one coinciding with the forward spread of (aT). Although these lower, fronted (ar) tokens are not r-less, Cork's rhotocism is not strong. Her centralization of the vowel in both lower and higher areas may be the main cue to the underlying /r/. Both (aT) and (ar)—including the higher central (ar) area—intrude into (æ). Her centers for (aT) and (aS) are very close, with (aT) centering barely forward of the fricative environment area. (aT) also extends back farther than any other (a) area. Cork's back distributions of (aK) and (aN) are largely overlapping, and a (aP) area is found there as well. Note that (aK) tokens are all in items in which a liquid precedes the vowel. This encourages a back realization as much as the following velar does. Cork's (ar) distribution is quite dispersed, and much of it extends above the (a) area. She has two (al) tokens, a back one in *dollars* and a low forward one in *trolleys*. Cork and Austin are the only informants with any centralized (al) tokens. Each has one fronted (al) phone.

Marion Thompson overlaps (a) and (æ). This is due to the centralization of portions of (aT) and (ar) and the centralization of portions of (æT) and (æS). Thompson is the only speaker to have a forward token of (aT) in an item other than *got, lot, not*. Her low fronted vowel in *god* is as forward as some (æ) tokens. For Thompson (aS) centers highest of (a) areas. It also centers higher than (ar), which is distributed mainly in the same area as (a). The highest (a) vowels are in *bothered, father's*. There is also a quite high back vowel, within (a) in *oxygen*, although (aK) centers between (aT) an (aS), and lower than either. The lowest vowel is in *doctors*. (aS), (aN) and (aP) are the three back distributions within (a).

The middle-aged informants Sharon Ryan and Jean ORoark (see Figures 6.3. and 6.4), do not centralize any portion of (ar). Both have (ar) distributions that concentrate

vowels in a high area mainly separated from (a). There are some lower phones as well, and it may be that each of these speakers has a split distribution for (ar), as discussed above. Ryan has one token of (al), a very back vowel in *dollar*. There is interference with (æ), particularly with (æS), from the fronter tokens of (aT). Ryan's vowels in *spot* and *bottles* are the backest of her (aT) tokens. She has back areas of (aK), (aS), and (aN). (aS) is barely forward of (aK). Her backest (a) tokens are in *on, mom, concrete*. There is a discernible area for (aP) in front of the nasal environment.

Jean ORoark has an (al) area represented by vowels in *dolls, college, volley*. The vowels in *college* and *volley* are well back of the (ar) area (or areas), which overlaps with (a) toward the front of the (a) territory. ORoark has a back token, within (aT), in *spotted*. Her most forward (a) vowels are in several instances of *got*. Her lowest (a) distribution is (aK), her backest (aS). (aN) centers almost as back as (aS). The lowest token is in *box*, the backest, by far, in *father*. There is a (aP) concentration, low and central within (a).

Charts for the centers and spreads of distributions for Suzi Rockland and Jesse Austin are given in Figures 6.5. and 6.6. Suzi Rockland extends the higher part of her (ar) into central vowel space. Most of her (ar) area is separate from (a). (ar) centers well above, and slightly forward of (aT). There is overlap between (a) and (æ), particularly between (aT) and (æS). (aS) is also involved. Rockland is the only speaker who extends (aS) as far forward as (aT). She has a (aP) concentration central to (a). Her (aN) is wide-ranging, but centers rather low and back. The lowest and backest (aN) tokens are in *mom* and *predominantly*. Vowels in instances of *want* are relatively high within (aN). Rockland has three tokens of (al), in *dollar(s)*. These are within (ar), but toward the back of that area. It is possible to regard Rockland's (ar) as a split distribution, with lower and higher concentrations and (al) between them.

Jesse Austin provides two tokens of (aT) in *god*, and one in *goddamn*. None of these is far forward, and the vowel in one instance of *god* is almost her backest (aT) token. (aT) overlaps with (æT) and (æS). Of her obstruent environment areas (aT) is the frontest,

followed by (aK) and (aS). (aS) distributes very far to the back, separated from the stop environment areas. An (aP) area is fairly central within (a), centering near the mean point for (aK). A dispersed (ar) distribution overlaps completely with (a), but centers higher than any (a) distribution. Austin's backest vowels are in several instances of *father*. There are also quite back vowel phones in two instances of *blockage*. Like Meg Cork, Austin's (aK) is mostly represented in post-*r* and post-*l* environments. Two tokens of (al), in *involved* and *anthropology*, are extremely back, but another (al) token appears low and relatively front within the (ar) distribution.

The youngest speakers are Ginger Ryan and Beth Thompson. (See Figures 6.7. and 6.8.) Ryan's (ar) shows almost no overlap with her (a) area. Tokens of (al) are found at the back of (ar); there is very little interference between (ar) and (al). (al) centers lower and backer. (ar) and (al) are both unassociated with (a). Ryan's (aT) not only centers toward the front of (a), but distributes mainly there. (aT) and (aN) overlap with (æ). There are no (aT) tokens backer than the center of (a) as a whole. The (aS) area centers only slightly in front of (aK), but ranges down and forward, while (aK) ranges up and back. The (aP) area is almost separate from (aT), whereas for other speakers there is great overlap between (aT) and (aP). Ryan's (aN) is a large distribution whose lower edge marks the base of her vowel space in the back. Generally, fronter low (aN) tokens appear in *want*, backer ones in the labial nasal environment, in *prom, mom('s)*.

Beth Thompson contains most of (ar) within the same part of her vowel space as (a). Her (aP) and (aN) areas both center higher than (ar) does. Thompson's (aT), a condensed area toward the front of (a), is distinct from (aK) and (aS). She shows an unusual lack of overlap among these obstruent environment areas. (aP) is a more dispersed distribution than the others. Thompson's (aK) centers low, her (aS) high. Within (aT) the two forward tokens are in instances of *got*. Vowels in *stopped, body, Scotland, cotton,* are all backer. There is overlap of (aT) and (æS). The lowest and backest (a) tokens are in

clock and *block*, respectively. Thompson shows a surprisingly high vowel in *wanted*. She has one (al) token, in *college*, at the back of the (ar) area.

Charts for supplementary group speakers are found in Appendix A. All six of these speakers place (aT) tokens to the front of the total (a) areas. Of note is the lower, backer vowel in *bottom* for Tracy Sawyer and the backer vowel in *bodies* for Rachel Stone. Front (aT) tokens appear in *got* and *not*. An exception is fronted (aT) in Nan Levine's *hot*. Three of the speakers have high areas for (ar), Carol Winter, Maureen Donovan, and Barb Walsh, while the other three contain (ar) within (a). Donovan, Walsh, and Nan Levine also centralize part of their (ar) distributions, as a few of the main group speakers do. All tokens of (al) are quite back. Donovan's single token of (al) in *college* is low within (a), which is unusual, while her (ar) is a high distribution. Donovan is unique in showing no association between (ar) and (al).

6.2. (ɔ), ((ɔr), and ((ɔl) in San Francisco English. For each speaker (ɔr) and (ɔl) distribute differently than (ɔ). The (ɔr) area is high, relative to (ɔ), the (ɔl) area is back. It becomes clear, upon close inspection, that fronting of (ɔT) is favored, and that the tendency to position (ɔT) tokens to the front of other (ɔ) tokens in obstruent or nasal environments increases through apparent time. The patterns discerned for (ɔ), (ɔl), and (ɔr) are the main findings concerning historical /ɔ/ in San Francisco speech.

Examination of charts also reveals that areas for (ɔS) and (ɔK) have relative orders agreeing with (aS) and (aK) for most speakers. Also, a nasal environment area, isolatable for each speaker, is a low distribution for working class speakers, as (aN) is.

6.2.1. (ɔ) before obstruents and nasals. Frontness and height orders for the centers of (ɔ) distributions before alveolar stops, velar stops, and fricatives are given below.

	working class speakers		middle class speakers	
	frontness	height	frontness	height
oldest	S/T>K	K>T>S	K>T>S	K>T>S
	T>S>K	S>T/K	T>S>K	S/T>K
	T>K>S	K>S/T	T>K>S	T/S>K
youngest	T>S>K	K>T/S	T>K>S	S/K>T

Table 6.2. Relative frontness and height of obstruent environment centers for eight speakers, oldest pair to youngest pair. (If no > separates symbols there is less than 10 Hz difference between F1 means or 20 Hz difference between F2 means.)

There is no discernible patterning by height. Marion Thompson positions (ɔK) in front of (ɔT). For Meg Cork, (ɔS) is centered slightly forward of (ɔT). Across class, all but these oldest two speakers center the distribution of (ɔT) in front of centers for vowels in other obstruent environments. It appears that a relative front position within (ɔ) for (ɔT) is not part of the phonology of the informants over 50, but becomes important for younger speakers. Like (aT) in relation to the rest of (a), (ɔT) distribution centers are in front of centers for (aK) and (aS) but not entirely separate from them. The constraints fronting (ɔ) before alveolar stops and backing the vowel before nasals are the only ones that can be stated for this variable.

The relative positions of centers for (ɔT), (ɔK), and (ɔS) distributions were assigned values: 3 = front position; 2 = middle position; 1 = back position. (ɔK) scores 23, (ɔS) 25. This simply corresponds to the observation that there is no fronting relationship between these. The fronting score for (ɔT) is 36, compared to 41 for (aT). This is due in part to the fact that the oldest two speakers do not front (ɔT). It is also a result of apparent nonfront positions within (ɔ) for (ɔT) in the speech of three of the six supplementary speakers. Sampled tokens from each individual are few and so the relative positions of distributions centers are less reliable for these speakers than for main group speakers.

While there is evidence of (ɔT) fronting, it does not reflect as heavy a constraint as the fronting of (aT) does. It can be seen that (ɔT) does not range as far forward of other distributions of (ɔ) as (aT) does in relation to the rest of (a). Each of the main group

informants who center (ɔT) to the front of other obstruent environments also extend the distribution of the variable in some other environment as forward as (ɔT). For Ginger Ryan some tokens of (ɔ) before fricative consonants are as centralized as forward tokens of (ɔT). For Jesse Austin and Beth Thompson this is true for tokens of (ɔ) before velar stops. The other three speakers who are under 50 each extend (ɔN), discussed below, as far forward as (ɔT), and one of them, Jean ORoark, actually centers (ɔN) in front of (ɔT).

Percentages of fronting within the whole (ɔ) range for (ɔT) for the four age group dyads of the main group speakers, calculated after normalization of F2 means across speakers, are these:

20s: 62% 30s:55% 40s:52% over 60:45%

An average of F2 measurements for (ɔT) for the youngest dyad is 62% of the way along a line representing back to front range for (ɔ) as a whole, for the informants in their 30s, 52% of the way, and so on. A test for difference of means comparing youngest with oldest dyads does not show significance.

It is observable, however, that the distributions of (ɔT) position gradually more and more to the front of (ɔ) through apparent time for the main group speakers. The back wall of the (ɔT) area moves in from the absolute back wall of the individual vowel space. Unlike the similar phenomenon for (aT), this does not seem to be a contraction of (ɔT) area; the moving in of the back wall of (ɔT) finds correspondence in a forward movement of the front position of (ɔT). Overlap of (ɔT) and (ɔl) decreases over time for both class groups of speakers.

Within (a) distributions a pattern is found across age of speaker revealing correlation of speaker SES index score to relative frontness of (aK) and (aS) means. In the case of (ɔ) the correlation is not consistent. Three main group working class speakers, including the oldest one, position (ɔS) in front of (ɔK). Thirty-four year old Suzi Rockland does not. Three main group middle class speakers, including the oldest one, center (ɔK) in front of (ɔS). Jean ORoark does not. Sharon Ryan and Jean ORoark, in

their forties, both back and lower (ɔK). The extreme back and low centers for (ɔK) mean that, for Ryan (ɔN) is not centered lowest among (ɔ) distributions, unlike for other working class speakers, and for ORoark (ɔS) is not the backest obstruent environment area, unlike for other middle class speakers. The behavior of supplementary group speakers appears to conform to the difference by class apparent for most main group speakers. It is not evident that through time the class correlation is becoming stronger.

There is no noticeable tendency for (ɔ) before nasals to have either a relatively front or back position. For working class main group speakers (ɔN) centers lowest within (ɔ). (For Ryan (ɔN) is in competition with (ɔT) and (ɔS) for low position.) For each of these informants tokens of (ɔN) mark the lower edge of the (ɔ) distribution. The lowest phones are not always those with the vowel before a velar nasal, as might be expected. Tokens of the vowel in both *long* (2) and *gone* (2) are found in this position. For the youngest working class main group speaker, Ginger Ryan, tokens of (ɔ) before /t/, /k/, and /s/ are all lower than her lowest nasalized vowel phones.

The majority of the speakers under 50, then, show agreement of environment order for (ɔ) and (a). Sharon Ryan and Ginger Ryan have (aT) (aS) (aK), (ɔT) (ɔS) (ɔK) orders, and Jesse Austin and Beth Thompson have (aT) (aK) (aS), (ɔT) (ɔK) (ɔS) orders. Also, (aN) and (ɔN) are the lowest centered areas for working class speakers.

6.2.2. (ɔr) and (ɔl). Three principal conditioning factors affect what is phonemically /ɔ/ in dialects of American English maintaining a distinction between /ɔ/ and /a/. These are designated (ɔ), that is, /ɔ/ before obstruents and nasals, (ɔl), representing /ɔ/ before /l/, and (ɔr), representing historical /o/ and /ɔ/ before /r/. In most American English varieties /ɔ/ and /ʊ/ have merged before /r/, and so a phonological separation of /ɔ/ from /ɔr/ is well established. In San Francisco speech this is reflected in the relatively high position of the distribution of (ɔr) for all speakers. The relationship of (ɔl) to (ɔ) is less clear. (ɔl) associates with both (ɔr) and (ɔ), positioning toward the back of (ɔ) but sometimes higher.

There is evidence that the subphonemic status of /ɔl/ has undergone change in the last four decades due to a general lowering and fronting of (ɔ).

As with (ar), there are many sampled tokens of (ɔr) for each speaker, so the distribution of this variable in relation to (ɔ) and (ɔl) is especially clear. For all speakers (ɔr) centers higher than (ɔl) or any area within (ɔ). A relatively high position for (ɔr) seems established in the phonology of the oldest speakers in the study and is maintained through apparent time; it is perhaps increased relative to (ɔ). For most main group and supplementary group informants there is little or no overlap between (ɔ) and (ɔr). This is true across age of speaker. For Meg Cork and Ginger Ryan, the oldest and youngest speakers, (ɔr) overlaps with (ɔl) but not at all with (ɔ). For a few speakers a low portion of (ɔr) overlaps with (ɔ). The overlap is greatest in the speech of Sharon Ryan, Meg Cork's daughter and Ginger Ryan's mother.

There is evidence that degree of backness has changed over time. For the oldest speakers the center of the (ɔr) distribution is approximately above the center of the (ɔ) distribution as a whole. For these speakers a forward portion of (ɔr) extends as front as, or fronter than, any area of distribution within (ɔ), although the (ɔr) territory spreads forward higher than the (ɔ) areas. For the middle-aged woman Sharon Ryan this is also true. For Jean ORoark, however, and for main group informants in their twenties and thirties, (ɔr) centers back of the mid points for (ɔ) as a whole and even in back of most (ɔ) area centers. Exceptionally, Jesse Austin centers (ɔr) to the front of both (ɔN) and (ɔS). For ORoark and the four younger speakers the distribution of (ɔr) does not extend as far forward as (ɔ) distributions. Carol Winter and Nan Levine, two of the supplementary group speakers, all of whom are under 35, are the only young speakers with any forward tokens of (ɔr). All this does not necessarily mean that (ɔr) has contracted back. It is more likely that (ɔ) has moved forward as (ɔ) merges with (a).

(ɔr) associates with (ɔl), as (ar) does with (al), for most but not all speakers. Seven main group speakers show overlap, although for Ginger Ryan it is very slight.

There is no sign of overlap of (ɔr) and (ɔl) areas for three of the supplementary group speakers. This may or may not be due to the small samples for speakers in this group. What is notable is that (ɔl) centers, and generally spreads, backer and lower than (ɔr). (ɔl) is an area for most speakers to the back of (ɔ) and (ɔr), but in association with both of them. The variable centers can be seen as three points of a triangle within an individual's vowel space, with the (ɔl) center point to the back. For almost all informants, the area of (ɔl) occupies the backest portion of nonhigh back vowel space. This is similar to the relationship of (al) to (a) and (ar).

The relationship of (ɔl) to (ɔ) changes more through apparent time than the relationship of (ɔl) to (ɔr). For the two oldest speakers there is great overlap of (ɔ) and (ɔl) distributions. For Cork and Marion Thompson (ɔl) centers to the back of (ɔ) areas but spreads forward well into (ɔ). Further, the center for (ɔl) is not high relative to centers for (ɔ) distributions. All four older speakers have obstruent environment centers above (ɔl). By contrast, the four younger main group speakers center (ɔl) above all centers for (ɔ) distributions as well as in back of both (ɔr) and all (ɔ) area centers. There is, besides, very little overlap of (ɔl) and (ɔ) areas. In Ginger Ryan's case the overlap is accounted for by two tokens of the vowel in *all* and *called,* out of nine (ɔl) tokens. The distributions of (ɔ) and (ɔl) seem, then, to have separated, with (ɔl) becoming higher and backer in relation to (ɔ). Merger of (ɔ) and (a) is involved. (ɔ) is becoming lower and fronter in relation to (ɔl). Supplementary speakers place (ɔl) to the back of (ɔ). Three of these, Tracy Sawyer, Rachel Stone, and Nan Levine, appear to completely separate (ɔl) from (ɔ).

Since the separation of (ɔl) from (ɔ) is completely phonetically conditioned, it could be regarded simply as the development of allophony, parallel to the development of allophony for /æ/. /æ/ is relatively front and high now before nasals. /ɔ/ is relatively high and back now before /l/. The situations are not, however, parallel. The relative height and backness of (ɔl) is due to lowering and fronting of (ɔ), and this characterizes the process of

merger of (ɔ) and (a). What needs to be determined is whether, in the merger, (ɔl) associates with (al).

6.2.3. Summary of observations. The variables (ɔ), (ɔl), and (ɔr) distribute in three clearly discernible areas in the back of vowel space for each speaker. Within (ɔ), relatively front positioning is favored for (ɔT) tokens, and the constraint fronting (ɔ) before alveolar stops becomes heavier over time; (ɔT) distributes more and more forward. The distribution of (ɔ) before other obstruents and nasals shows imperfect agreement with (a) frontness orders for obstruent areas on the one hand and relative height for (aN) on the other.

(ɔr), representing vowels in lexicon with historical /or/ and historical /ɔr/, occupies an area of vowel space higher than (ɔ), although there is sometimes overlap between the two. Because (ɔ) is moving forward and down in the course of merger with (a), the relationship of (ɔ) and (ɔr) has changed somewhat over the last 60 years or so. (ɔr) now centers and distributes to the back of as well as above (ɔ). (ɔ) and (ɔr) centers can be seen as two points of a triangle the third back point of which is the center for (ɔl). (ɔl) associates with both (ɔ) and (ɔr) more than these variable distributions associate with each other. Generally there is overlap of (ɔ) and (ɔl) and of (ɔl) and (ɔr). The oldest main group speakers are seen to have an (ɔl) area centering toward the back of (ɔ) but not high in relation to it. The youngest two main group speakers have (ɔl) distributions that center back of and above (ɔ) area centers; and there is very slight overlap. As (ɔ) lowers and fronts (ɔl) becomes separate from it. If there were not an ongoing merger of /ɔ/ with /a/, the separation could be regarded as the development of an allophone. Because there is a merger—and the merger process causes the separation—the phonological relationship represented by present distributions of (ɔ) and (ɔl) requires further consideration.

6.2.4. Informal speech vowel charts. Figures 6.9-6.16 show distributional spreads and center points for the eight main group speakers. In Appendix A

charts with all tokens plotted for both main group and supplementary group speakers are given.

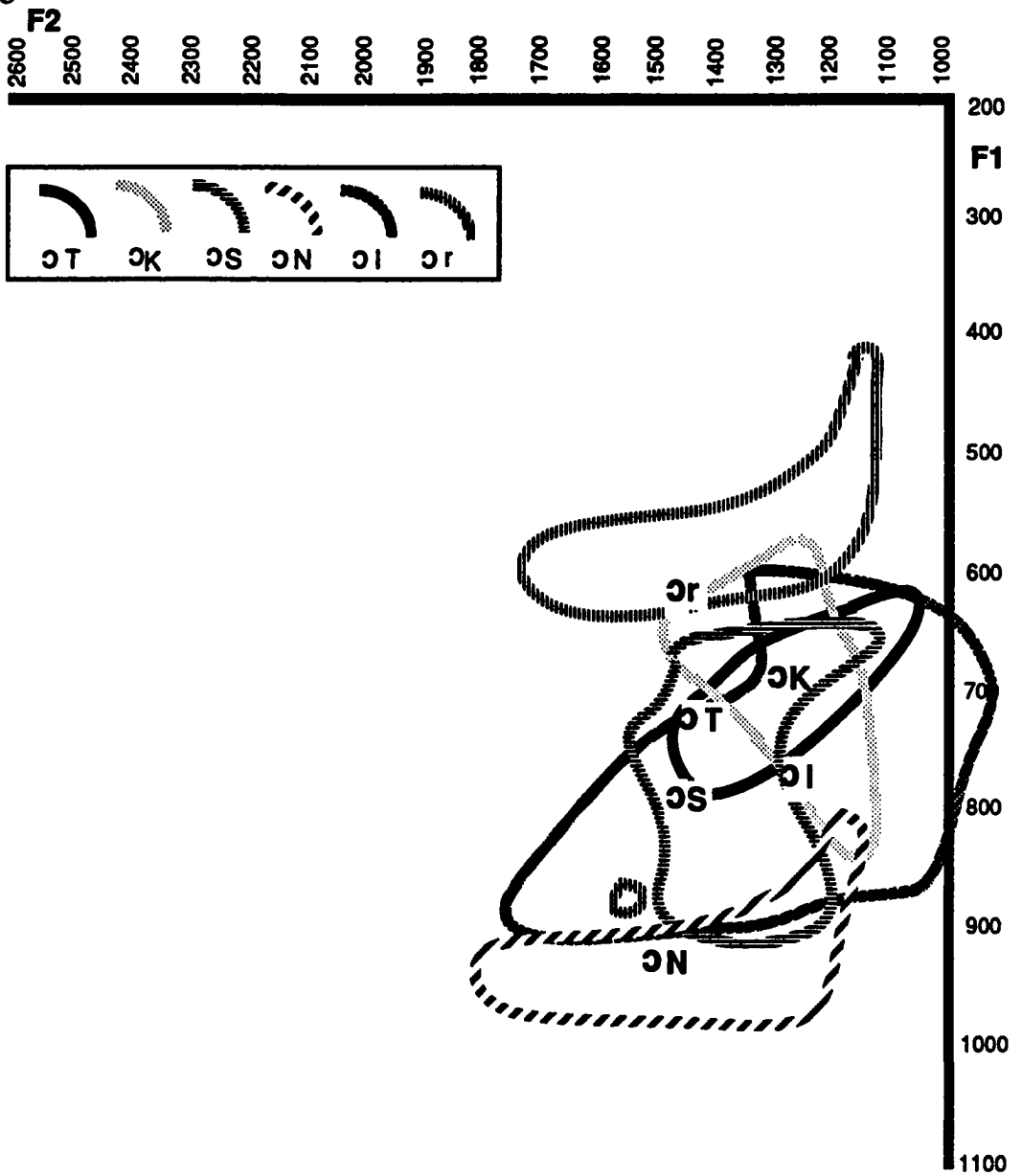

Figure 6.9. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Meg Cork, 74, working class.

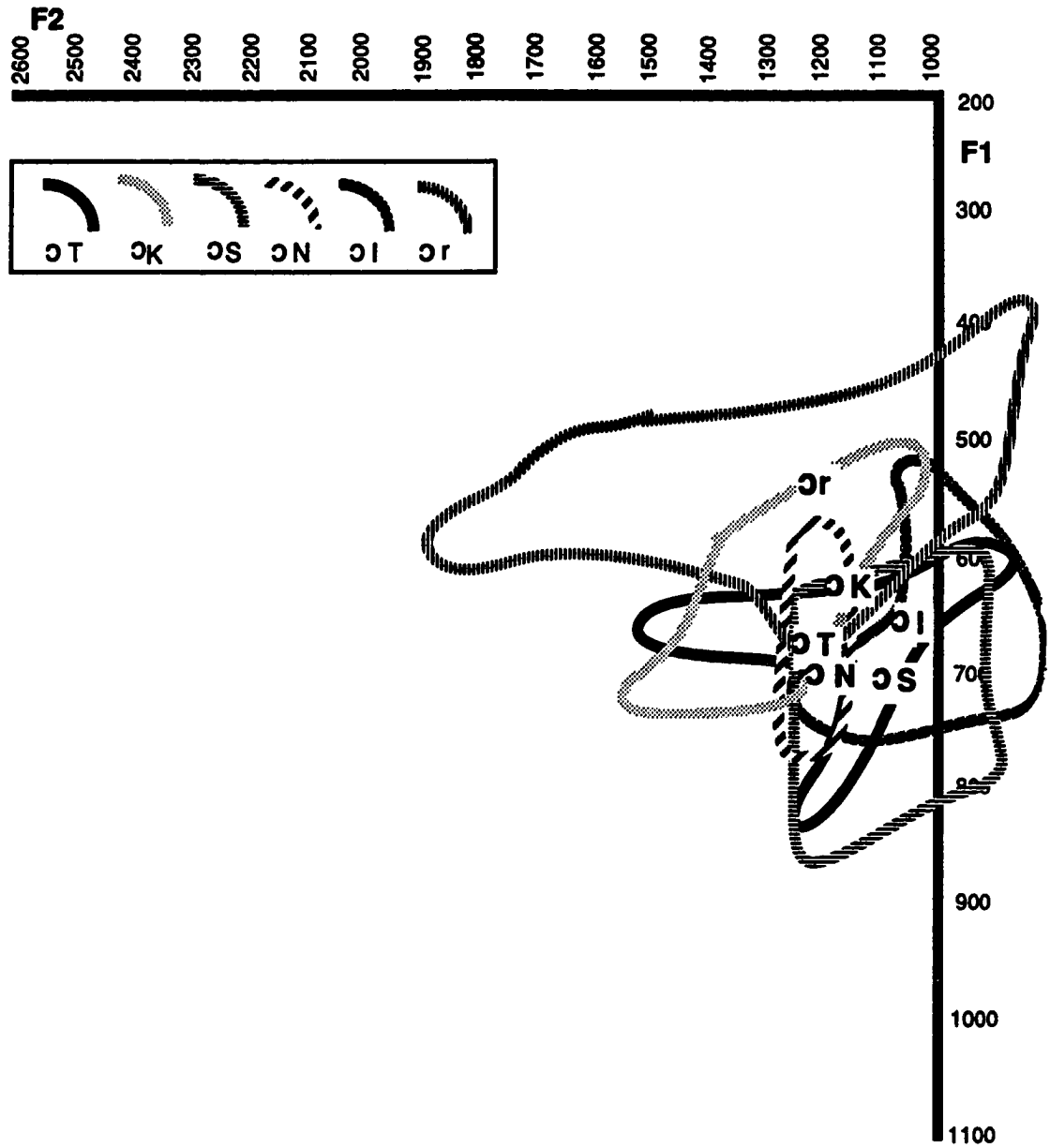

Figure 6.10. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Marion Thompson, 65, middle class.

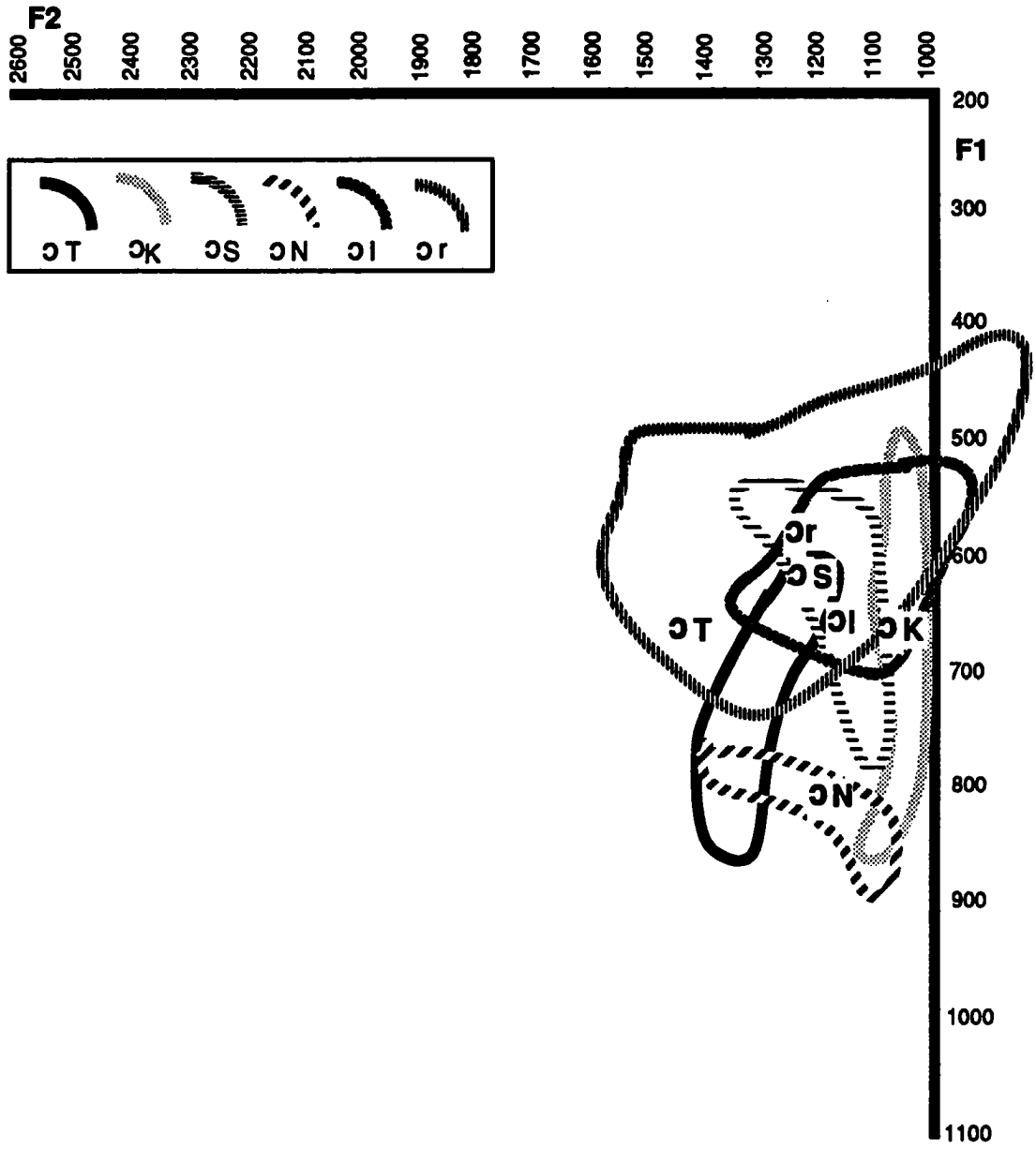

Figure 6.11. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Sharon Ryan, 45, working class.

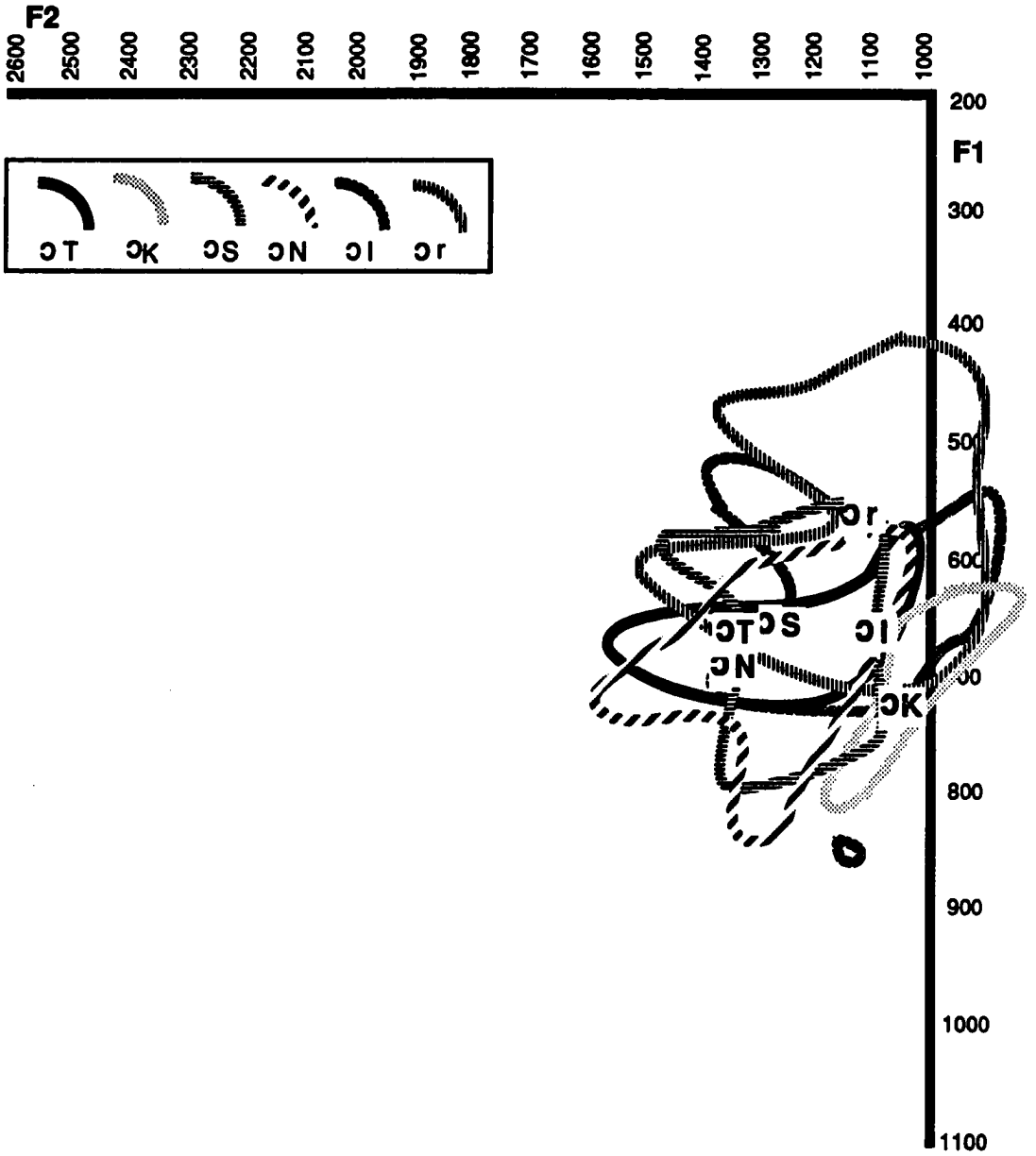

Figure 6.12. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Jean ORoark, 43, middle class.

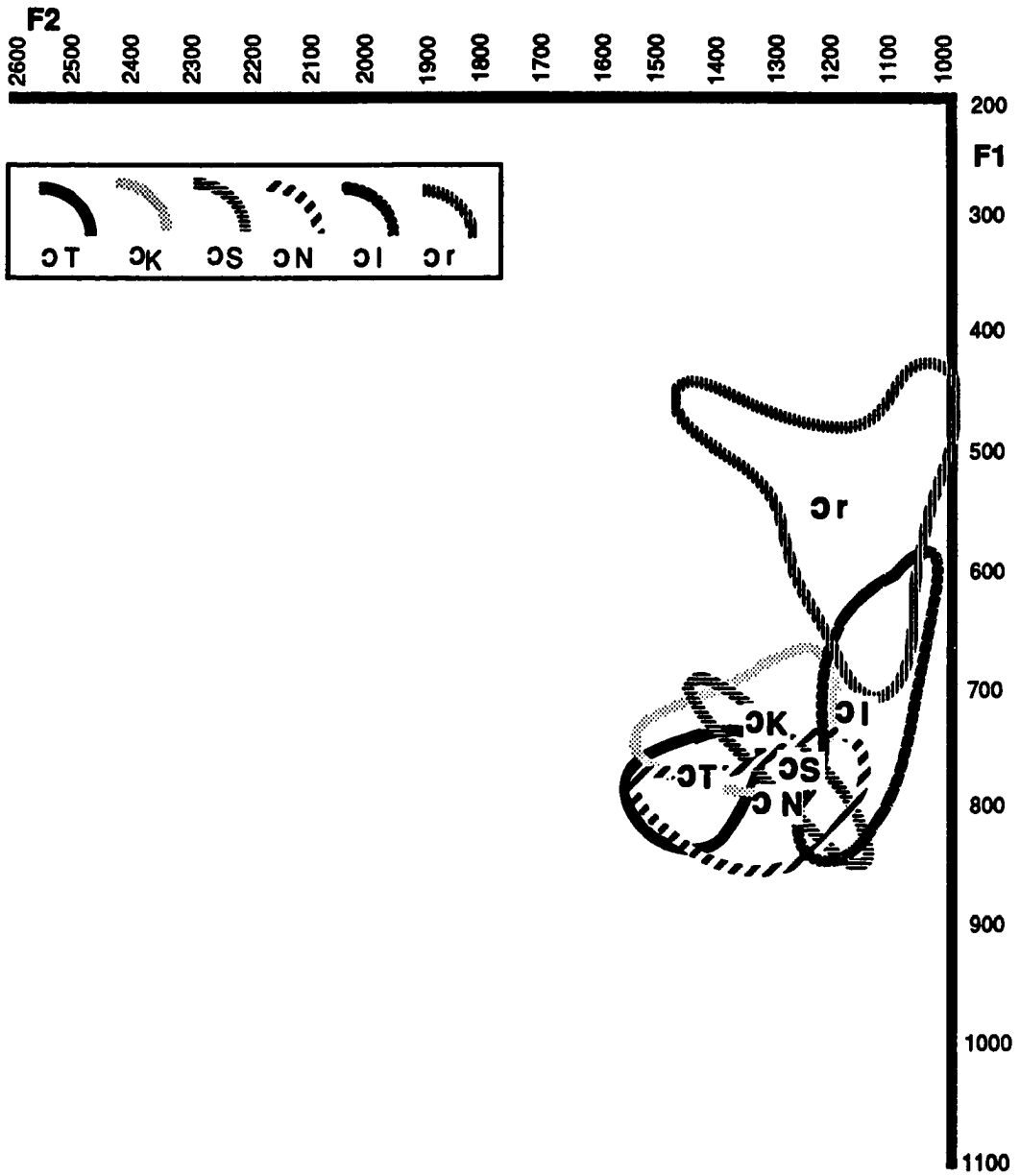

Figure 6.13. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Suzi Rockland, 34, working class.

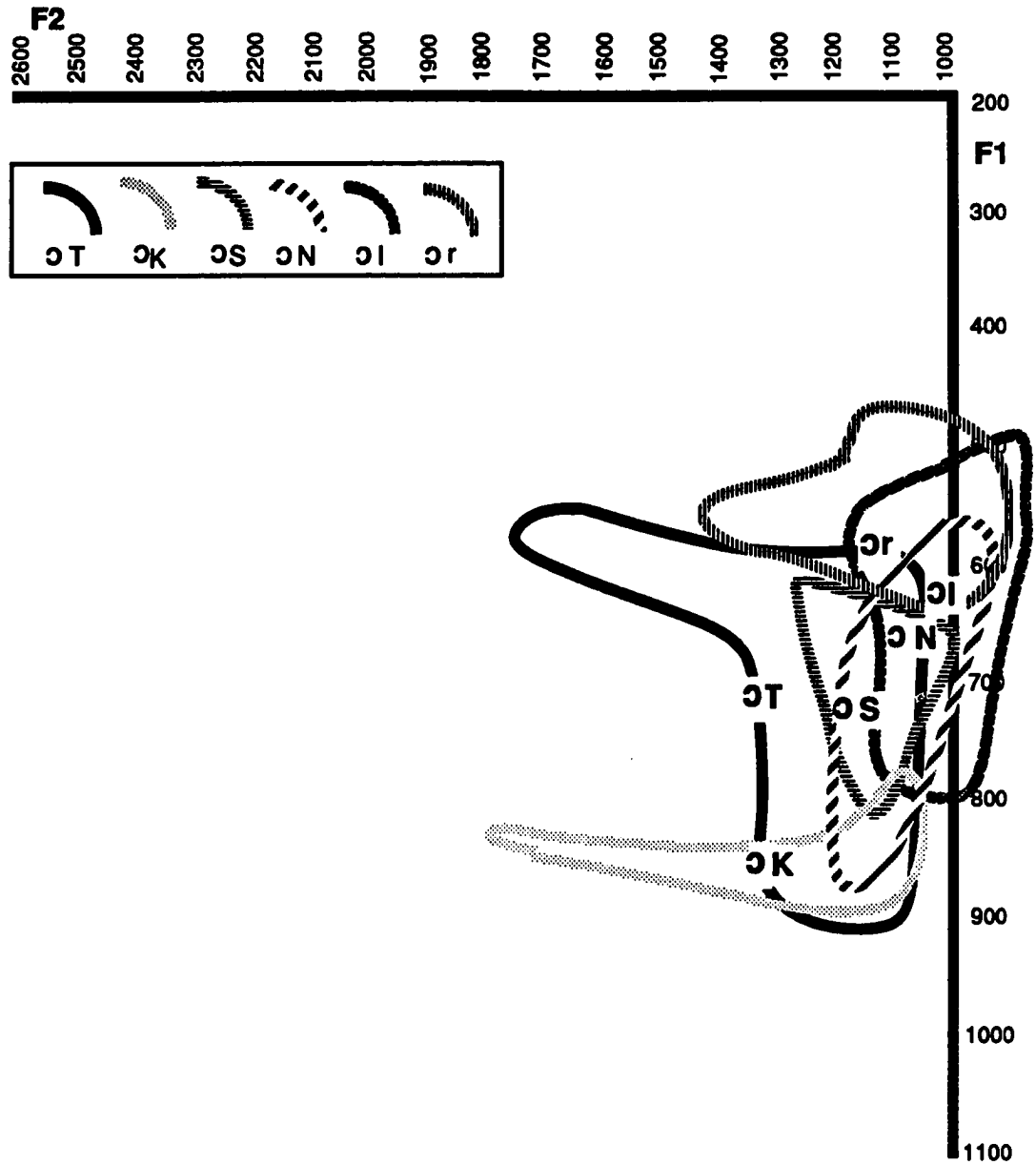

Figure 6.14. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Jesse Austin, 31, middle class.

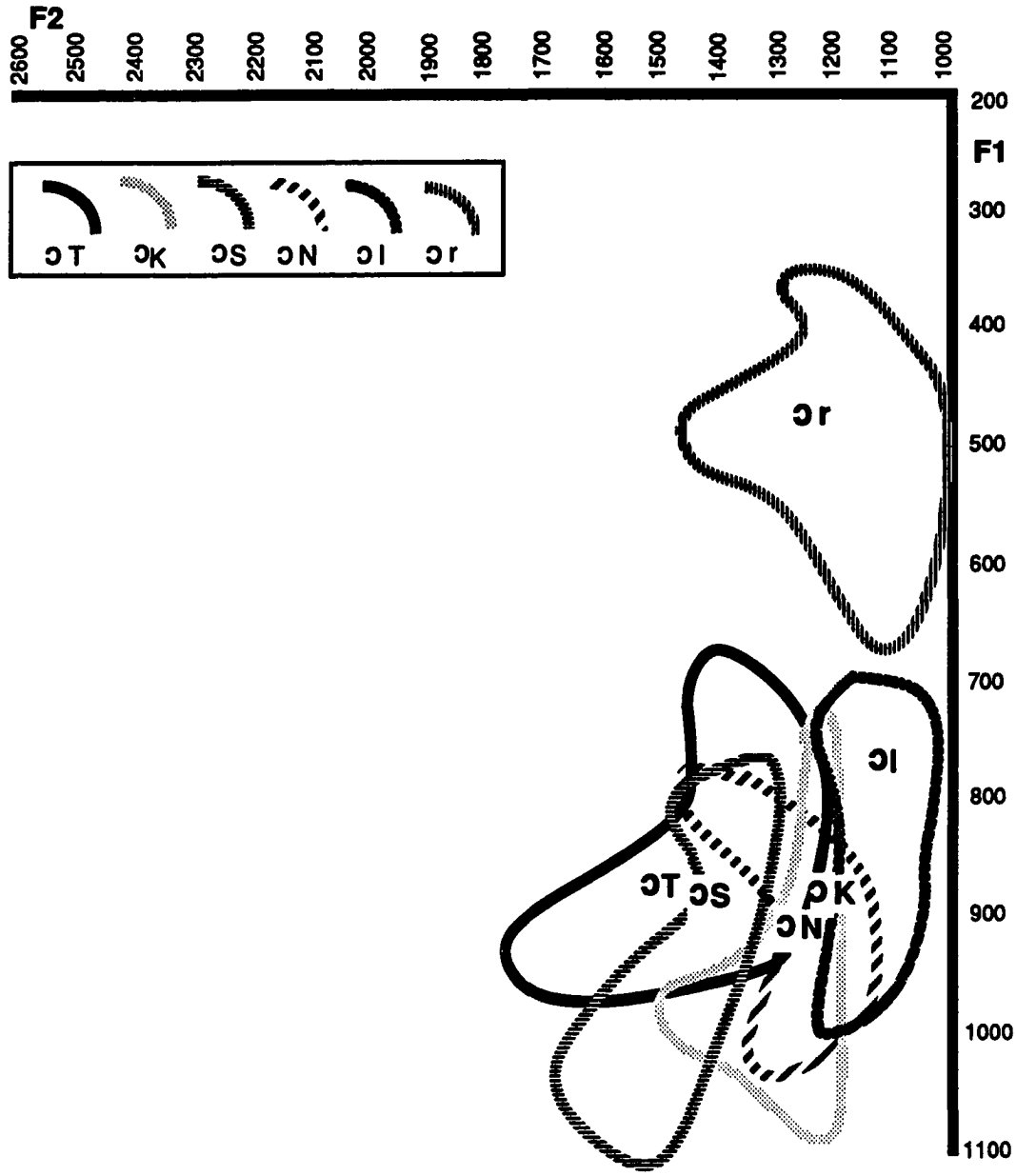

Figure 6.15. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Ginger Ryan, 22, working class.

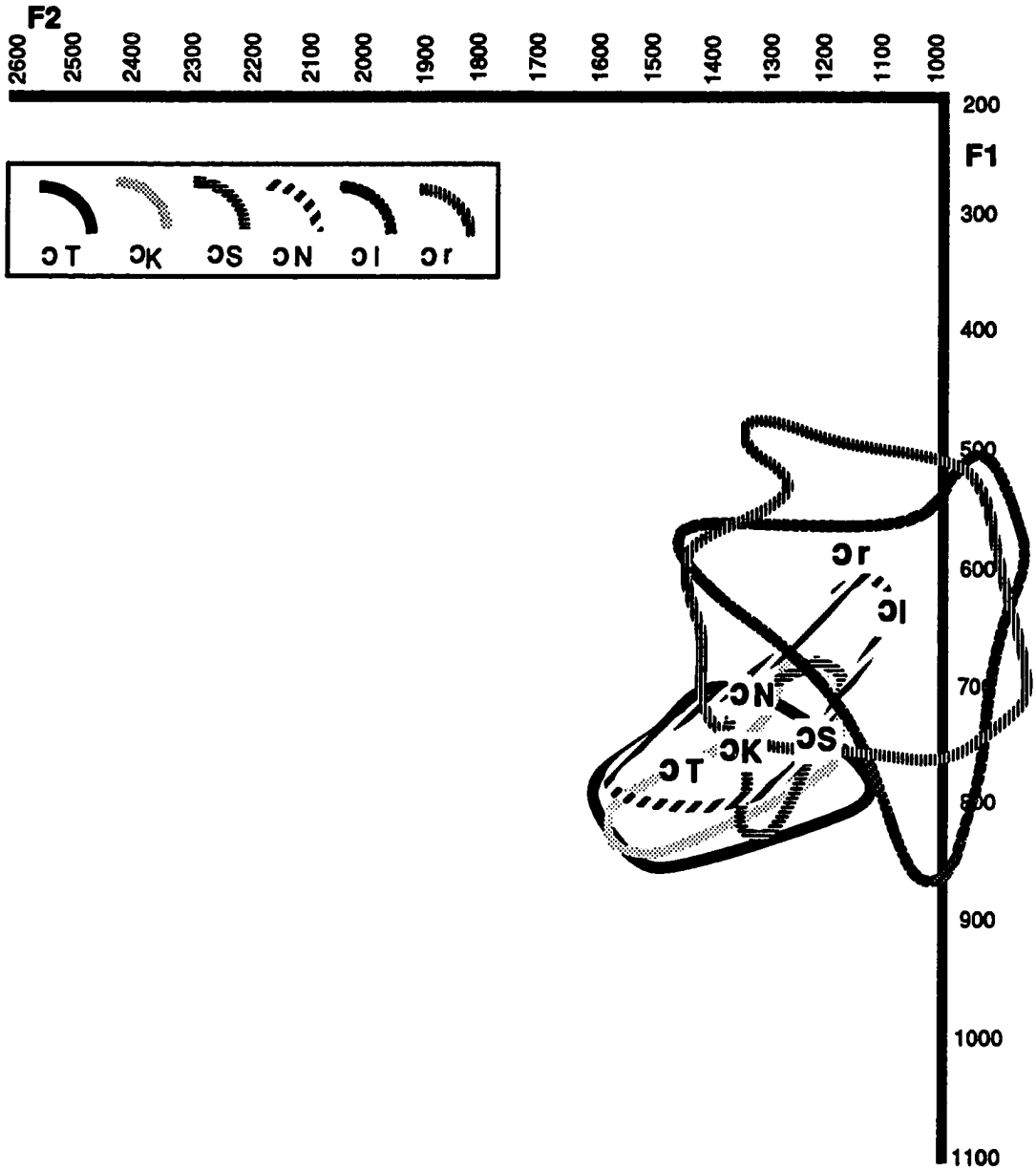

Figure 6.16. Distributional spreads and mean points for F1 and F2, for (ɔ), (ɔl) and (ɔr), Beth Thompson, 25, middle class.

Meg Cork (see Figure 6.9) centers (ɔr) directly above the (ɔ) distribution. There is almost no overlap of her (ɔ) and (ɔr) areas. (ɔr) extends forward, as do (ɔN) and (ɔS). Her most forward tokens are in *door, shore, long, along, off.* (ɔT) is not fronted in her speech. (ɔl) centers in back of (ɔ) area mean points, and relatively low. The (ɔl) distribution extends throughout a large portion of the (ɔ) territory, and ranges well in back of it also. There are several quite back tokens of the vowel in instances of *all.* Like other main group working class speakers Cork has a low distribution for (ɔN). Hers is extremely low, hardly overlapping with any other (ɔ) area except (ɔS). Five tokens of (ɔN) show the vowel before a velar nasal, but the lowest token of all is in the alveolar environment. The low position of (ɔN) and the tight clustering of tokens of (ɔT) suggest that these are distributions representing subphonemic realities.

Marion Thompson's (ɔr) also centers above her (ɔ) distributions. Her most forward tokens are of (ɔr) and (ɔK), in *door, walk.* Thompson is unusual in having tokens of (ɔK) to the front of (ɔ); two vowels in *walk, walking* appear very back and high. There is much overlap of the three variable areas for this speaker. (ɔl) centers to the back of (ɔ) and low. Many of Thompson's (ɔr), (ɔl), and (ɔ) tokens are very back vowels, having F2s below 1000: *before* (3), *cord, forth, all* (3), *crawling, fall, watch, awful, off* (2), whereas only two low (æ) tokens, in *slaps, hatch,* are this low. Thompson is unusual in having a low back vowel distribution that extends lower than (æ). For her both (a) and (ɔ) vowels followed by fricatives, either immediately or as second consonants in clusters, are involved. Thompson's (ɔT) ranges both forward and back in (ɔ). The area does not spread as far forward as (ɔK); the two frontest tokens are in instances of *thought.*

Sharon Ryan extends (ɔr) well above and to the back of her (ɔ) distribution, but there is quite a lot of overlap, more than for any other speaker. (See Figure 6.11.) She has a front extension of (ɔr) that is as front as her most forward (ɔT) tokens, so that the vowels in *war* and *water* are both centralized. Ryan has a very low (ɔN) area. Most of her (ɔ) is positioned in the mid range of her back vowel space, but the whole of (ɔN), and lower

portions of the spreads of (ɔT) and (ɔK), are not. Her lowest tokens are in *taught, walking, long*. (ɔl) centers to the back of (ɔ), at about a mid point for the whole (ɔ) distribution. (ɔl) distributes quite far back. Her backest tokens are in instances of *all* and in *born*.

Jean ORoark does not overlap (ɔr) and (ɔ) at all, but centers (ɔl) between them, showing overlap of that area with both (ɔ) and (ɔr). (See Figure 6.12.) Her plosive areas are more compact than the fricative or nasal distributions. (ɔT) is a relatively high centering area. (ɔK) runs up and down the lower back wall of her vowel space, delimiting it. Her lowest (ɔ) token is in *walk*. (ɔS) and (ɔN), rather diffuse distributions, both show some extension forward from the back wall.

Suzi Rockland shows near separation of (ɔ), (ɔl), and (ɔr) distributions. The lowest portion of her (ɔr) area is well above (ɔ). (ɔl), centering between but to the back of (ɔ) and (ɔr), overlaps slightly with both. Her chart is Figure 6.13. Nasal, fricative, and velar stop areas each have forward extensions represented by single fronted tokens: *along, across, fog*. The alveolar stop area centers and mainly distributes in front of the others. Vowels in *thought* and *watch* are the most forward.

For Jesse Austin, whose chart is Figure 6.14, (ɔr) and (ɔl) are to the back of the obstruent and nasal environment areas, but do not center high enough to avoid overlap with several distributions within (ɔ). The most overlap is with (ɔN). The backest tokens are of (ɔl). Austin has forward extending portions of (ɔT) and (ɔK), the alveolar stop area showing one centralized mid vowel in *bought*, the velar stop area one centralized low vowel in *Fog Hat*. Fricative and nasal regions are back. The three velar nasal environment tokens are back and high, distributing with (ɔl) phones.

Like Rockland, Ginger Ryan shows almost complete separation of the three variables' distributions. (See Figure 6.15.) The liquid areas barely overlap with each other. They both center and range back of and higher than (ɔ). (ɔl) interferes only with (ɔN) within the (ɔ) territory. Ryan's (ɔT) and (ɔS) distributions spread forward in low

vowel space, producing centralized tokens in *cost, caught, thought*. Her fricative area shows some internal structure. (ɔs) phones are low, (ɔf) tokens higher, with the exception of one high (ɔs) in *cross*. (ɔN), centering to the back of (ɔ), is represented only by vowels before the velar nasal. Ryan's lowest vowels are in *walked, walking*, with F1 heights greater than 1050 Hz.

(ɔr) and (ɔl) for Beth Thompson, centering high and back in relation to (ɔ), both overlap with all (ɔ) distributions. (See Figure 6.16.) Thompson's (ɔN) extends particularly high, showing vowels in *lawn, longer* near the center of the (ɔr) area. Otherwise, her (ɔ) territory is compact. Center points for (ɔS) and (ɔK) are close, with the center of (ɔT) much fronter. There are forward vowels for both (ɔT) and (ɔK), in *thought* (2), *talking*.

All six supplementary speakers show (ɔr) distributions above (ɔ) areas. For two informants, Carol Winter and Barb Walsh, (ɔl) distributes altogether lower than (ɔr), showing no overlap. For them, (ɔl) centers to the back of (ɔ), and there is interference between the areas. Tracy Sawyer, Rachel Stone, and Nan Levine, while overlapping (ɔr) and (ɔl), keep (ɔl) and (ɔ) separate. (ɔN) is a back distribution for each speaker, Sawyer, Donovan, and Winter seeming to separate it from the obstruent areas. The middle class supplementary speakers have tokens of (ɔT) as their most forward (ɔ) phones, in *thought* (Stone, Levine), *bought* ((Donovan), and *brought* (Walsh). Winter and Sawyer, on the other hand, extend their (ɔ) areas forward with vowels in *offering, talk*. There are fronted vowels in *off* and *talking* for Stone and Walsh as well. The favoring of (ɔT) for front position is not strong across this group of speakers. For all of them except Stone, the base of the (ɔ) area is marked by (ɔK) tokens.

6.3. Merger of /a/ and /ɔ/ in San Francisco White English. The merger of these two vowels is well advanced in San Francisco. The coalescence of /a/ and /ɔ/ in the Third Dialect of English is mainly a Far Western, nonurban phenomenon. On the basis of anonymous, brief interviews with telephone operators and findings from studies in

western Canada and the United States (e.g. Terrell's (1975) work in Los Angeles) Labov states (in press:43) that 'the Western merged region covers most of English-speaking Canada and the western United States....The non-urban character of the low back merger appears most clearly in California, where a large concentration of two phoneme speakers appears in Los Angeles and San Francisco.'[1] Labov adds (p.44) that there is evidence that the geographical area of the merger is expanding in accordance with the principle that mergers expand at the expense of distinctions. This means that in the case of this sound change the propagation is not from city centers out to suburbs and then rural areas but from the countryside to the city. In the 1950s the LAPC surveyors noted merger of /a/ and /ɔ/ more in the small towns of California than in Los Angeles or San Francisco , which accords with Labov's claim. (See Chapters 2 and 8.)

Sound change in progress studies of mergers have more often than not been of incomplete mergers. An exception is Herold's (1990) detailed study of the extension of the /a/ and /ɔ/ merger from Western to Eastern Pennsylvania; the merger has long been complete in the western part of the state and Herold treats it as complete in some Eastern Pennsylvania communities. Herold's investigation does not entail, however, close examination of the phonetic process of neutralization over time. There are also reconsiderations, in the sociolinguistic literature, of apparent reversals of merger, which are better understood as the final results of changes in which coalescence was never perfected. (See Chapter 3 for a review of studies of incomplete mergers and apparent reversals of merger.) What are the details of the mechanism of this kind of sound change?

In studies of incomplete mergers a discrepency is often noted between hearer perception and speaker-hearer categorization, on the one hand, and speaker production, on the other. (See Chapter 3.) Phonetic distinction is maintained in informal speech by speakers who categorize the relevant sounds as the same. Sometimes the same speakers who produce a difference in less formal speech produce no difference in more formal

speech. The level of categorization involved is reflected better in speech when production is likely to be more rather than less subject to conscious self-assessment.

In a completed unconditioned merger we expect three things:

1. lack of categorical distinction between the vowel phones realized for one class of words and those realized for another;
2. complete phonetic overlap of the total vowel space occupied by one historical vowel with the space of another;
3. environmental distribution for one historical vowel which matches environmental distribution for the other within the overlapping territories.

The first of these can be inquired about through perception tests and elicitation of formal speech. Comparison of charts based on formal and informal speech may reveal distributional differences that suggest recategorization has taken place and is better reflected in the formal speech charts than informal. The second and third can be investigated through transcription and formant height and amplitude measurement of vowels produced in informal speech. Overlap of whole variable areas and of environment areas within them should be apparent in charts plotting F1 against F2 heights.

It seems that recategorization takes place before or just upon the accomplishment of complete overlap; neutralization in particular environments mainly follows after complete overlap and apparent recategorization, if the generalization can be made from the San Francisco case.

In assessing informal speech vowel chart evidence one can compare frontness and height constraints at work for the two historically distinct vowels. For (a) and (ɔ), then, relative positions of obstruent areas, especially the alveolar stop distributions, are compared for match. Relative heights of nasal environment areas within each of the whole variable distributions are compared. For (ar) and (ɔr) height is important, and for (al) and (ɔl) height and backness relative to (a) and (ɔ), and (ar) and (ɔr), are compared. For any one speaker, a matching of frontness and height orders for (ɔ) areas does not necessitate environment by environment neutralization. For instance, favoring of both (aT) and (ɔT) for fronting does not necessarily mean that these areas greatly overlap for any particular

speaker; (ɔT) and the other (ɔ) areas may be both higher and backer than (aT) and other (a) areas. Complete general overlap of (a) and (ɔ) distributions increases the likelihood of frontness and height order matches. Thorough environment by environment coalescense,—that is, complete or nearly complete overlap of all areas environment by environment—while it does not quite necessitate a matching of frontness and height orders, makes the match very likely. It is possible, however, for great overlap to occur, but for center points within environmental distributions to be so far apart that frontness orders—for obstruent areas, for instance,—do not match. After complete overlap of (a) and (ɔ) has been achieved, environmental neutralization which establishes merger follows. The merger in San Francisco is well along in this stage of the process. In this view, then, an unconditioned vowel merger is a collection of conditioned mergers. Complete merger is the achievement of several partial mergers. If the accomplishment of the partial mergers, determined through guidelines specified below, is not accompanied by a matching of frontness and height orders for individual speakers, this is because the merger has done away with the former, distinct vowels and their separate environmental distributions. New frontness and height orders are established for the phoneme resulting from merger.

In an inspection of vowel charts for overlap of environmental areas in order to assess whether or not merger, a phonological fact reflected in the phonetics, has come about, it is necessary to use some guidelines for deciding the claim. Relying on the plotted F1 and F2 measurements to show degree of frontness and height, and on these to assess environment by environment merger, I use the following tests to assess whether overlap of (a) and (ɔ) areas reflects merger. (The use of 'one-half' is justified only by its neutrality as a percentage.)

No overlap:	no merger; unless the total vowel space area involved is continuous, and phonetic or lexical conditioning can account for the position difference; then, possible merger.
Some overlap:	no merger; unless conditioning can account for the position difference; then, possible merger.

(some overlap: occupation of the same area of vowel space by no more than one-half the number of tokens for each of the variables in the environment.)

Neutralizing overlap: merger;
unless distribution internal to the area of overlap cannot be explained by conditioning, phonetic or lexical; then, only possible merger.
(neutralization: occupation of the same area of vowel space by more than one-half the number of tokens for each of the variables in the environment)

In complete coalescence there should be environment by environment neutralization. Observation of the merger in the Third Dialect, as it completes iself in San Francisco, discloses how that comes about. Since relative frontness for (aT) is the heaviest constraint for either variable, coalescence of (a) and (ɔ) cannot be regarded as phonologically complete until there is neutralization of (ɔT) and (aT).

6.3.1. Evidence of ongoing merger. Complete phonetic overlap must accompany merger. Except for the much rehashed merger and reversal of merger of the vowels in *mate* and *meat* , mergers treated in the literature are of back vowels. (See Chapter 3.) It is there, of course, that vowel space is crowded, and especially so in English. Inspection of vowel charts from this study and from other sound change studies shows that more overlap of areas of production is tolerated in the back than in the front. Overlap is not merely intrusion of the area of confusability for one vowel into the area of production for another; rather, areas of production themselves overlap. This occurs, as has been seen, in front as well as in back vowel space in informal speech for all informants; overlap is simply greater in the back.

For (a) a following alveolar stop provides the heaviest constraint. The fronting of (aT) and the diachronic lowering and fronting of (ɔT) are processes with direction along not quite parallel tracks that should come together at approximately the low center point of vowel space for any one speaker. Across age and class speakers center the distribution of (aT) to the front of mean points for vowel phones in other environments, as has been seen. A relatively front position is also found for (ɔT), with favoring of this fronting increasing over time; but the fronting score for the subvariable (ɔT) is not as high as that for (aT).

Different frontness orders for (aK) and (aS) are found for speakers in different classes, as discussed above: for lower SES speakers, (aS) (aK); for higher SES speakers (aK) (aS). The synchronic fronting rule for (a) includes a condition that weights the fricative and velar stop environments differently for different SES groups. Correspondence of frontness positions for these environments, found for the majority of main group speakers across class, would suggest that the process of merger has made lexicon formerly belonging to /ɔ/ subject to the social conditioning in the fronting rule for /a/, if the match of velar stop and fricative area frontness orders were seen to become more consistent over apparent time. There is not evidence of more consistent match over time. There is evidence of alignment of overall obstruent environment order of (ɔ) with that of (a).

All working class main group speakers position both (aN) and (ɔN) low. This match of relative height for nasal environments within (a) and (ɔ) has been a fact of the phonology for at least 70 years. Working class speakers who acquired phonology as long as 70 years ago, and ever since, have positioned (aN) low within (a) and (ɔN) low within (ɔ). In this respect, subphonemic conditioning for /a/ and historically distinct /ɔ/ are the same.

Table 6.4 aligns frontness and height center orders for (a), (ar), and (al) with centers for (ɔ), (ɔr), and (ɔl). Bold type indicates that an individual has a height order match for nasal or liquid environments or a match, even partial, of obstruent environment frontness orders. The orders for Marion Thompson, for instance, show that she positions both (aN) and (ɔN) lowest within the whole vowel space for phones representing historical /a/ and /ɔ/ respectively, and positions both (ar) and (ɔr) highest; and her frontness order for (a) obstruent areas matches her frontness order for (ɔ) obstruent areas. In 6.3.1.1. and 6.3.1.2 below, the meaning of environment area order matches is considered, degree of whole variable overlap for older and younger speakers is noted, and vowel charts are

examined for evidence of partial mergers. Overall there is a tendency for the internal structure of (ɔ) with (ɔl) to become parallel to the internal structure of (a) with (al).

MC	F: **aF/aT** ar aP/aK aN F: ON Or **OF/ɔT OK** Ol	H: **ar** aF/aK/aT/aP **aN** H: **Or OK** OT Ol/ɔF **ON**	oldest dyad
MT	F: aT ar aP aK aF/aN F: OK ON/ɔr/ɔT OF Ol	H: aF aN/ar aP/aK aT H: Or OK Ol/ɔN/ɔT OF	
ShRy	F: **aT** ar aP **aF** aK aN F: OT Or/ɔF Ol/ɔN **OK**	H: **ar** aF aP/aK aT **aN** H: **Or** OF Ol/ɔN/ɔT/ɔK	40s dyad
JO	F: ar **aT** aK aP aN/al aF F: ON **OT** OF Or Ol/ɔK	H: **ar aT** al/aN aF aP aK H: **Or** OF/ɔl/ɔT ON OK	
SuRo	F: **aT**/ar aF/aP al aK/aN F: OT OK ON/ɔF Or Ol H:	H: **ar** al aT/aK/aP/aF **aN** Or Ol OK OF/ɔT/ɔN	30s dyad
JA	F: **aT** aN/ar aP **aK** al **aF** F: **OT OK** Or ON/ɔF Ol	H: al ar aN aT aP aF aK H: Or Ol ON OT/ɔF OK	
GR	F: **aT** ar aN **aF** aK aP al F: **OT OF** ON Or **OK** Ol	H: **ar** al aK/aP aT/aF **aN** H: **Or** Ol OK OT/ɔF/ɔN	20s dyad
BT	F: **aT** aP/ar **aK** aN **aF** F: **OT OK** ON **OF** Or Ol	H: aN ar/aP aF aK/aT H: Or Ol ON OF/ɔK OT	

Table 6.4. Comparison of frontness and height positions of centers for (a), (ar) and (al) with centers for (ɔ), (ɔr), and (ɔl). (Bold type indicates positional match; (aN) and (ɔN) bold for Sharon Ryan because height difference between (ɔN) and lower (ɔ) centers is slight.)

6.3.1.1. Evidence from the informal speech of older informants. For all speakers, charts for (a) and (ɔ) given in this chapter and in Appendix A can be compared to see where in an individual's vowel space overlap occurs. In informal speech the overlap between the distributions of (a) and (ɔ) is observed to increase over apparent time. For the four older main group speakers the overlap is partial. The extent of the mutual interference and the shape of the overlapping areas varies from person to person. For 74 year old Meg Cork only (ɔN) and the lower portion of her (ɔS) areas intrude into the (a) territory. Her (ɔ) distribution is altogether backer and higher than her (a). The two nasal areas, both backest within the distributions of their separate variables, largely overlap. F2 means,

however, are about 100 Hz apart, so the nasal area center points are not close. Front positioning for her (ɔN), which is also an unusually low (ɔ) area, make for overlap of (aN) and (ɔN). (aN) is included within (ɔN). There is no conditioning apparent within the combined nasal area, suggesting that this neutralizing overlap would not be regarded as merger. There is some overlap between (aS) and a low portion of (ɔS) containing two of the seven (ɔS) tokens. Conditioning does not account for the fact that (ɔS) is mainly a higher and backer area. There is no merger in this environment. Alveolar and velar stop areas do not overlap.

Marion Thompson, 65, also positions (ɔ) higher and backer than (a), as seen in Figure 26, but there is some overlap of nasal areas and each obstruent environment area. The overlap of (aS) and (ɔS), and of (aN) and (ɔN) is almost complete. Nasal area centers are close. Fricative area centers are not, showing a difference of more than 100 Hz for F2 heights. The relatively high positions of (aS) and (aN) within (a) and low positions of (ɔS) and (ɔN) within (ɔ) allow for the large overlap. So here, lack of environment order match facilitates neutralization. (ɔN) is contained within (aN); (aN) extends up the back of vowel space, enveloping (ɔN). There is no conditioning internal to the area that suggests this is not a merged environment. The neutralizing overlap of (aS) and (ɔS) is likewise convincing. One low token out of six (ɔT) vowel phones, in *water,* accounts for the overlap of (aT) and (ɔT). Only two of six (ɔK) tokens are low enough to interfere with the (aK) area.

For Sharon Ryan and Jean ORoark, both in their forties, although one area of production interferes with the other more than is true for the oldest speakers, the territories of (a) and (ɔ) are still more separate than not (refer to Figures 27 and 28); on the whole, (ɔ) distributes higher and backer than (a). As is true for her mother Meg Cork, Sharon Ryan has completely overlapping (aN) and (ɔN) areas, due to the low placement of her (ɔN) distribution. Centers are not close. There is more than 150 Hz difference in the F2 means for (aN) and (ɔN). There appears to be conditioning internal to the combined nasal areas,

but it argues for, not against, regarding the vowels as merged in this environment. Vowels before velar nasals, in *concrete* and *long*, are both relatively low, and are, in fact, almost in the same place. Ryan shows virtually no other overlap in any environment. Velar stop areas do not overlap at all. Fricative and alveolar stop areas of (a) are interfered with minimally by (ɔ) phones. Ryan has (aT) distributing in front of (aS) in front of (aK); and she places (aN) low. She has (ɔT) distributing in front of (ɔS) in front of (ɔK); and she places (ɔN) low. Since her total (ɔ) distribution centers higher and backer than her (a), overlap of most environmental areas is avoided. Only her extremely low positioning of (ɔN) brings about overlap of the nasal territories. Ryan's match of frontness orders for the environmental distribution centers within the two variables may reflect an advance in the merger process, if this includes an adjustment in the phonology of relative positions of environments as well as, eventually, complete phonetic overlap of those environments. It is the very fact of the frontness order match that prevents neutralization in most environments.

For Jean ORoark, as for older Marion Thompson, (aS) and (ɔS), as well as (aN) and (ɔN), show complete overlap. ORoark is the only speaker under 50 who does not position (ɔT) in front of all other (ɔ) environments. Instead, she fronts (ɔN) more than (ɔT). It overlaps greatly with her relatively back (aN). No environment-internal conditioning disallows regarding the vowels as merged before nasals. An (aS) area is nearly contained within her (ɔS) distribution, which extends, although it does not center, low. (aS) and (ɔS) distributions can be said to reflect merger. Nasal areas show close (a) and (ɔ) center points, but the centers for fricative areas are more than 100 Hz apart. Velar stop areas do not overlap. Alveolar stop areas barely overlap.

Through apparent time from the oldest speakers to the middle-aged pair, degree of overlap of (a) and (ɔ) as a whole increases slightly. More interestingly, degree of area interference between the two variables in particular environments does not increase. All four speakers show so much overlap of (aN) and (ɔN) that one can regard /a/ and /ɔ/ as

neutralized in the nasal environment. The middle class older informants appear to have neutralized /a/ and /ɔ/ in the fricative environment as well. For the two working class speakers (aN) and (ɔN) are both extremely back vowel areas. Neutralization is achieved in spite of rather than because of this. Only one older speaker, Sharon Ryan, matches obstruent area center orders including front position for the alveolar stop environment. The match impedes neutralization. It is notable that no speaker shows neutralizing overlap, or any overlap at all worth considering, of the alveolar stop areas. The favoring of a front position for (ɔT) increases over time. This can be seen from the frontness orders given above. But for these older speakers (ɔT) has not lowered and fronted enough to overlap more than slightly with (aT). (aK) and (ɔK) also fail to show any neutralization.

(ar), (ɔr), and (ɔl) have been treated separately from (a) and (ɔ). It is clear that no merger of (ar) and (ɔr) is taking place. For all four older speakers (ar) and (ɔr) distribute separately. As discussed, older speakers have (ar) areas that greatly overlap with (a) for each individual; so (ar) is low in relation to (ɔr). (ɔr), representing an established coalescence of historical (or) and (ɔr), is relatively high for all speakers. For Sharon Ryan and Jean ORoark (ar) ranges both low and high. The dispersed or split distributions may reflect a raising process. Ryan's high (ar) area overlaps slightly with her (ɔr).

(ar) and (ɔr) distributions are separate, but there is overlap of (al) and (ɔl) areas; this overlap is difficult to assess because there are so few tokens of (al) for any one speaker. Degree of overlap of (al) and (ɔl), which should indicate whether or not there is neutralization in these areas, is pertinent to the question of the relationship of (ɔl) to (ɔ). Meg Cork's two tokens of (al), in *trolleys* and *dollar*, are included in the area of her (ɔl) distribution, which extends forward, overlapping even with the front portion of her (ɔ). There are no (al) tokens for Marion Thompson. Sharon Ryan has one (al), in *dollar*, which lies within the (ɔl) distribution. Jean ORoark's vowels in *college, dolls, volley* occupy an area mainly to the back of her lower and upper (ar) areas. Her (ɔl) area overlaps with both (ɔ) and (ɔr). Two of her three (al) tokens lie within her (ɔl) area.

6.3.2. Evidence from the speech of younger informants. All ten younger speakers—the four main group and the six supplementary group speakers—show complete or almost complete overlap of the two variables' distributions. (ɔ), which for older speakers distributes to the back of and higher than (a), is mainly contained within (a), the formerly round back vowel having a tighter distribution than (a). Areas of nonoverlap are generally at the back of the distributions, where tokens of (ɔ), e.g. in *lawn, longer,* for Beth Thompson, are found to the back of and higher than any tokens of (a). (Nevertheless, portions of (a) distributions do sometimes appear backer or higher than (ɔ), represented by, e.g. *probably* (Jesse Austin), *mom* (Suzi Copeland).) The oldest of the younger speakers, Suzi Copeland, 34, was 10 years old 24 years ago; the younger of the speakers in their forties, Jean ORoark, 43, was 10 years old 33 years ago. Sometime between about 25 and 35 years ago increased lowering of (ɔ) resulted in complete overlap of the distributions of vowel phones representing the variables (ɔ) and (a).

Even for older speakers some phonetic neutralization takes place, involving nasal and fricative environment areas. Among younger speakers, however, neutralization occurs in other environments. For Suzi Copeland, 34, (ɔN) is contained within (aN). Copeland's (aK) is contained within her (ɔK), (aS) within (ɔS), and (ɔT) within (aT). Center points are close except in the fricative environment; F2 for (ɔS) is more than 130 Hz lower than for (aS), making (ɔS) a backer distribution. In no case is there conditioning internal to these distributions that suggests there are phonologically separate areas for /a/ and /ɔ/ in the environments in question. Vowels in *watch* and *thought* are nearly as forward as vowels in instances of *got, not*. This speaker has merger in all environments for (a) and (ɔ). She fronts both (aT) and (ɔT) but does not match the order of the other two obstruent areas. Because of general (a) and (ɔ) overlap—that is, because (ɔ) is not high and back in relation oto(a) overall—, and because Copeland is advanced in fronting (ɔT), neutralizing overlap of the alveolar environments occurs.

For Jesse Austin, 31, the nasal distributions show partial overlap. Her (ɔN) is just in back of and above the (aN) area, and can be seen as a continuation of the same distribution, dependent on phonetic conditioning. Three (ɔng) tokens are high and back; (ɔn), in *gone,* is within the (aN) area. Although the overlap is slight, it is possible that Austin merges (aN) and (ɔN). Area centers are not close. She contains (aK) within (ɔK); most of her (aK) and (ɔK) tokens are toward the back of her (a)/(ɔ) vowel space, but a phone in *Fog Hat* is even more forward than her vowels in front tokens of *got.* Center points are close. Austin merges (aK) and (ɔK). (aS) and (ɔS) show some overlap. (ɔS) is represented by (ɔf) and (ɔs), while (aS) is represented by vowels before an interdental. The height and frontness difference between (aS) and (ɔS) may reflect conditioning by place. (ɔS) actually centers in front of (aS). Merger is possible. There is overlap between (aT) and (ɔT). Most of her (aT) tokens are farther forward than her (ɔT) phones, although area mid points are very close. Her one fronted (ɔT) token, in *brought,* fronts high, while five of her seven fronted (aT) phones front low within her back vowel space. In general, across speakers (aT) is fronted most in *got.* For Austin, however, while there is one back token of (aT) in *god,* there are fronted tokens in instances of *god* and *goddamn.* Austin does not consistently front (aT) only in *got.* It is not true, then, that four out of five (ɔT) tokens are toward the back of her combined (aT) and (ɔT) areas simply because their words are not subject to lexical conditioning. Austin's center for (ɔT) is well above her center point for (aT). Merger is possible. This speaker matches frontness obstruent environment orders for (a) and (ɔ). The total (ɔ) area is low and front enough to allow overlap in all environments.

Ginger Ryan, 22, distributes (ɔN) within the back portion of (aN). All of her (ɔN) tokens are of vowels before velar nasals, while her (aN) tokens, of course, are not. The velar nasal conditions the relatively back position of (ɔN). There is merger in this environment. (aK) is higher than but contiguous with (ɔK); there is no real overlap, and (ɔK) centers farther back (F2 means 200 HZ below F2 means for (aK)). Five of the six

(ɔK) tokens are in instances of *walked* where the prevocalic labiovelar may keep the vowel low and back. On the other hand, vowels in all instances of *want, wanted* are fronted for this speaker. Merger is possible. (aS) and (ɔS) barely overlap. (ɔS) distributes in front of (aS). While (ɔf), in *off, often,* is found higher and backer than (ɔs) in *cross, cost,* (ɔs) hardly interferes with the backer distribution of (as) in *hospital(s), closet, possibly.* Closed versus open syllable status may be a factor. The distributions do not provide a good case for merger, but there may be merger in this environment. Area centers are close. For this speaker there is overlap of the lower portions of (aT) and (ɔT). Four of ten (ɔT) tokens distribute within the (aT) area. Ryan's (aT) distribution represents vowel tokens only in instances of *got* and *not.* Vowels in *thought* and *caught* are fronted, positioning as far forward as the front edge of (aT). Merger is possible. Ginger Ryan matches frontness orders for obstruent environments between (a) and (ɔ). She also matches relative heights of nasal environments. Like other working class speakers she has very back (aN) and (ɔN) centers. Further, (ar) is higher than (al), which is higher than all of (a); (ɔr) is higher than (ɔl), which is higher than all of (ɔ).

For Beth Thompson there is some overlap of nasal environment areas. (aN) centers and largely distributes higher than (ɔN). The difference in position may be attributable to prevocalic /w/ in fronter tokens of (aN), *wanted* (3). The vowels may be merged in the nasal environment. There is neutralizing overlap of (aS) and (ɔS). /a/ and /ɔ/ can be regarded as merged in the fricative environment. (aK) and (ɔK) show some overlap. (ɔK) centers and extends its distribution in front of (aK). The backer portion of (ɔK) overlaps with the fronter, higher portion of (aK). Few of the tokens of (ɔK) and (aK) are contained in this overlapping area. A single token of (aK) in *clock* extends Thompson's (aK) area into the distributional area of (ɔK). All the (aK) tokens have /l/ prevocalically, which conditions a backer pronunciation. It is possible that there is merger of (aK) and (ɔK) for this speaker. For all three of the environments just discussed center points are close. Thompson contains most of her (aT) distribution within (ɔT). F2 means

for the areas are not close, due mainly to a backed token of (ɔT) in *bought*. Vowels in two instances of *thought* are as far forward as the frontest vowel in *got*. She has merger of (aT) and (ɔT).

All six of the supplementary group speakers overlap (a) and (ɔ). For five of these (ɔ) is contained within the (a) distribution. Carol Winter, who shows the least overall overlap, has several (ɔ) tokens higher than (a) in *thought, gone, walk*. There are often fewer tokens per environment for supplementary group speakers than for main group speakers. Overlap of environmental areas for the six women listed in the table below is not used as evidence of merger. Matches of frontness orders, based on centers determined for the distributions of the plotted tokens, are as follows:

	frontness orders (a)	(ɔ)	apparent overlap	SES score
Carol Winter	T>SK	S>K>T	S	10
Tracy Sawyer	T>S>K	T>K>S	T	11
Rachel Stone	T>K>S	T>K>S	T,S	14.5
Maureen Donovan	T>KS	S>T>K	none	14.5
Barb Walsh	T>KS	T>K>S	K	15
Ann Levine	T>K>S	T>S>K	T,K	18

Table 6.5. Frontness orders for distributions within (a) and (ɔ) for supplementary group speakers, listed in order by SES score. Areas of overlap are noted. (If no > separates symbols there is little or no apparent distributional difference.)

Two of these individuals do not front (ɔT) before (ɔS). It can be seen that, while frontness orders for environmental distributions within (a) agree with the difference by class found for main group speakers, frontness orders for (ɔ) do not seem to have aligned with (a) in this way for most of these speakers in their early thirties. Frontness orders match only for Rachel Stone and Barb Walsh. Overlap involving all obstruent environments is observed; but only two speakers show overlap in more than one environment. No overlap of nasal environment areas is apparent.

For all four main group speakers the vowels before /r/ and /l/ center higher than in obstruent or nasal environments, except that Beth Thompson's very high centering (aN) is

above her (ar) distribution. (ar) and (ɔr) distribute separately. Supplementary group speakers show no overlap of tokens in these areas. Three of the main group speakers overlap the areas very slightly. (ar) consistently centers lower and fronter than (ɔr). Overlap is found within the lower, fronter portion of (ɔr) and tokens from the back wall of (ar); Suzi Rockland's vowels in *are, part, far,* for instance, are found in virtually the same place as her vowels in instances of *four, more.* As discussed in section 6.3.1. younger middle class speakers Jesse Austin and Beth Thompson contain most of the (ar) distribution within their (a) vowel space. (ar) distributes and centers lower for them than for main group working class speakers Suzi Rockland and Ginger Ryan. For this reason the overlap of (ar) and (ɔr) is less for Rockland than for Austin or Thompson. It is quite clear that (ar) and (ɔr) are not merging. (ɔr) is a backer, higher area than (ar). (ar) is associated with (a) more closely than (ɔr) is with (ɔ).

For middle class speakers Austin and Thompson there is overlap of (al) and (ɔl). Two of Austin's three (al) tokens, in *involved* and *anthropology,* are within the (ɔr) area. These (al) phones are quite far back, backer than any (ar) tokens. Thompson's one (al) vowel, in *college,* at the back of her (ar) distribution, associates with the portion of (ar) that overlaps with (ɔr). The vowel in *college* is forward of all (ɔl) tokens except two. Working class speakers also show some overlap. This is very slight for Suzi Rockland, involving only one of her three (al) tokens, in *dollar.* Ginger Ryan provides the best evidence for the relationship of (al) and (ɔl) because she has seven tokens of (al) in *dollar,* and one in *involved.* Her (al) area distributes to the back of (ar). Her (ɔl) area is lower and mainly in back of (ɔr). (al) distributes in front of (ɔl) except for overlap involving three phones, in *dollars* (2) and *involved.* Of the four supplementary group speakers for whom (al) tokens are plotted, only Maureen Donovan shows no overlap. Carol Winter, Barb Walsh, and Ann Levine appear to position (al) in the same area as (ɔl).

Altogether only 15 tokens of (al) have been plotted for 10 younger speakers. No claim about merger can be made on the basis of this sample. It is possible to say, however,

that the degree of overlap observable does not argue against merger. Merger of /al/ and /ɔl/ would create a neat back, mid allophone of the merged /a/ and /ɔ/. (ar) and (ɔr) do not associate with each other; (ɔr) does not associate with (ɔ). /ar/ may remain phonologically associated with /a/ after completion of merger of /a/ and /ɔ/. A neutralization of /al/ and /ɔl/, if it occurs, will preserve the phonological association of /ɔ/ and /ɔl/.

The phonetic neutralization of /a/ and /ɔ/ in the nasal and fricative environments for older speakers are the initial environmental neutralizations in a phonological merger. Coalescenses in other environments are added to these for younger speakers. Neutralization proceeds in the plosive environments, accompanied by adjustment of relative frontness orders for obstruent environment distribution centers for three of the four speakers. The frontness orders for (ɔ) reveal the same relative weighting for speakers of different classes as orders for (a) do. This can be seen as simply an adjustment, speaker by speaker, of (ɔ) to (a), and argues for a view of the merger as one of adjustment, in the dialect, of (ɔ) to (a). It is (ɔ) that is lowering and fronting. Note, however, that in the merger the class difference could be lost. Across class speakers could settle on either the order TKS or TSK. Apparently, this is not happening.

/ar and /ɔr/ continue to be distinct. It is possible that /al/ and /ɔl/ are merging.

6.3.3. Evidence of merger from formal speech. In a completed unconditioned merger we expect three things (see section 6.1.), the first of which is lack of categorical distinction between the vowel phones realized for one class of words and those realized for another. Loss of phonological distinction may be reflected in informal speech by complete overlap of distributions of the historically distinct vowels. In the present study this is observed to take place several decades before environment by environment merger is complete. Comparison of the results of perception tests with speech production in formal styles in other studies of vowel mergers, discussed in Section 6.1, has sometimes failed to show the same discrepancy between perception and production that appears when perception tests and informal speech samples are compared. This suggests that

recategorizations have taken place, in each case depositing the lexicon of two formerly separate word classes into one class. In less rather than more formal speech styles a phonetic distinction is maintained, while in more formal styles it is not. The phonological recategorization, which accompanies a stage in the merger process, is simply reflected better in speech in which the speaker is paying more attention.

Vowel charts of measured vowels from reading, word list, and minimal pair list elicitations for individuals under 35 reveal complete overlap of (a) and (ɔ) territories. In the same charts the (æ) distributions are kept apart from (a) and (ɔ). (a) and (ɔ) show some overlap with (æ) for Ginger Ryan, Suzi Rockland, and Beth Thompson only, who have the lowest SES index scores of the six women for whom formal speech tokens were measured. Otherwise, the (a) and (ɔ) distributions are mingled together in the back low and mid areas of the charts, separate from (æ) which distributes forward and up from low, central vowel space, reflecting the complementarity of /æN/ and /æ/. The overlapping distributions of (a) and (ɔ) vowels are separated from (æ) by large margins of security never found for informal speech distributions.

(ɔr), in *born* and *short*, appears high, except for Walsh's vowel in *born*, which lies within the (a) and (ɔ) area. (ar), in *are* and *barn*, is found within the combined (a)/(ɔ) area. Only Jesse Austin places (ar) high, very close to the vowels in *born, short*. Tokens of (ɔl) in all in both word list and minimal pair styles are to the back of the combined distributions for all speakers.

Within (a) and (ɔ), that is, within the areas in which the vowels are in obstruent or nasal environments, very little conditioning is shown. Importantly, neither (aT) nor (ɔT) is consistently found toward the front of the total distribution. In the four pertinent words, *bottle, cot, brought*, and *water*, tokens of (a) or (ɔ) are forward of the center of the distribution in *bottle* for Thompson, Donovan and Austin; in *cot* for Ryan, Thompson, Donovan, and Austin; in *brought* for no one; and in *water* for Thompson, Donovan, and Walsh: forward in 10 out of 24 tokens. This does not mean that vowels in other

environments are not even more forward; they are in half the cases. There is a tendency to place tokens in the nasal environment relatively high and back. In the lowest portion of the back of Maureen Donovan's vowel space, for instance, tokens of the vowels before obstruents in historical /a/ and /ɔ/ items distribute together. Just above and slightly to the back of this distribution is an area occupied by (aN), (ɔN), and (ɔl). Except for a separation of obstruent and sonorant environments, no conditioning is discernible.

Formal speech charts differ from informal speech charts for given individuals by evidencing no fine phonetic conditioning and by showing clear separations, sometimes wide, between distinct vowel areas. The complete intrusion of (ɔ) into (a) corresponds to a probable recategorization, reflected in formal speech, of the vowels as not distinct.

6.4. Conclusion. Except for the oldest speaker, (aT) distributions center in front of (aK) and (aS). Not only does (aT) occupy front position across speakers under 50, but also fronting in relation to the total distribution of (a) has increased, mainly through a move of the (aT) area in from the back of vowel space. There is lexical conditioning; the vowel in *got* is advanced in the fronting. Working class speakers center (aS) forward of (aK); middle class speakers have the opposite order across age. Working class speakers also place (aN) low within (a). Older speakers position (aN) toward the back of (a). Except for the relative height of (aN) for working class speakers, frontness, not height, of the vowel is meaningful for the internal structures of (a) distributions. For (ar) height is important. There is some evidence that (ar) was in the process of raising for speakers of both classes. For speakers now in their thirties and forties (ar) positions in two ways: for some speakers it is high, showing little or no overlap with (a); for others it is lower, mainly overlapping with (a). (al) distributes high and back in relation to (a), but does not center highest or backest of all distributions for any one speaker. (a), (ar), and (al) centers can be seen as three points of a triangle in back vowel space, with the (al) center marking the back angle whose height lies between that of (a) and (ar).

The relationship of (ɔ), (ɔr) and (ɔl) can be viewed in exactly the same way, except that (ɔr) centers higher, in relation to (ɔ), than (ar) does to (a), and so at least two edges of the triangle are longer. All but the oldest two main group speakers place (ɔT) toward the front of (ɔ). Fronting of (ɔT) increases over apparent time. Across age and class of speaker there is no discernible pattern for frontness of (ɔK) and (ɔS), but the three youngest main group speakers have frontness orders for obstruent environment centers that match their orders for (a). As is true for (a), (ɔN) within (ɔ) is low for working class speakers. (ɔr), merged with (or), centers and distributes high in relation to (ɔ). (ɔl) is seen to become increasingly separated from (ɔ), positioning high and back in relation to the center for (ɔ). This is due to the lowering and fronting of (ɔ) in the process of the merger of /a/ and /ɔ/.

Examination of vowel charts to test for the three things expected in a completed merger, using guidelines for the assessment of environmental phonetic neutralization that reflects partial merger, reveals the details of the process of merger of /a/ and /ɔ/ in San Francisco White English. For the oldest speakers (a) and (ɔ) distribute separately. Then, increasingly there is general overlap of (a) and (ɔ) distributions until total convergence of territories has been achieved. The following table summarizes the findings for partial mergers.

		/_T	/_K	/_S	/_N
older speakers:	Meg Cork				m
	Marion Thompson			m	m
	Sharon Ryan				m
	Jean ORoark			m	m
younger speakers:	Suzi Rockland	m	m	m	m
	Jesse Austin	pm	m	pm	pm
	Ginger Ryan	pm	pm	pm	m
	Beth Thompson	m	pm	m	pm

Table 6.5. Environmental mergers reflected in the speech of main group informants.

While older speakers show little overlap of (a) and (ɔ) distributions, they do appear to neutralize the distinct vowels in two environments. All four speakers neutralize the vowels before nasals, and two speakers neutralize before fricatives. Neutralizing overlap in certain environments is facilitated by the failure of environment frontness and height orders to match. For Sharon Ryan, the one speaker who matches frontness orders for obstruent centers, including the front positions of (aT) and (ɔT) centers, that alignment impedes neutralization. This is because her total (ɔ) territory centers and generally distributes above and in back of (a). One difference between environmental neutralization for older and younger speakers is that for the older, neutralizing overlap in the environment of the most phonological importance for /a/ when not before liquids, that is before /t/ or /d/, is avoided entirely. (aT), low and central, is out of the reach of (ɔT) until general overlap is accomplished.

For each younger speaker the whole of (ɔ) and (a) greatly overlap. Also, as can be seen from Table 6.4, there is a gradual adjustment, over time, of (ɔ) frontness order to (a) frontness order for obstruents. This order alignment, which holds for the three youngest main group speakers, may simply result from the process of environment by environment neutralization. Younger speakers merge or may merge the vowels in all nonliquid environments. The increasing lowering and fronting of (ɔT) accommodates the fronting of (aT). Low position for (aN) and (ɔN) maintain their match. Conditions are good for merger of (al) and (ɔl). If this merger is occurring it will establish a relatively back, high, allophone for the vowel, paralleling the establishment of /æN/ as complementary to the rest of /æ/. (ar) and (ɔr) remain distinct from one another.

There are three striking differences between the age groups. Older speakers do not have a general overlap of (a) and (ɔ) distributions, younger speakers do. Older speakers neutralize in fewer environments than younger. More curious is the finding that it is not as clear that younger speakers neutralize, in any particular environment in which there is evidence of merger at all, as it is that older informants do. All four older speakers merge

the vowels before nasals, for instance. So do Suzi Rockland and Ginger Ryan. But Jesse Austin and Beth Thompson only show possible merger. No one of the three youngest speakers shows overlap that counts, by the guidelines used, as neutralizing overlap, in more than one environment; for no one person is it the same environment. The merger has proceeded by addition of environments in which neutralization occurs, but this has not meant that partial mergers that appear already secure for older speakers continue to appear secure for younger speakers.

The nearly completed process of the merger of /a/ and /ɔ/ has not yet eliminated distributional differences between (a) and (ɔ) in each environment. That is, in most environments for any one young speaker, (a) and (ɔ) areas can still be distinguished; they are mainly separate. Given the influence of lexical or fine phonetic conditioning (such as place of following nasal consonant or presence of preceding /l/) as well as the environmental restrictions on the historically distinct vowels (such as place for nasals or voicing for fricatives following either /a/ or /ɔ/), (a) and (ɔ) distributions may remain distinguishable in the sense just discussed. As a result, the merged vowel phoneme is reflected phonetically in collections of phones in each environment that take up more vowel space than phones in the comparable environments for formerly distinct /a/ and /ɔ/, and in a total nonliquid vowel area that is larger than the areas for formerly separate /a/ and /ɔ/.

Variance analysis shows some differences between vowel distributions in formal and informal speech for younger speakers. (a) and (ɔ) tokens obtained from reading, word list, and minimal pair 'style' elicitations position within the same low back vowel space without internal structure for the distributions that reflects environmental conditioning except of a gross sort, for instance, the separation of sonorant and nonsonorant following consonant areas. Also, across speakers a clear separation between phoneme areas, for /a/ with /ɔ/ and /æ/, is found. This avoidance of overlaps of areas of production, and in some cases perhaps of areas of confusability, is never found for informal speech. The more careful speech appears to reflect a recategorization at a high level of the phonology. A

distinction has been lost at this level. The recategorization itself, as seen in formal speech charts, does not involve environment by environment neutralization, that is, does not entail the partial mergers that compose a complete completed merger.

Notes

1. In this reference to San Francisco speech Labov must be relying on preliminary reports of the pilot study conducted through the Linguistics Department, UCB.

Chapter 7: (æ), (a), (ɔ): comparison of findings

7.0. DeCamp's findings, within the LAPC survey, for San Francisco English vowel pronunciation can be compared with the findings for (æ), (a), and (ɔ) in the present study. Results from more recent sociolinguistic studies of vowel change in progress can also be compared with those for the low vowels in San Francisco. Because most of the sociolinguistic work has been done in Northern cities, and because the Northern Cities Shift is chiefly characterized by the tensing of (æ), a process in which many—perhaps most—White American English varieties participate to some degree, comparison will mainly be made between the San Francisco study results and findings from Northern Cities investigations. The chronology of movements involving /æ/ and /ɔ/ can be better understood through consideration of DeCamp's material; the early stages of both changes can be better described. Integrating statements about the present day San Francisco low vowel phonemic and subphonemic changes into a larger description of American English processes makes the shape of the whole clearer.

Changes involving historical /æ/ and those involving historical /ɔ/ play quite different roles in reshaping American vowel systems. The tensing of (æN) in San Francisco English has brought about complementarity between the vowel before nasals and elsewhere. This development of allophony is a result of participation in (æ) fronting and raising, a process found in all of the three dialects of English as defined by Labov. This restricted, phonetically conditioned tensing is a low degree of participation in the process. There is some tensing in localities where the Southern Shift is found. The Atlantic seaboard cities and Northern Cities participate much more. It is the greatest degree of participation that brings about no phonemic or subphonemic change; in the communities of the Northern Cities Shift in which (æ) is always tensed to some degree, no complementarity or split is effected. The tensing of /æ/, whole, has set a rotation in motion. Lesser degrees of participation in fronting and raising /æ/ bring about some

recategorization; in New York City and Philadelphia there is marginal phonemic split; in San Francisco there is a new categorical rule.

The treatment of /æ is the same, across lects, in that there is fronting and raising, highly restricted, less restricted, or hardly restricted at all. The merger of /a/ and /ɔ/ in the Low Back Merger lect is not the result of involvement in a common process. /ɔ/ is treated in several distinctly different ways. Raising of the vowel in the Southern Shift and in seaboard cities, especially NYC, is one treatment. Lowering and fronting are found in the Northern Cities Shift and in the Low Back Merger, but one is a matter of inclusion in a pull chain merger and the other is a coalescence. In the one, loss of distinction is avoided, and in the other it is not. The treatment of pivot point vowel /ɔ/ distinguishes the three dialects of English more than treatment of pivot point vowel /æ/.

7.1. San Francisco vowels 1952, 1990. DeCamp looked for and found evidence of dialect mixture in San Francisco English. Considering the city a focal point, in the dialect transition area of California, for the dispersement of traits inherited from eastern American dialects, he correlated findings about San Francisco vowel pronunciation with characteristics of eastern speech. Correlations predominated between the City's English and that of NYC, the Inland North, Eastern Pennsylvania, and Western Pennsylvania, areas BCDE in his dialect division scheme (DeCamp 1953:90-100). For the vowels in the present study the alternations found involve mainly /æ/ with /a/, and /a/ with /ɔ/. The alternation of /a/ with /ɔ/, in *wash, wasp, hog, fog, log,* is of course responsible for the correlation of San Francisco speech with the speech of Western Pennsylvania. The other areas happen to be the very areas in which the Northern Cities Shift is found. Also as it happens, a number of DeCamp's informants have family history in these areas. Further, the early migration to San Francisco was from New England and the Inland North, although in this century immigration from these regions has decreased as immigration from the South and West to California has increased (pp.33-34). The tensing of /æ/ has a long history in the Northeast, however, (Babbitt 1896; Trager 1940), at least in urban areas, but

very little fronting and/or raising of this vowel is found in San Francisco from DeCamp's survey. The merger of /a/ and /ɔ/ is completed in Western Pennsylvania, and had been for many decades before DeCamp's study. In the 1950s survey, merger was also found in some other parts of the Pacific Coast and in Nevada. DeCamp states (1955:556) that it 'is possible that the peculiar use of fronted allophones of /ɔ/ is an indication that this coalescence is beginning in San Francisco.'

The interviews involved elicitation of careful speech, resulting in lists of items from each speaker. The collection of items provided a basis for a contrastive analysis, allowing DeCamp to produce a phonemic inventory for the English of the City and to designate certain phones as 'phonemic norms' for a distinct vowel—phonemic targets. At the same time the work was a dialectology study; variation was highlighted, not ignored. All variation was noted in the transcriptions and correlations made between variants and speaker types, which were based on informants' age and education. Although DeCamp's dissertation was written before the publication of Weinreich's (1954) *Is a structural dialectology possible,* it seems that the question was in the air. American dialectological work had made use of structural phonemics since the inception of LAUS, but the phonetic detail obtained from speaker after speaker made conflicts in individual systems and across systems apparent. DeCamp approached a solution to the problem by making use of Pike's (1947) 'coexistent systems' idea, in particular for words in which historical /æ/ alternated with /a/ and historical /a/ with /ɔ/.

7.1.1. (æ) then and now. DeCamp found very little variation for any one speaker or across speakers. The most common transcription by far in his material for (æ) is [æ]. He elicited forms showing raising, both with and without diphthongization, in items *marry* and *bag;* and one instance of raising and a separate instance of diphthongization, in *cans*. Several women also lowered and backed the vowel in *bags, bath, glass,* and *half,* transcribed as [æ, a^, a]. DeCamp suggests that a few speakers have two inventories, 'coexistent systems', in one of which historical /æ/ has the phonemic

norm [a], and in the other [a]. This suggestion is an attempt to account for rather than avoid the facts of variation.

Since DeCamp was eliciting careful speech his transcriptions reflect phonemic and subphonemic categorization in the same way the formal speech elicitations in the present study do. There is almost no sign of tensing of (æN). In current speaker vowel charts formal speech shows complementarity between /æ/ before nasals and /æ/ elsewhere, reflecting a categorical rule for allophony. In the DeCamp material there is evidence of fronting and raising of the vowel before a voiced velar stop, and backing and lowering before voiceless fricatives. This occurs across type, age, and sex of speaker. Fronting and raising of (æg) is found now, but is inconsistent in formal speech. Tensing of (æg) does not seem to have increased since DeCamp's study. The three (æS) words from DeCamp's study used here for comparison with (æS) in formal speech now, in which the vowel is backed and/or lowered before fricatives, are *ask* words. It is not clear if the low realizations are due to a rule for the fricative environment or are a matter of lexical conditioning. It may be that a low, back position for /æ/ before voiceless fricatives and a peripheral position for /æ/ before /g/ are sturdier phonological facts in 1950s San Francisco English than any other for this vowel. Table 7.1. compares careful speech findings from the 1950s and now.

	LAPC	SF speech transcriptions						formal speech now
	æ^	æ^ə	æ	æə	æ^v	a^	a	
Saturday			x					no fronting or backing
bag	x	x	x	x	x			fronted and raised (4)
bath			x		x	x	x	fronted (2), lowered (2)
glass			x		x	x		fronted (1), backed (2), lowered (2)
half			x		x		x	lowered (4), backed (1)
cans	x		x	x	x			extreme tensing
pan			x					extreme tensing
					(4 female speakers)			(6 female speakers)

Table 7.1. Item by item comparison of DeCamp's transcriptions and current speech formal vowel chart evidence for (æ).

The development of allophony involving (æN) in San Francisco White English is dramatically clear and quick, as seen in the informal speech vowel charts of present day speakers. (æN) drifts through apparent time from relatively low and nonperipheral to relatively high and peripheral. Formal speech charts reflect the working of a categorical rule for younger speakers. DeCamp's material confirms that this is a new phenomenon. Much less dramatic in the present study is evidence for an increase in backing of (æ) before fricatives. It cannot be confirmed by inspection of vowel charts alone, but requires finding differences in means for speakers of different ages. If the special history of *ask* words is not responsible for the low and back phones for /æ/ that DeCamp obtained in *bath, glass, half,* then a variable rule favoring low centralization was operating in the phonology in the 1950s, in the speech of individuals who were children many decades before that. The transcriptions of careful speech that DeCamp made show no fronting of (æS); but in formal speech charts for present day speakers there is fronting in this position as well as lowering and backing. If this is hypercorrection, it suggests that lowering and backing of (æS) is now but was not several decades ago a process above the level of social awareness, subject to conscious correction. The women who lowered and backed the vowel before fricatives in DeCamp's survey were Type II speakers, with high school educations, the second highest status group within DeCamp's survey. It may be that two different hypercorrections are evidenced, one involving backing in the 1950s, the other fronting in the 1990s.

7.1.2. (a) and (ɔ) then and now. In the LAPC San Francisco material there is a striking difference between the variation found for /a/ and that found for /ɔ/. There is less variation for /a/ that for almost any other vowel in the survey. (a) is backed before velar and palatal sounds, as in *Chicago, notch.* (ɔ) on the other hand, shows more variation within idiolect and across speakers than any other vowel. There is enough for DeCamp to distinguish four degrees of backness and three degrees of height. The vowel is transcribed in 10 different ways. Deviation from [ɔ] is a matter of lowering and/or

unrounding much more than fronting. There is very little overlap in realizations of /a/ and /ɔ/; only [a, a>] are found as transcriptions for both historical vowels, and these infrequently. A labial consonant favors vowel rounding; a sibilant variably conditions lowering and fronting. The vowel in *launch* is sometimes lowered and fronted. In *fog* the vowel is always fronted and lowered. This word is one of the diagnostic items distinguishing dialect areas AEF from BCDGH; /a/ alternates with /ɔ/. DeCamp posits a low back, unrounded phone as the phonemic norm for /ɔ/ in San Francisco; the norm for /a/ is [a]. The vowels are clearly distinct, although some speakers may have phonemic alternation between /a/ and /ɔ/ for the vowels in *wash* and *wasp*. At the same time DeCamp suggests that the Far West merger of /a/ and /ɔ/, underway or completed in some areas of the Pacific Coast and Nevada, may be beginning in San Francisco.

This suggestion is based on the degree and kind of variation he finds. Women's speech largely accounts for it. Across age and speaker type, allowing for the bias towards older, male speakers in Type I, women produce more variants of (ɔ). The norm DeCamp posits for /ɔ/ is suitable for male speech. It seems likely that women have two norms, a higher and a lower one, both with little or no rounding. Table 7.2 compares DeCamp's transcriptions with the evidence from vowel chart plottings for current formal speech formant measurements.

	LAPC		SF	speech	transcriptions				formal speech now
	a	aə	a>	a>	ɑ	ɔ	ɔ	ɔ	
bottle	x								fronted (1), backed (3)
Chicago	x		x						lowered (1), raised (1)
wasp	x		x	x	x	x	x	x	raised and backed (3), extremely fronted (1)
palm	x								raised and backed (2)
barn	x	x	x						raised and backed (3)

	LAPC		SF	speech	transcriptions							formal speech now
	ɑ	ɑ>	ɑ>	ɑ	ɑ	ɔ^{v}	ɔ̲^{v}	ɔ̲	ɔ			
fog	x	x	x		x							lowered (1)
cough	x				x	x			x	x	x	back (2)
frost	x	x			x					x		back (1)
wash	x	x	x		x	x	x		x	x		lowered (1), high and back (1), fronted (1)
all					x					x		high and back (6)

Table 7.2. Item by item comparison of DeCamp's transcriptions and current speech formal vowel chart evidence for (a) and (ɔ).

In informal speech both (a) and (ɔ) show much variation now. Through apparent time (ɔ) drifts lower and fronter in vowel space, changing from showing very little overlap with (a) to showing complete general overlap and some environmental neutralization. The variation in the DeCamp material for the vowel before sibilants and in *launch* suggests that in the 1950s fricative and nasal environments conditioned movement that led to neutralizations. It is possible that the item *fog* was advanced in the merger due to the historical phonemic alternation between /a/ and /ɔ/. The vowel before /l/ was formerly and is now quite back, and usually higher than in other environments. Its place has not changed with the lowering and fronting of the rest of /ɔ/. In general the DeCamp findings are in agreement with vowel chart evidence in the present study for both informal and formal speech of older individuals. Speakers who were in their thirties and forties then are the same ages as the oldest main group speakers in the present investigation. They treat /a/ and /ɔ/ as categorically distinct, producing little or no phonetic overlap in careful speech. Speakers in their forties now, who were young children in the early 1950s, still show little

overlap of the distributions. That there is a great deal of variation in DeCamp's transcriptions suggests that change was under way, in contrast to the lack of variation for /æ/. The merger is the older change, and has proceeded more slowly than the development of the nasal /æ/ allophone.

7.2. American English vowels east and west. Informal speech findings from sociolinguistic studies concerning low vowels can be compared. Different chronologies and different conditions for the tensing of (æ) are found in the east and San Francisco. Both (æ) tensing and the merger of /a/ and /ɔ/ are older processes in the east than the west. It is the different degree of participation in the tensing process that makes for a different result for (ɔ) lowering and fronting in the Northern Cities and in San Francisco. In the Northern Cities Shift unrestricted tensing of (æ) initiates a pull shift and /a/ and /ɔ/ remain distinct because both are included in the rotation. In the Third Dialect very tensing under very restricted conditions leaves most of /æ/ now and central. There is no low vowel shift; /a/ and /ɔ/ merge.

7.2.1. (æ) east and west. The tensing of (æ) is a process in which different dialects of English participate in common, but to different degrees. The lects can be divided into two groups: those in which there remains a stable low, nonperipheral, front vowel which reflects historical /æ/—the Third Dialect, the Southern Shift, the Middle Atlantic States version of the Northern Shift; and those in which historical /æ/ has shifted as a whole front and up, with formerly back /a/ rotating into its place—the Northern Shift lects outside of the seaboard cities. In this common process actuation of change is relative to results produced in particular varieties. There is a set of major constraints, having to do with sonorance and nasality, which can be described as a collection of embedded subsets. Roughly, there is a scale for increasingly broad conditions under which tensing occurs; tensing under the least common phonetic condition implies tensing under the other conditions. This is not a perfect hierarchy, however. Importantly, there is not a common

tendency across all lects for tensing which has been underway in one environment to then begin in the environment that is next on the scale.

Participation in American English (æ) tensing is either unrestricted or restricted by some or all of a certain set of conditions. In the Northern Cities Shift (æ) tenses, setting in motion the older portion of the rotation, a pull chain of low vowels. No change has occurred in the system; but the place of historical /æ/ is vacated by that vowel and filled by /a/. Word classes remain intact. In northeastern cities in which tensing does not affect all items in the /æ/ class there is nevertheless fronting and raising of most of the vowel, leaving a residue in low, nonperipheral position. Because there is lexical conditioning, by which vowels in some items do not tense although they should (e.g. *began, ran, swam, manner, camera),* while vowels in other items tense although they should not (e.g. *bad, glad, mad, and, can* (aux)), the tensed and untensed distributions cannot be said to reflect allophony. A split has occurred, although its status is marginal. The tensing process is an old one for the northeastern cities in general. In the case of the Northern Cities Shift a rotation of low vowels is begun. In the case of the seaboard cities in which the /æ/ residue remains in low place, this rotation is not initiated. In the Southern Shift and the Third Dialect most of /æ/ continues to be realized as a low lax vowel. Tensing occurs under highly restricted conditions. No split is effected. In San Francisco allophony has developed between /æ/__[+nas] and /æ/ elsewhere. No low vowel rotation is initiated. This subphonemic change is the result of a fairly new process; it was not operating in the phonology as reflected in the informal or careful speech of individuals who acquired language 60 years ago.

The tensing is a long-time process in the northeast. The positional change in the Northern Cities Shift is an intact wave, operating variably. Actuation of the split of tense and lax word classes in cities like NYC and Philadelphia is dependent on lexical conditioning and so should fit the uniform or ordered decomposition models of sound change; detailed descriptions of the exceptional conditions (e.g. Payne 1980, Labov 1981)

indicate that special lexical conditioning rather than overall diffusion is at work. The actuation of split can probably best be regarded as the result of an intact wave with some interference from lexical exceptions. Actuation is these cases has taken a long time. A full rotation is in motion in one case, a split has come about in the other; tensing itself continues. In San Francisco White English the tensing process appears regular. The variable version of the regular change model for sound change depicts what has been going on. For some young adults and probably for San Franciscans acquiring English now the change, although subphonemic, can be called regular, categorical change; young speakers tense /æ/ before nasal consonants. The actuation of the change, the development of allophony, has come about quickly, in contrast to actuation of changes in the Northeast, although the tensing process in operating in the dialects in common.

Although in the Northern Cities Shift (æ) tenses as a whole there are conditions under which more extreme tensing is favored. When the vowel is followed by a nasal fronting and raising are most extreme; voiceless fracatives provide the next most favorable environment; and the voiced stop environment is the third heaviest constraint. The obstruent environments sometimes show the opposite relative weighting. Tensing in other environments is not as extreme. In NYC postvocalic nasals, voiceless fricatives, and voiced stops, in that order, condition tensing. In Philadelphia tensing is phonetically conditioned only by nasals and voiceless fricatives. The Philadelphia conditions are a subset of the NYC conditions, which are the conditions under which tensing is most extreme in the other Northern Cities. In the northeastern cities this set of major constraints interacts with additional conditioning by place. Palatal and alveolar consonants encourage peripherality more than labial and velar consonants. Also, a morpheme boundary following the vowel favors tensing; a liquid environment impedes tensing. The San Francisco fronting and raising of /æ/ occurs under very restricted conditions some of which are a subset of the restricted subset applying in Philadelphia and some more southern urban

areas. (See Figure 7.1.) Place of articulation conditioning appears to match that for the east.

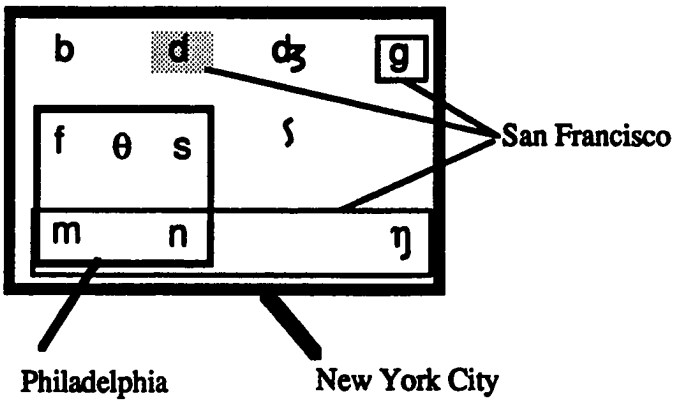

Figure 7.1. Environments for tensing of (æ) in NYC, Philadelphia, and San Francisco.

The truth is not quite as tidy as the preceding paragraph implies. For one thing, there is some degree of tensing before /g/ and, more variably, before /d/. The San Francisco conditions are not, then, simply a subset of the Philadelphia conditions. The frontness and height orders for /æ/ in San Francisco for young speakers are both (æN æT æK æS), which happens to correspond more or less to the order of environmental constraints for tensing in the second stage of (æ) movement in NYC: formerly the vowel before nasals fronted and raised more extremely than before voiced stops, where it tensed more than before voiceless fricatives. It is possible that tensing before voiced stops is increasing in San Francisco. This is not a new phenomenon though. It is found across age of speaker in the present study in formal and informal speech and is seen in DeCamp's material as well.

If tensing progresses in a less restricted way in San Francisco it is highly unlikely that fricatives will provide an environment for it, either with more or less priority than voiced stops. The backing of /æ/ before (mostly voiceless) fricatives is a contrary movement to the tensing before nasals. The backing has gradually increased over apparent

time. The movement is subtle, as it would have to be in low, central vowel space, but the process is steady and at least as established in this obstruent environment as the fronting and raising of the vowel in the sonorant environment. The only pressure on the backing of (æS) is the fronting of (a) before alveolar stops. (æS) backs as a whole; also, a variable lowering rule operates in which the presence of frication is the major conditioning, and in which word boundary following the fricative and /l/ preceding the vowel or following the fricative encourage lowering.

It is not true, then, that the process of (æ) tensing in American English is simply subject to a common set of constraints from which lects select restricted subsets embedded within larger subsets selected by other lects. While tensing in the voiced stop environment implies tensing before voiceless fricatives and nasals, and tensing before voiceless fricatives implies tensing before nasals, it is not the case that tensing before nasals means that, if the process continues in a less restricted way, tensing before fricatives will follow. Nevertheless, the tensing of (æ) in American cities is a shared process.

7.2.2. (a) and (ɔ) east and west. In American English, in a system in which (æ) tenses as a whole, (a) fronts; where some of (æ) remains stable in a low, nonperipheral position, (a) does not front as a whole. In the Northern Cities Shift (a) has fronted as one of the older changes in a rotation; items *got* and *not* have been advanced in this change. Labov regards (æ) before (especially voiceless) stops as the residue whose place maintains a distinction between /a/ and /æ/ in the exceptional Northern Cities lects, the seaboard cites varieties.

In San Francisco part of (a)—(aT)—is becoming increasingly front; the very frequent item *got* is advanced in the fronting. The movement is an expansion of the distribution forward along with a retraction in from the periphery. Some overlap is tolerated between (a) and (æ). Forward moving (aT)—now historical /at/ with /ɔt/—encounters (æ) in all obstruent environments, but because (æS) is in low, central position in vowel space it is the fricative environment area of production that (at) intrudes into most.

DeCamp found the distinction between /a/ and /ɔ/ maintained in San Francisco. The process of its loss is traceable through apparent time. Now coalescence is nearly complete. Since the LAPC survey the dialect area of the low back merger has been expanding in the Far West and includes San Francisco. /ɔ/ raising is found as far west as Texas, so the Low Back Merger and Southern Shift communities intermingle in the West as well as in the Northeast. The 'assembly of speech communities' in which there is merger are found throughout the country, according to the map produced by Labov (in press).

7.3. General American processes. The idea of a General American speech, a kind of pandialectal folk standard, was rightly discarded with the first systematic dialect survey work in this country. There are, however, vowel treatments in American English that are shared and widespread, two of which are (æ) tensing and the low back merger. Of these, in San Francisco the older process is the merger, a general Far Western treatment of the low back vowels, but barely underway in early decades of this century in the City. It is much older in the east, but isolated in pockets of the North and South. The merger is expanding at the expense of distinction in the western US but is not doing so in the east in general, although expansion is observed in Pennsylvania (Herold 1990). The merger is found in White English but not in Black English. An even newer phenomenon in San Francisco is the tensing of (æ). This vowel movement involves San Francisco White English in a process operating in a much less restricted way in many eastern cities. An important difference between eastern participation and the City's is the working of a contrary movement in San Francisco English, the backing of the same vowel before fricatives. At the same time (aT) is becoming increasingly fronted. Some overlap of areas of production is tolerated, but is the only remaining low vowel distinction is to be maintained at least one of these movements can be expected to halt.

Chapter 8: Conclusion

8.0. The findings concerning low vowel changes in San Francisco White English reported here are the result of work deriving from the pilot project of the Berkeley Linguistics Department group in 1986. The present investigation is the first detailed, modern study of sound system and sound change in the English of the urban Bay Area of California, using instrumental analysis. Additional work on the low vowels is desirable, and investigation of other vowel behavior is necessary for the White English phonology of San Francisco to be understood as well as the phonology of English in some other urban centers like NYC, Philadelphia, Detroit, and Chicago. It is especially important for the higher back vowels to be investigated. Unrounding, monophthongization, fronting (and some lowering) of these were observed in the pilot project work and have been found in the material collected for this study but not reported here. It is to be hoped that future sound change in progress work in California would make possible a comparison of the speech of working class and lower middle class urban young adults, such as reported here, with the speech of suburban background college students and other suburban young adults. The speech of these latter groups will show the influence on the phonology, if any, of the adolescent Valley Girl talk phenomena after the childhood and adolescent periods of life in which the effects of age grading can most be expected. Back vowel changes are especially salient, as is clear form the availability of a stereotype for entertainers to mimic (See Chapter 1.)

The elicitation of both less and more careful speech in this study has allowed comparison of findings with some of DeCamp's findings from the 1952 survey and with findings from modern sociolinguistic studies in Northeastern cities. Results from the present investigation can also be considered in relation to those from other sound change in progress investigations, for instance from Far Western centers such as Salt Lake City and Los Angeles. This report includes a first attempt at fitting San Francisco vowel changes

into the emerging picture of pan-American English vowel movements by concentrating on comparison of the San Francisco results with those from the extensively studied large Northeastern cities.

The Labovian sociolinguistic enterprise, which is establishing an empirical basis for a theory of language change, necessarily addresses issues for phonology and diachronic linguistics. Several are pertinent to interpreting observations of low vowel movements in San Francisco White English. In the matter of the place of lexical conditioning within sound change in which sound rule regularity is the dominant mechanism, the importance of word frequency is considered; when lexical diffusion is at work, more frequently used words have been observed to be affected first. The issue of item frequency and the mechanism of lexical conditioning arises in a consideration of the present study's findings. Another question concerns the stage in the change process at which phonological recategorization takes place and what its effect is on the phonetics of the change after it has been accomplished. Recategorization at the level of vowel distinction and at the subphonemic level are found in this study. The former involves loss of distinction through merger. There are questions about the nature and mechanism of merger and how recategorization fits in the coalescence process. The latter level, the one of subphonemic reorganization, involves the establishment of allophonic conditioning and the eventual development of complementarity. There is the question of the difference—is it a matter of kind or just degree?—between the exercise of the rule for allophony and the subphonemic sets it establishes on the one hand, and the exercise of a similar rule that results in the establishment of phonemic split on the other.

This chapter contains a review of the results of the investigation in San Francisco and of the comparisons made in the last chapter with the LAPC material and Northeastern sound change in progress reports. Following these are discussion of the issues mentioned in the preceding paragraph.

8.1. Summary of findings from the San Francisco study. From the speech of informants in this investigation one discerns vowel movements that can be classified as two different kinds of vowel activity: forward movements making a pattern that suggests chain shifting; and vowel behavior that frustrates the achievement of the rotation.

The forward movements of vowel distributions representing the variables (æ), (a), and (ɔ) are accompanied by raising in the front of vowel space and lowering in back; the raising and increase in peripherality in front accomplish the tensing of (æN); the lowering and lessening of peripherality in back accomplish the laxing of (ɔ) in nonliquid environments. These movements resemble the unrestricted tensing of (æ) and laxing of (ɔ) in the Northern Cities Shift.

There are impediments to a rotation in the San Francisco phonology. One of these is the restriction on (æ) tensing: tensing only occurs before nasals and, less severely, the voiced velar stop. Most of the phones realizing /æ/ are relatively low and nonperipheral. (æ), representing /æ/ before obstruents, is stable in position over time when before nonvelar stops but shows an increase in centralization in the fricative environment. The occupation by (æ) of a low, nonperipheral place impedes the fronting of (a). In order for (a) to extend forward more than it has one of three things would have to happen: tolerance for phonetic overlap of the phones of the two distinct vowels would have to increase while distinction was somehow categorically maintained in spite of it; distinction would have to be abandoned as the vowels merged; (æ) would have to tense as (a) moved into the low, front position. There is no evidence that any of these are happening. A second impediment, resulting at least in large part from the first but having, phonologically speaking, its own effect, is the merger of /a/ and /ɔ/. Because the forward movement of (a) is impeded by (æ) the lowering and fronting of (ɔ) brings about complete overlap of (a) and (ɔ) distributions. During the process a phonological distinction is lost and /a/ and /ɔ/ are recategorized as one distinct sound, at least when in nonliquid environments.

Vowel or consonant shift is typically characterized by maintenance of historical distinctions. Shift does not necessitate phonemic split or even partial merger, although these may occur; it does not necessitate subphonemic reconditionings, although these may occur. In San Francisco White English there is no shift because of the vowel behavior just described that blocks rotation. Instead a historical distinction is lost with the merger of /a/ and /ɔ/ and subphonemic reorganization takes place, with the development of allophony within /æ/.

8.1.1. (æ). The tensing of (æ) has proceeded as a change for which the intact wave model seems the best fit; it is now a categorical process for some young adult speakers although degree of tensing is variable. The change has progressed quickly. For the oldest speakers in the study, the 65 and 74 year old women, there is no sigh of conditioning for peripheral realization of (æN). Also, DeCamp transcribed hardly any fronting or raising of (æN) in 1952. Both informal and careful speech of individuals who were youngsters sixty years ago or more evidence no tensing. Young adults now regularly tense (æN) in informal speech; the rule is only more consistently applied in formal speech. What was categorically not done 40 years ago is now categorically done by speakers in their twenties and thirties.

The development of the allophone shows both fine phonetic conditioning and social conditioning. Vowels before /n/ are tensed most extremely; that is, they are most frequently found fronter and higher than vowels before /ŋ/ or /m/. The velar environment conditions fronting more than raising; the labial environment is least favored for either. Originally middle class speakers distributed (æN) higher, but backer, than working class speakers. The mean for distributions for middle class speakers changes over apparent time from a high central position relative to (æ) to a higher front position relative to (æ), showing fronting and raising on a diagonal. The mean for distributions for working class speakers changes from a front, mid-low position relative to (æ) to a fronter, much higher position, showing fronting and raising that is more upward than diagonal in vowel space.

For young speakers of both classes (æN) means are now well in front of and above means for (æ). The height and frontness difference based on class appears to have been eliminated. This came about without the speech of either class adjusting to the speech of the other. Another class difference involves diphthongization. Speakers are much more likely to diphthongize (æN) than (æ); for both variables middle class speakers are more likely than working class speakers to glide the vowels; this is particularly notable for (æN) which is more liable to diphthongization.

In general (æ) is lower and less peripheral than (æN). Means for distributions of vowels before stops are in front of and higher than means for distributions in the fricative environment. (æT) is found higher than (æK). The voiced velar stop, however, conditions tensing. There is no instance of an unfronted (æg) in informal speech. The fronting, sometimes accompanied by raising, does not show increase over time. Tensing of (æN) is much more extreme for all speakers under 35.

(æ) before fricatives is subject to an (æS) backwards rule. (æS) becomes increasingly centralized by a backing rule containing conditioning: a vowel followed by a fricative and by word boundary is more likely to centralize than a vowel followed by stop-plus fricative or fricative-plus-stop; (æ) followed by a fricative-plus-vowel is least subject to backing; both prevocalic and postvocalic liquids encourage centralization. There are also conditions under which a lower realization of the vowel is more favored than others: (æ) followed by a fricative followed by a vowel or word boundary is more likely to be low within the (æ) distribution than (æ) followed by fricative-plus-stop or stop-plus-fricatve; the presence of /l/ encourages lowering, while the presence of /r/ impedes it. The backing and lowering rules are not the same. The conditioning is different. Backing is increasing while lowering is not. As centralization goes on, the lowering rule continues to operate, conditioning height within the increasingly back distribution.

(æS) backing is a gradual process. It is not a dramatic movement in vowel space like (æN) tensing. It has been going on for an indeterminable length of time in the

phonology prior to the childhood acquisition of informants in this study. The movement is not obvious from an inspection of vowel charts of speakers across age. It was discovered only through statistical testing. Here is an indication of a limitation for sound change observation through comparison of phonetic transcription value scores or of distributions of tokens plotted from formant measurements. A difference of means was not readily apparent. This gradual vowel movement shows show lexical conditioning. The vowel in the word *class* is advanced in centralization even more than is expected given the preceding /l/ and following fricative and word boundary. The frequently used word class—more frequently in the corpus for this study than any other word containing (æS)—is involved in conditioning in a slow proceeding change; slow sound changes are more likely to show lexical diffusion, according to Cheng and Wang (1972:111).

The two sound changes observed for /æ/ are quite different from each other. Tensing of (æN) has proceeded quickly, apparently going from development of the conditioning to categorical tensing in about forty years. The backing of (æS) is an undramatic, slow movement of a part of the low, nonperipheral variant in a direction contrary to the movement of (æN).

8.1.2. (a). (a) before obstruents and nasals is moving forward. The fronting is not an increase of range in central low vowel space but an expansion of the fronter area of the variable's distribution with a contraction of the backer portion in from the periphery. (al) maintains a back position. A raising of (ar), with social conditioning by class, may have been underway several decades ago. (ar) presently has two target areas; some younger speakers distribute (ar) low, within the distribution of (a); others distribute (ar) in a mid vowel range, but overlap it little or not at all with (ɔr). The choice of target area shows no clear correlation with class of speaker.

The fronting of (a) is not extreme. Forward movement is impeded by the presence of (æ) in low front and central vowel space. Within (a) there is a distribution stable across generations in which relative frontness is significant for the vowel before obstruents and

height for the vowel before nasals. (aN) is low within (a) for working class speakers of all ages. For all speakers (aT) represents the most forward distribution; working class speakers position (aS) next and keep (aK) backer; middle class speakers position (aK) in front of (aS).

Within (a) fronting there is lexical conditioning. The mean value for F2 for the vowel in the word *got* is higher, indicating a fronter vowel, than for (a) in any other (aT) item. There is significant difference for means for (a) in *got* and in *god*. *Got* is the most frequently used (aT) item, and, in fact, the most frequently used (a) item.

Across age of speaker there is little overlap of (a) and (æ) in informal speech. Overlap usually involves (aT) items, of course, commonly *got*. In formal speech There is almost no overlap of (a) and (æ).

8.1.3. (ɔ). (a) and (ɔ) show parallel behavior. Direction of vowel movement is similar, under similar conditioning. Subvariable distributions pattern similarly. Vowel movement results in merger, however, rather than chain shift fronting, which would be predictable if the forward migration of the (a) distribution was not blocked, as it is.

Like (a), (ɔ), representing /ɔ/ when not before /l/ or /r/, is fronting. The whole movement is a lowering and fronting during which the position of (ɔT) has changed, relative to the rest of (ɔ). Over time (ɔT) is fronted within (ɔ), assuming the most forward place. The mean of (ɔT) within (ɔ) is then positioned like the mean of (aT) is within (a). For most younger speakers the frontness orders for centers of (ɔK) and (ɔS) have come to match those for (aK) and (aS) for an individual. Working class speakers distribute (ɔN) low within (ɔ), which is how they treat (aN). (ɔl) and (ɔr) are both distributions along the back periphery of vowel space. (ɔr) is higher, reflecting a former merger of /ɔ/ and /o/ before /r/. The distributions and forward movements of (a) and (ɔ) match each other.

(ɔ) has adjusted to match (a). Low position for (aN) and (ɔN) for working class speakers is of long standing. Matches of frontness positions for vowels in obstruent environments are not stable over time. A forward position for (aT) is evidenced in apparent

time before a forward position for (ɔT). Opposing frontness orders for velar stop and fricative environment centers for working class and middle class speakers is stable for (a). This is not true for (ɔ); (ɔ) has adjusted to (a), as shown in the speech of younger informants.

During the merger environment by environment neutralizations began before complete general overlap was accomplished. The nasal environment is the oldest one for neutralization between (a) and (ɔ), showing merger for all four main group speakers over 40. The fricative environment also appears neutralized in the speech of two older informants. It is curious that neither of these environments is favored for neutralization by younger speakers as a group. Working class speakers keep both (aN) and (ɔN) low. Main group working class speakers Suzi Rockland and Ginger Ryan do neutralize in this environment. Rockland, however, shows merger in all environments. In spite of the fact that all four older speakers merge the vowels before nasals younger speakers, Jesse Austin and Beth Thompson do not show clear merger there. The nasal environment appears to have no advantage; neither does the fricative.

All four younger main group speakers show possible or clear merger in all environments. The (al) evidence is scanty, but it is possible that (al) and (ɔl) are neutralizing as well. If so, a back prelateral allophone of the merger vowel, almost perfectly complementary to the vowel before nasal and obstruents, is ready-made. The merger process, now nearly complete, has involved the accomplishment of complete general overlap, environment by environment neutralization, readjustment of environment frontness orders, and , at some point, a phonological recategorization. Formal speech charts suggest this recategorization was effected before speakers under 35 acquired their phonology.

8.1.4. Vowel change in San Francisco English. The main direction—the drift—of low vowel movement in San Francisco White English is forward in vowel space. By itself this motion creates no phonemic or subphonemic realignments. It is lack of

movement and movement contrary to the forward motion that does this. (æ) remains low and nonperipheral while (æN) tenses. Within (æ), (æS) gradually becomes more central. Because of the position of (æ) the forward movement of (a) is impeded. (ɔ), lowering and fronting, merges with (a). The tense allophone of /æ/ has developed. /a/ and /ɔ/ have coalesced, or nearly so, as shown in Figure 8.1.

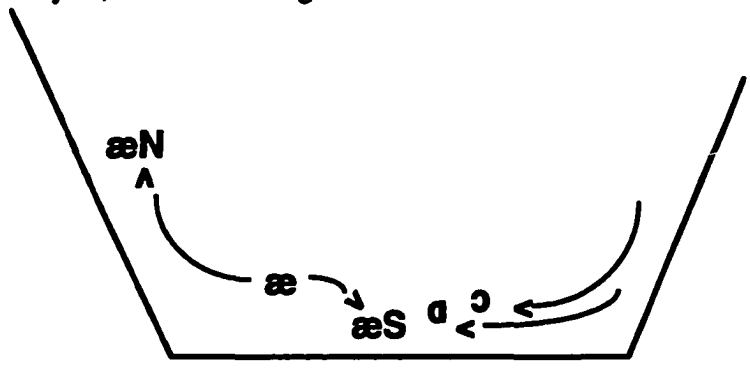

Figure 8.1. Low vowel movements in San Francisco White English

8.2. Historical and contemporary comparison. The tensing of (æN) is a newer process in San Francisco than the lowering and unrounding of (ɔ), leading to merger. Low vowel movements in San Francisco English involve two different *kinds* of treatments of the American English pivotal vowels /æ/and /ɔ/. One is participation, in a restricted way, in a pan-American (White ?) English process, the tensing of (æ). The other entails the selection of vowel movement direction for (ɔ). There is not one process common to American English for this vowel. Raising of (ɔ) or lowering, fronting, and unrounding of (ɔ) area the present choices; either changes the relation of /ɔ/ to /a/ and /æ/ especially.

It is possible to compare present day formal speech charts with DeCamp's transcriptions of careful speech tokens. DeCamp found tensing of (æg) but hardly any tensing of (æN). (æg) is presently fronted and sometimes raised. In formal speech (æg) is tensed less frequently than in informal speech, while (æN) in formal speech is even more extremely tensed than in informal speech. It appears that fronting and raising, accompanied

by diphthongization, was part of the phonology for DeCamp's informants, and is reflected in careful speech. Tensing of (æN) is more secure in the phonology now; formal speech charts show complementarity between /æN/ and the rest of /æ/ even better than informal charts do. The relative weightings of the constraints for tensing in nasal and voiced velar stop environments have changed.

DeCamp found more variation for realizations of /ɔ/ than for any other vowel. There was little variation for /a/. He posited a low, unrounded vowel, [ɑ], as a phonemic norm for /ɔ/; there seem to be two norms, however, that one, and a higher, backer, rounder one, simply [ɔ]. The phonetic target is unclear to the speech community. The phonemic categorization may have been becoming unclear. The amount of variation DeCamp found and the confusion about the phonemic norms support his suggestion that merger was beginning in San Francisco. The merger was instigated by variation and movement of (ɔ) rather than (a).

The merger of /a/ and /ɔ/ is an older change than the tensing of (æN) in San Francisco English in the sense that it is a slower one overall, a process of greater length. In recent decades, however, both changes have progressed quickly. Recategorizations have taken place in both cases, perhaps within the same decade; and in both cases conceptual change has preceded the completion of change phonetically.

Presently San Francisco /æ/ participates in the pan-American tensing phenomenon. The participation is severely restricted. Conditioning is entirely phonetic, involving only nasals, before which the vowel is tensed to a variable degree, sometimes extremely, and the voiced velar stop, before which the vowel is tensed but never as extremely as is sometimes the case before nasals. In the Northern Cities Shift (æ) is involved in no phonemic or subphonemic change. Where the tensing of (æ) is restricted, there is change. Conditions for tensing vary, with smaller sets of conditions nested not very neatly inside larger sets. (See Chapter 7.) It is true at least that tensing of /æ/ before obstruents implies tensing before nasals. In the Seaboard Cities of NYC and Philadelphia there is a marginal

phonemic split due to lexical conditioning that interferes with phonetic predictability. In San Francisco there is a subphonemic realignment; complementarity is established.

The process of /a/ and /ɔ/ merger is one of three treatments in American English of /ɔ/, in which the relationship of /ɔ/ to /a/ is changed or maintained. In the Northern Cities Shift (ɔ) fronts along with (a) and (æ) in the older set of vowel movements in the full rotation. The three vowels maintain their interrelations. The pivot points (æ) and (ɔ) rise and fall, respectively. This dissimilation in height creates the pivots for the rotation. In the Southern Shift, and in Seaboard Cities such as NYC (ɔ) rises, distancing itself from (a). The movements of (æ) and (ɔ) are parallel (Labov 1966); so treatments of peripheral vowels front and back are symmetrical. In the Third Dialect—the Low Back Merger—(ɔ) lowers and fronts as in the Northern Cities Shift but, since the position of (æ) impedes chain shifting, the interrelations of the three low vowels are not maintained.

8.3. Word frequency and lexical conditioning. The controversy concerning the domain for control of sound change—phonological or lexical—has been reviewed in Chapter 3. The position of Labovian sociolinguistics is that phonetic regularity is found when sound change processes work within phonological subsystems; lexical diffusion is more likely to interfere with regularity when changes involve more than one subsystem, because there change is more abstract. In some cases of sound change it has been observed that very frequently used items are the carriers of sounds affected first and most extremely by the change rule. Phillips (1984) argues that frequently used words are affected first if sound change is physiologically motivated; and the least frequently used words are affected first if change is conceptually motivated. The five-model sound change scheme (Labov 1973), in which sets A through E are arranged in order of decreasing phonetic regularity and social uniformity, include two models, C and D, that involve lexical diffusion. The models schematize observable behavior in different sound changes, or in different stages of a sound change, or in different subparts of a stage of sound change.

Regularity is expected at the end of a process of change; lexical diffusion may be at work in earlier stages.

Lexical conditioning has been found in the backing of (æS) and the fronting of (aT). In the sound change process, how are the vowels in these frequently used items acted upon that brings about advancement in movement exceeding the affect on vowels in other words of the same classes, the (æS) and (aT) classes?

8.3.1. Statements, storage, and phonetic gradualism. In the structure of a language, how do phonological processes interact with the lexicon?

A phonological process gets underway, the motivation for which is not a concern here. The process—directional change for a vowel, or unrounding, or lengthening—can be reified with a statement describing an observed result. In either segmental or autosegmental terms features are lost or gained, or their scope is changed. Statements reporting on the results of process necessarily describe discrete differences between input and output; they do not capture, and are not meant to capture, gradual phonetic modification. At best statements make use of devices such as letter variables to suggest a correspondence between gradual process and incremental change of phonological, rather than simply phonetic, significance. (See Chapter 3, note 3 for an example.)

The process of rule operation is observably a phonetically gradual one, continually changing the distribution of phones realizing a distinct sound as that sound occurs in particular lexical items. The results of the rule—rather, the process—that has effected complementarity between /æ/ before nasals and /æ/ in other environments can be seen in the vowel charts for individuals of different ages.

Each distribution, resulting from phonetic conditioning, has a mean. In a speech community there is a large collection of distributions for individuals, each with a mean. In ordinary interaction some information about those means, in association with the social identity of the language users, is available. The structuralist notion of phonetic target or phonemic norm may be a phonological reality that is based on distributional means.

Through apparent time distributions change; the relation of (æN) to (æ) changes. The distribution of (æN) of any one speaker is the pattern of vowel tokens that compose it, all realizations of (æN) in items stored in the speaker's lexicon. Tensing is observed as the gradual fronting and raising of (æN) as a collection of phones. Statements that reify process can not capture this, but would come closer by incorporating distributional information. Phonological theory has not advanced to the point of making this possible.

Variable rule theory was an attempt to link distributional information, in the form of probabilities based on frequency of variant occurrence, to statements reifying phonological processes. The establishment, maintenance, and parallel change in patterns common across speakers depend on shared knowledge about distributions.

Distinct sound units are stored in words. The tensing process for (æN), the laxing process for (ɔ), the backing of (æS), the fronting of (aT) operate as changes in the realizations of sounds in words that are maintained in the lexicon through use. As a process continues, the use of an item reflects, to speaker-hearers, the changing distribution of realizations of an affected sound in the item.

8.3.2. Mechanism of sound change. A phonological process affects sound in words. A rule applies across the lexicon to the sound or a feature or feature collection under certain conditioning. A process increases fronting, so there are fronter realizations of a low back vowel, historical /a/, when that vowel occurs before underlying /t/ or /d/ (or before a certain combination of features, or before the closure and release characteristic of an alveolar stop). A process increases backing, so there are backer realizations of a low front vowel, /æ/, when that vowel occurs before /s/ and other specific fricatives (or before a sound that is continuant but not sonorant, or before high frequency noise). The neogrammarian tenet of regularity is no more than the assertion that phonological process is patterned robustly enough to be reflected in statements that announce effects of the process; all synchronic and diachronic rules for sound alternation depend on this. Regularity is dependable in so far as phonological rules are dependable. If the domain for sound change

is the phonology, the main mechanism for sound change is the regular working of process at the phonological level. Phonological process works on sounds that are, stored in the lexicon.

The process works continually. Reifying that, a rule that has been added to the grammar operates on sounds in items as they occur. A notion that an active rule operates over time opportunistically on sounds as speakers speak them and hearers hear them is preferable to the notion that in some timeless way a rule operates through the lexicon on underlying forms, effecting phonological modification. The first notion is preferable because it associates language knowledge and language use.

A process affects a sound in each item in which it occurs in the appropriate environment. A distribution of phonetic realizations is associated with the sound in that environment, and the distribution has a mean. Under very fine phonetic conditioning every word has its own history, in the sense that only homophones provide the same environments for the same distinct sounds. A sound in any particular item has its own distribution with its own mean. For discussion, let us suppose that the distributional mean of a vowel is the same across items of the class, for instance the (æS) class and the (aT) class, prior to the initial working of a process; but the distributions are of phonetic realizations for a distinct sound in each item. The variable (æ) in *ask, has, laughs, mass, rather,* is a collection of five distributions.

As the rules for (æS) backing and (aT) fronting operate opportunistically on sounds in the lexicon as they occur, the vowels in frequently used words will be affected frequently. These vowels will be advanced in sound change, as the vowels in the frequently used items *class* and *got* are. They will be advanced unless advancement is otherwise impeded. Competing conditioning is the most obvious impediment. The vowel in the frequent item *lot (alot)* is not advanced in the fronting of (aT); rather, it is lagging behind in the change. The prevocalic /l/ impedes fronting.

It has not come to the attention of investigators of sound change in progress that sounds in items arrange themselves in distributions in which they show clear rank order by frequency of occurence. Such an obvious rank order is not observed. Two hypotheses for testing are the following:

That the means for sound distributions by item do show a rank order by frequency of occurrence unless competing conditioning disturbs this, the most common of which will be fine phonetic conditioning; interference from competing conditioning can be expected much of the time.

That favorable phonetic conditioning *that is additional to the main conditioning* for the sound change process enhances the phonetic effect of the process in frequently used items.

The second of these hypotheses requires more discussion. In the word *class* the vowel is preceded by /l/ and followed by a fricative and word boundary, both conditions favorable to backing. The principle conditioning is the presence of the following fricative. A fronting mean, expressed as a percentage, across words for the vowel when preceded by /l/ and followed by a fricative is 38; that is, vowels in these items are not forward. The mean for the vowel in the item *class* is 21, and the difference between the two is significant. This is lexical conditioning, and I have suggested that it comes about through the iterative working of the phonological process on sounds as stored in lexical items. If this is so, it is predictable that each factor conditioning, eg.g a directional movement, will affect frequently used items opportunistically; in the case of *class* rules backing the vowel in the presence of fricatives and of liquids work iteratively on the vowel in the word. It is an empirical question whether evidence for this can be found in many sound changes.

8.4. Process and statements about process. In formulating responsible sociolinguistic phonological statements about most synchronic or diachronic processes—that is, about processes more complicated than those involving phonemic distinction or complementarity due only to phonetic conditioning alone—it is necessary to inquire about at least four different kinds of possibilities. First, it is possible for a rule to be categorical or variable. The five models for types of sound change (Labov 1973; see Chapter 3) are sets composed of variable and categorical members. Classic neogrammarian statements of

sound change assume categorical application within phonetic environments as well as regularity within word class; this is modeled by the categorical member of the set A in Figure 3.1. Second, it is possible for conditioning to be phonetic, lexical, or both; or to be grammatical. The debate about lexical diffusion versus regular, phonetic conditioning as the chief mechanism in sound change—a debate built on the history of neogrammarian versus dialect geography views of change—has by now brought about an awareness of the importance of lexical diffusion in sound change. Third, it is possible for variability to be socially or linguistically conditioned, or both. Social variability will have reference to speaker identity and to the level of formality of a speech situation. Phonetic and lexical linguistic variability have been given more consideration than other kinds. If the variability is phonetic it is a matter of more frequent rule application in one environment than another, that is, of weighted phonetic constraints. Fourth, it is possible for a rule to change status in more than one way. Lexical conditioning may be lost, resulting in a rule that is entirely phonetically conditioned; Labov (1981:also, Weinreich, Labov, and Herzog 1968:) claims this is characteristic of final stages of sound change, that is, change is regular in its outcome. A rule may change from variable to categorical. At the end of a sound change a rule changes phonological status. A rule for phonemic distinction or for allophony—a rule describing shift, merger, split, or complementarity—is of a different phonological order than one describing, e.g., conditioned vowel movement in which no change in the state of the phonology has been effected.

8.4.1. Complementarity and phonemic split. Description of the process of (æN) tensing, as seen in the drift of tokens through time, addresses the embedding, transition, and actuation problems (see Chapter 3 for discussion). The embedding problem is to locate change 'within the linguistic and social matrix governing its development' (Weinreich, Labov, and Herzog 1968: 101), the transition problem to discover 'the route from one state of language to another' (p.101), and the actuation riddle to find 'how rule changes pass from an active to dormant state' (p.187). This study can place the tensing of

(æN) within a linguistic context and, in a less detailed way, within a social context. The route in vowel space from untensed to tensed for (æN) is clear. (æN) can be further tensed, but tensing itself is predictable. 'Actuation' of rule change, in the sense of the addition to the grammar of a statement describing a complementary distribution, has taken place or is in the final stage of coming about. The mechanism for the rule addition may or may not be a change in the status of the long-lived variable tensing rule or rules from variable to categorical; or, to put it another way, the addition of the categorical allophonic rule may or may not be the result of variable rule loss. Very nearly the same statement or set of statements accounting for tensing may have dual status: as categorical, describing complementarity; as variable, describing increasing tensing in all or some environments. The rule for allophony simply tenses /æN/. The variable rule or rules front and raise (æN) under several, differently weighted, constraints.

The tensing of /æ/ before nasals and in other environments has resulted in phonemic split in Philadelphia English. The collection of tense phones license phonemic status only because tensing fails to be completely phonetically conditioned due to the fronting and raising of vowels in a few items. Labov (n.d.) has referred to the tensed vowel /æh/ as a 'marginal phoneme', by which he means that its status depends on only slight disturbance of a pattern of complementarity. (See Chapter 3.) The tensing of San Francisco /æ/ before nasals, the most favored environment for raising, exemplifies a stage in a process that logically leads to split, either by merger with a higher nasal allophone of a front vowel if tensing does not extend to other environments or by the establishment of a new distinction if tensed /æ/ gains lexicon in some way other than through phonetic conditioning. I am not suggesting that split is predictable but that two preconditions for it have already been met: phonetic conditioning for allophony has developed; complementarity, reflected in separation between (æN) and (æ) in phonetic vowel space made graphic for particular individuals, has been effected. What remains to happen is some disturbance to the complementarity or partial merger of /æ/ with a higher vowel. The

high, front phones of /æ/ have reduced the phoneme's margin of security in relation to nonlow front vowels drastically. There is also no margin of security between /æ/ and /a/, and overlap is tolerated. The situation at present is one of maximal overlap of areas of confusability between /æ/ and higher front vowels and between /æ/ and /a/; and of minimal overlap of areas of confusability between the two alternants of /æ/. I am suggesting that the separation in vowel space between the two allophones of /æ/ be regarded as the same sort of thing, phonologically, as separation of phoneme distributions, but relevant to a different level of categorization in the phonology.

The development of allophony for /æ/ is embedded socially within a continuum of class differences. Phonologically, the route from lack of allophony—or from an undiscernible former allophony—to clear complementarity is one of fronting primarily and raising secondarily. Allophony is actuated by rule addition already discussed. The rule has been variable. Now tensing of (æ) is categorical, although further tensing may continue, variably. Both categorical and variable versions of a tensing rule may be said to exist, the first describing that fact of complementarity. The achievement of categorical status for the tensing rule marks that a *phonological* change has already taken place. To say this, however, is simply to reify an observation that a process, tensing, now seems to consistently occur to a degree that maintains phonetic separation of the phones distributing as (æ) and those distributing as (æN). The consistent occurrence itself manifests the probably psychological reality of allophony. The reality of allophony can be said to have been effected at some point prior to consistent separation of (æ) and (æN) distributions across individuals, in the sense that 'free variation' can manifest complementarity. A linguistic perspective tying the phonetic detail of specific stages of sound change to phonological feats such as the accomplishment of allophony, split, or merger is the most obvious bottom-up approach to the problem of how one rule changes into another. This problem is 'the generative aspect of the transition problem' (Labov 1973:101). The development of the allophone /æN/, a simply conditioned, categorical matter by one kind of

account, can be seen as a process describable by a list of selections from several sets. There are categorical and variable rules tensing /æ/, involving linguistic conditioning that is purely phonetic, with linguistic and social variability.

8.4.2. Merger: the route. Of the three things we expect in a completed unconditioned merger,

1. lack of categorical distinction between the vowel phones realized for one class of words and those realized for another,
2. complete phonetic overlap of the total vowel space occupied by one historical vowel with the space of another, and
3. environmental distribution for one historical vowel which matches environmental distribution for the other within the overlapping territories,

only one concerns a conceptual change, a realignment of lexicon from two classes into one. The other two concern the phonetics of transition, the route by which the language passes from one state to another. This section is a discussion of the unfolding of the route, not of the merger recategorization. Note, however, that if phonemic categorization in the contrastive sense is best reflected in careful speech, then in the merger of /a/ and /ɔ/ in San Francisco speech recategorization and the accomplishment of general phonetic overlap have been coincidental, or nearly so. Before this, subphonemic adjustments were already underway, with neutralization occurring under restricted conditions. After recategorization environment by environment mergers continued and are continuing. These observations parallel observations from other studies of late stages of merger, in which speakers categorize two formerly distinct sounds as one, but phones representing the new category still distribute in such a way that maintenance of phonetic distinction is clear.

8.4.2.1. Transition. Study of the merger process through a close examination of vowel charts allows one to address the embedding and transition problems, and to consider the actuation riddle as well. The historical and changing relationship of /a/ and /ɔ/ can be located in linguistic and social matrices. The phonetic route of the coalescence can be followed. The distributional facts pertinent to embedding and transition in the /a/ and /ɔ/ merger are discussed in detail in Chapter 6, and have been summarized in Section 8.1 of this chapter.

The lowering, fronting, and unrounding of (ɔ) that results in complete overlap with (a) and, eventually, several environmental neutralizations, is embedded first of all in a history of /a/ and /ɔ/ in English in which instability has been the rule. The vowels have exchanged lexicon in a number of processes over many centuries, resulting in tactic restrictions for both. (See Chapter 6.) It is mainly in coronal environments that /a/ and /ɔ/ both occur; and these provide the few minimal pairs, e.g. *cot, caught; don, dawn.* The functional load for each vowel is decreased because of these restrictions. The distribution between them can be seen as favorably preconditional to coalescence with several complementary distributions.

One restriction involves nasal consonants. /a/ occurs before /ŋ/ only in sound symbolic words and in certain borrowings; /ɔ/ does not occur before /m/; both occur before /n/. Neutralization of (aN) and (ɔN) is the first observed in San Francisco. It does not appear, however, that this was due to a favorable condition for phonetic overlap of the two before the alveolar nasal and maintenance of separate vowel spaces before the other nasals. Vowel charts show overlap of (aN) and (ɔN) regardless of the place of the following nasal. A fact of social embedding is that (aN) and (ɔN) are stable low distributions for working class speakers. For the two older working class speakers, diffuseness of the (ɔN) area along with particularly low relative means for (ɔN) allowed for neutralizing overlap.

This study has viewed the merger of /a/ and /ɔ/ as a series of partial mergers, of which the neutralization of (aN) and (ɔN) was the first. Over all, the route of transition is the lowering and fronting of (ɔ), in which (ɔ) approaches the area of (a), which is itself slowly fronting. Within this overall distributional shift environmental redistributions have come about for (ɔ). Frontness orders for vowels before different stops and before fricatives have changed, so that for middle aged and young speakers (ɔT) is most forward, matching the relative position of (aT); and a realignment of (ɔK) and (ɔS) to match orders for individuals for (aK) and (aS) is well underway. The height match of (aN) and (ɔN) is

maintained for younger working class speakers. As (ɔ) lowers and fronts it becomes increasingly separated from (ɔl), which remains a back and mid-high area. (al) does not appear to be retracting from the back of vowel space as (a) is. There is some overlap of (ɔl) and (al) areas.

The actuation riddle concerns how a rule leaves the grammar or becomes deprioritized to the point of being inoperative. Rule change is discussed below. The relevant phonetic observations are that the fronting of (a), in particular of (aT), is impeded by the low position of (æ), and that (ɔ) continues to front; (ɔT) shows some overlap with (aT) for most young speakers. Merger or possible merger exists in the alveolar environment for the younger main group speakers. Just as (æN) may continue to tense after the establishment of complementarity between /æN/ and /æ/ elsewhere, (a) and (ɔ), no longer representing distributions of distinct vowels, may continue to front. (æ) presents a block, however; this may encourage rule loss.

8.4.2.2. Rule change in merger. At the phonemic level a distinction is lost in merger. A rule has been lowering and fronting (ɔ) variably for many decades, perhaps for most of this century, in San Francisco White English. Some older native San Franciscan women interviewed by DeCamp showed a great deal of variability for (ɔ). In this process the entire distribution of (ɔ) has shifted. Although a recategorization of the two formerly distinct vowels as one has already taken place, environment by environment neutralization is not yet complete. Of the four different sets of parameters to be considered in formulating sociolinguistic phonological statements the third set is of chief importance in merger or split. A rule changes phonological status. Lowering and fronting of (ɔ) may continue, and may continue to show variability in degree of laxing, but phonologically historical /ɔ/, when not followed by a liquid, is now low and lax, as well as unrounded. /ɔ/ is categorically identified with /a/.

For both historically distinct vowels selections from the second and third parameter sets are involved with rule change at the subphonemic level. There is phonetic and lexical

conditioning. Variability is itself linguistically and socially conditioned. There are several possibilities for subphonemic rule change processes during merger. These can be expressed in terms of distributional organization and in terms of modification of either structural description and structural change in rules or rule substitution.

1. The distributions for each historically distinct vowel can have the same internal organization; in merger, rules for environmental conditioning remain the same.
2. There can be distributional realignment for one vowel to conform to the internal structure of the distribution of the other;
   in the merger process, either early or late, environmental conditioning changes for one historical vowel; there is rule addition or substitution.
3. There can be distributional realignment for both merging vowels, with the result that their internal structures match;
   environmental conditioning changes for both vowels; both lose old conditioning rule(s) and add new.
4. The distribution of one vowel conforms to the other or both change to become matched, as in 2 and 3;
   in the merger process, this is brought about by an expansion of the scope of the structural description, an enlargement of the environment in which the process operates, a reanalysis of conditioning.

In the merger nearly completed in San Francisco the first two means of actuating rule change are observed. Within the distributions of (a) and (ɔ) the nasal environments areas are low for working class speakers across age of informant. The variables (al) and (ɔl both distribute back in vowel space, although (al) is not consistently backest across speakers for whom means could be obtained. For these areas little of no readjustments in relative positions are needed in order to achieve frontness and height order matches. Environmental conditioning remains the same during merger. Other environment areas for (ɔ) have changed; (ɔ) has adjusted its internal structure to (a). The positions of (ɔT), especially, and (ɔK) and (ɔS) have realigned to conform to the environment frontness order found for (a). The adjustment of (ɔT) to (aT) was made early. A subphonemic rule conditioning forward realizations of (ɔT) was added to the phonology during merger. In general, the originally higher and backer position of (ɔ) along with the gradual nature of the fronting and lowering movements delays the achievements of environmental coalescences.

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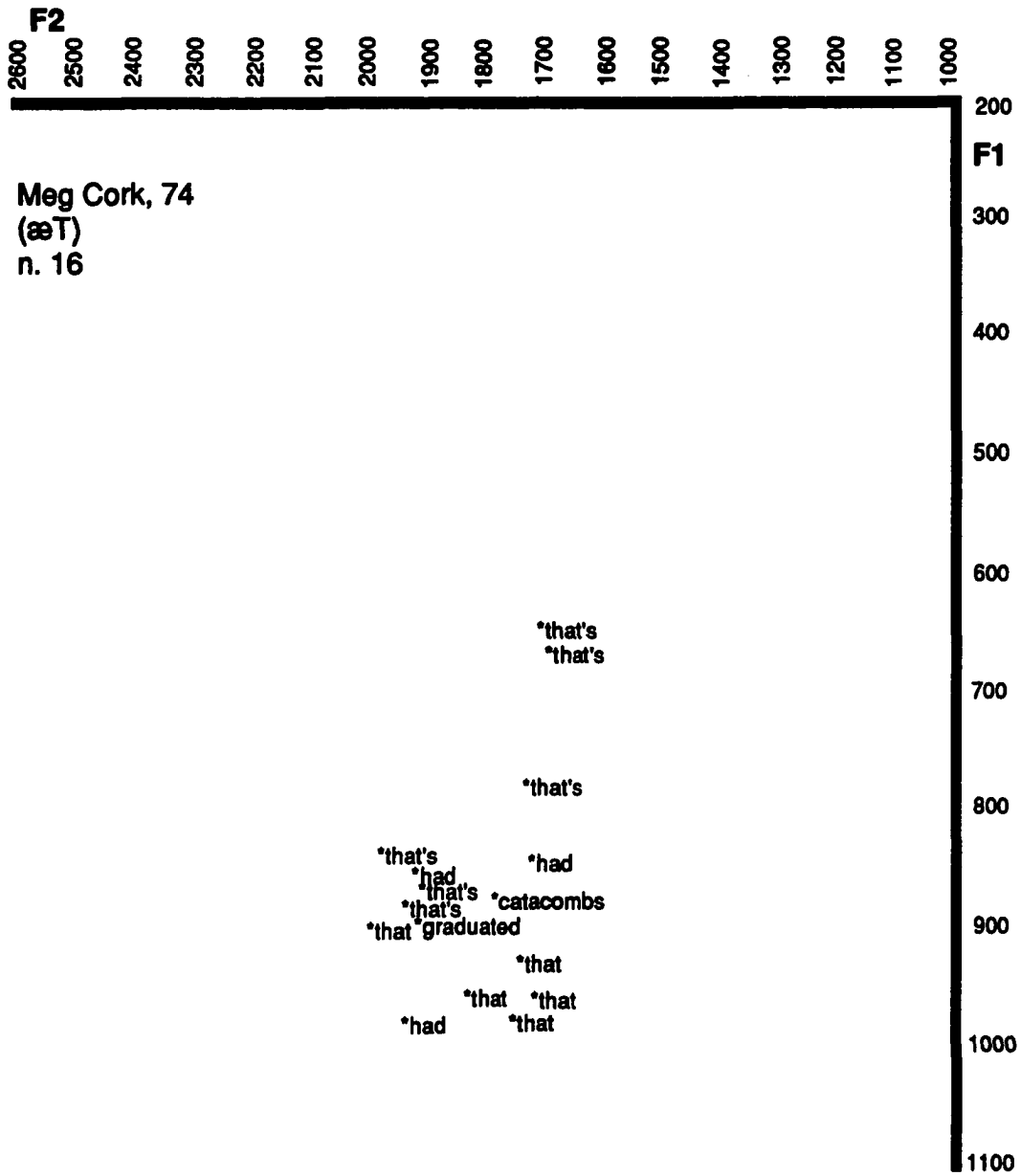
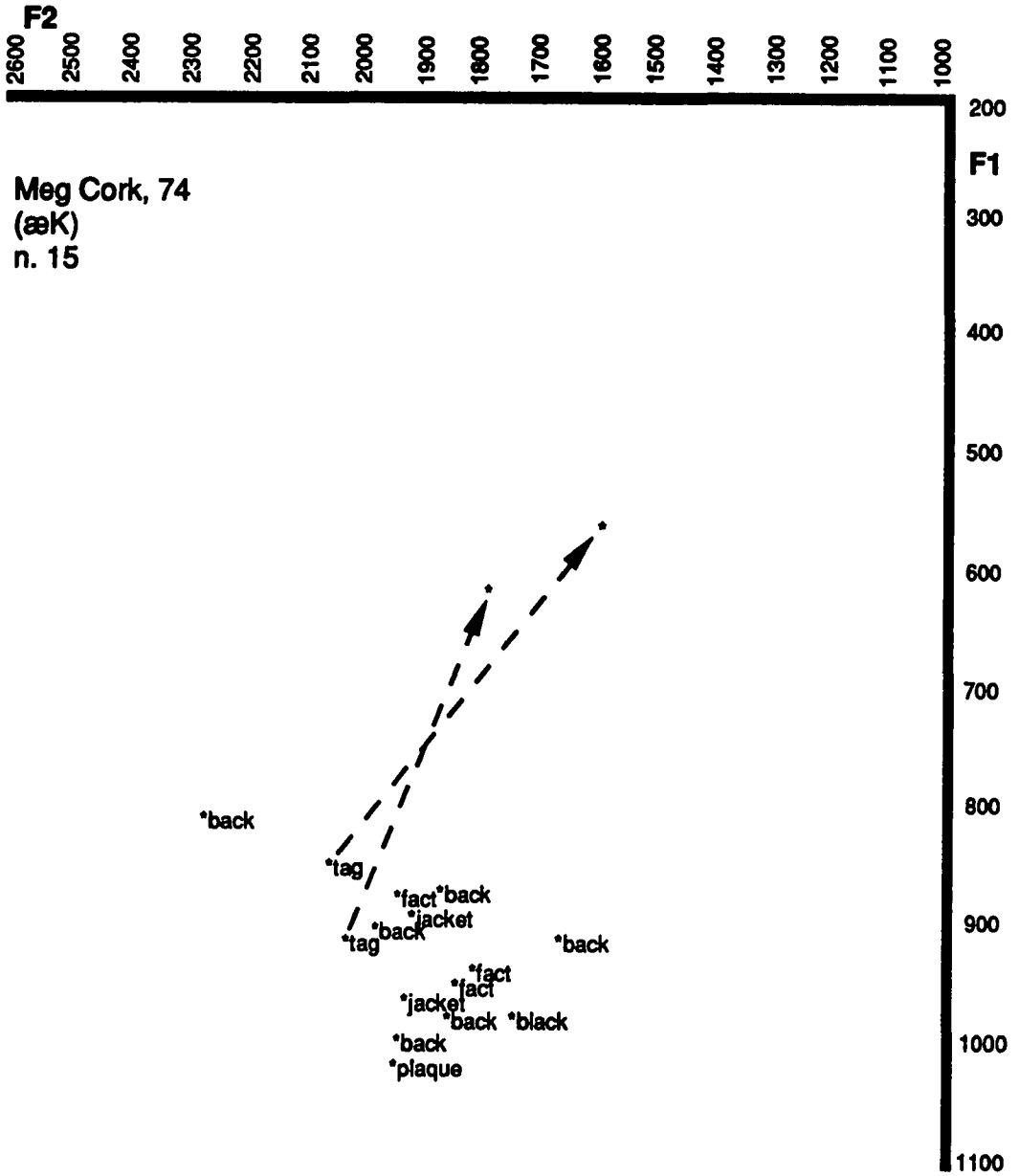
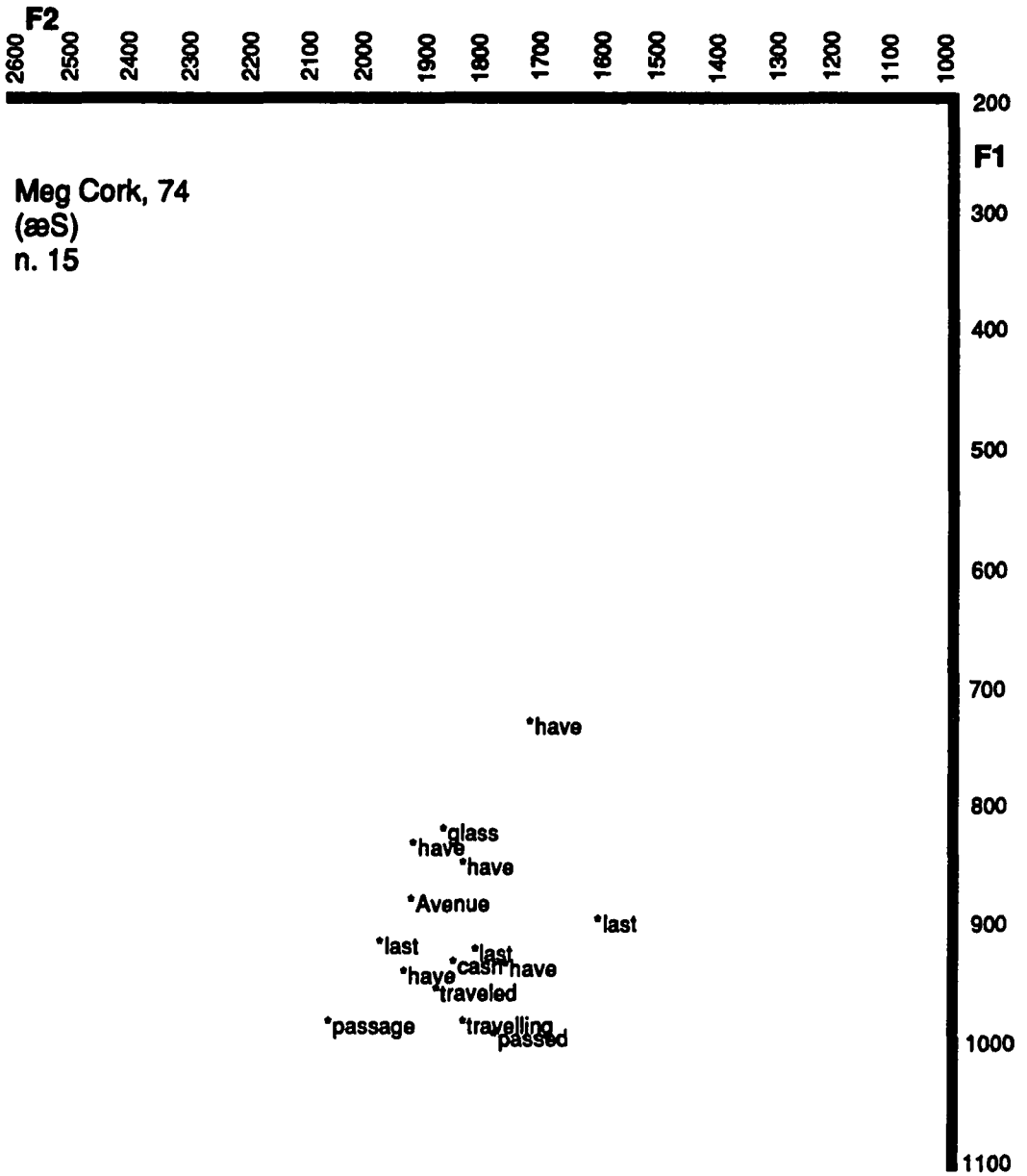
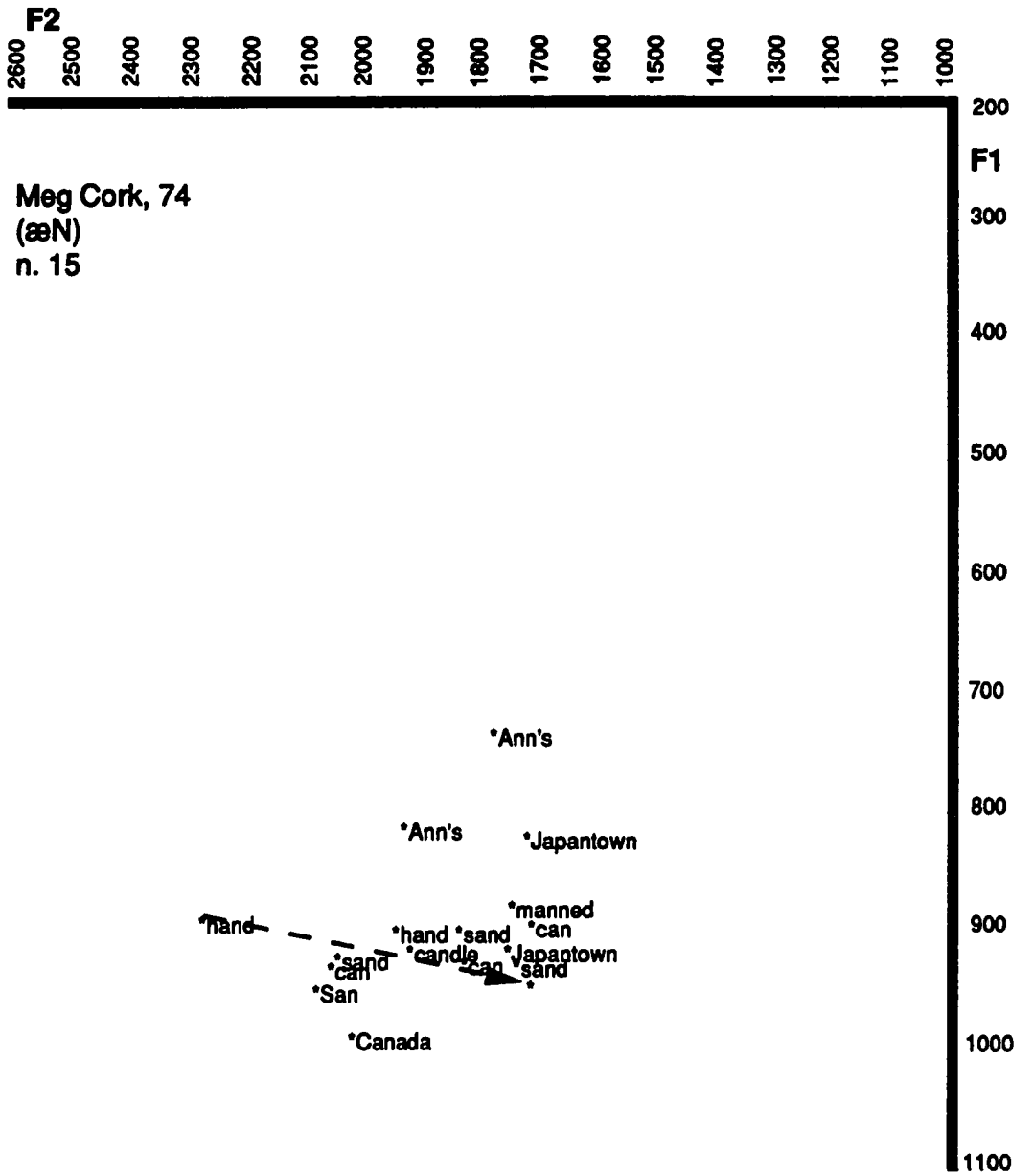
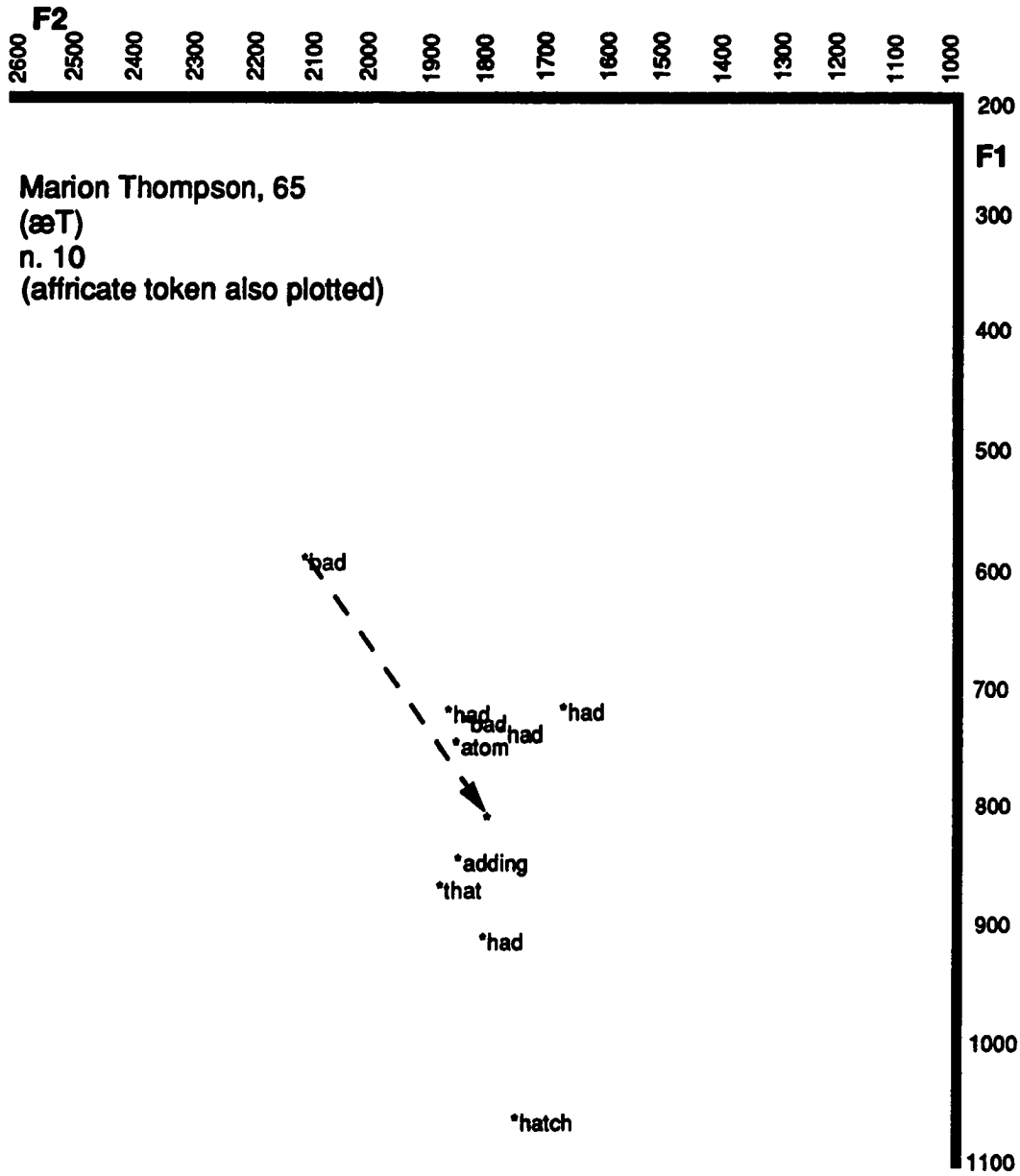
Appendix A: Vowel charts

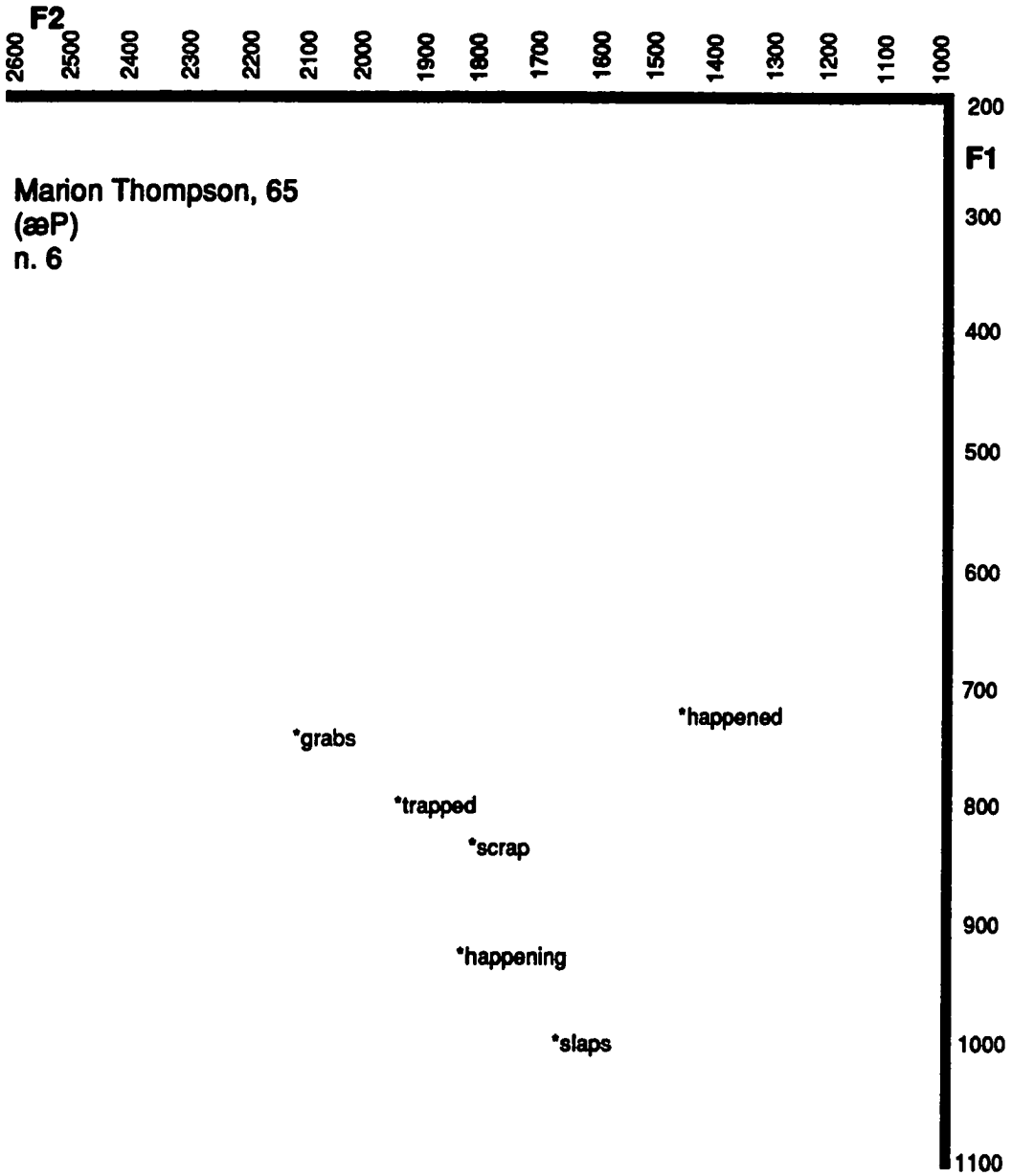


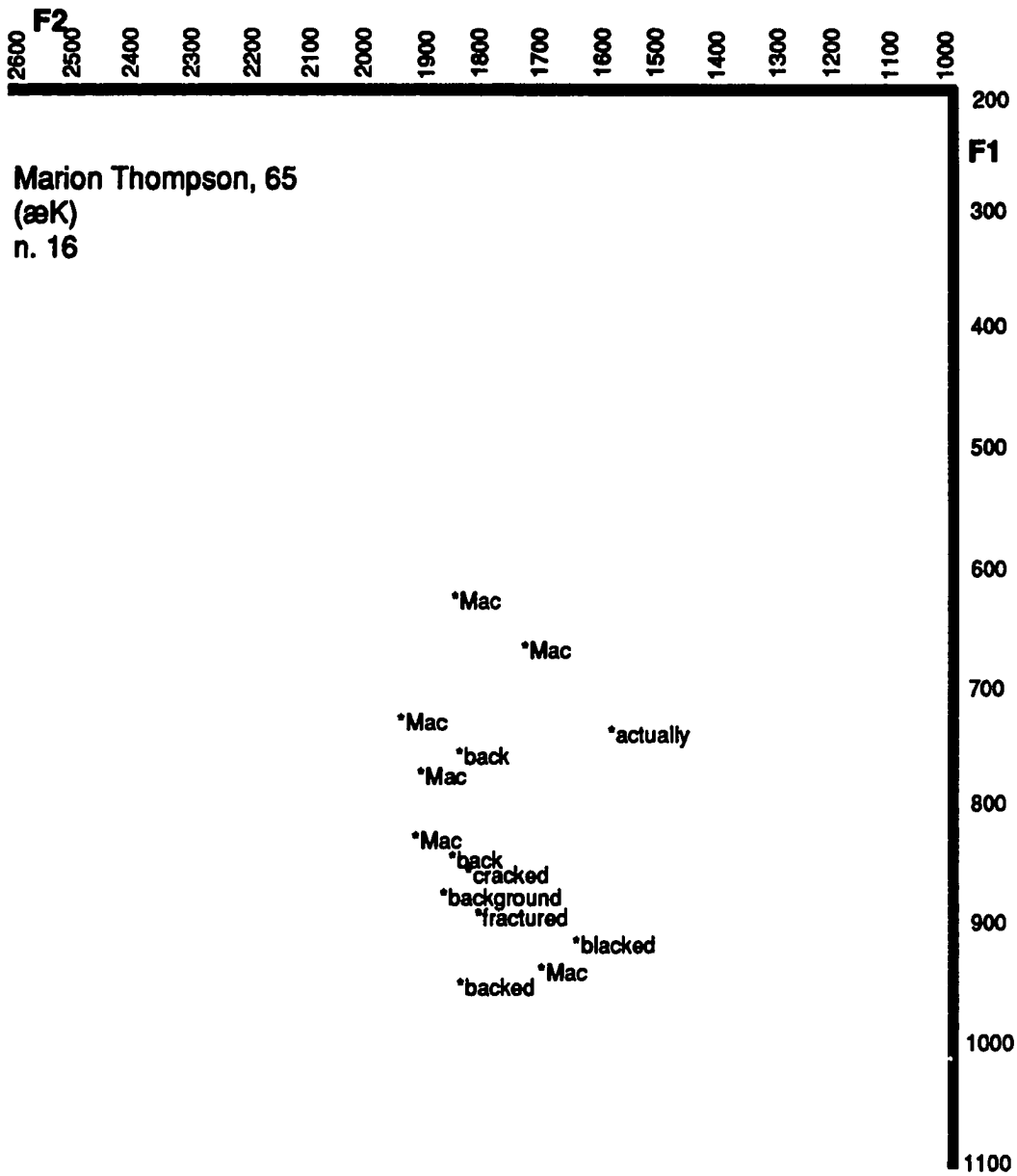


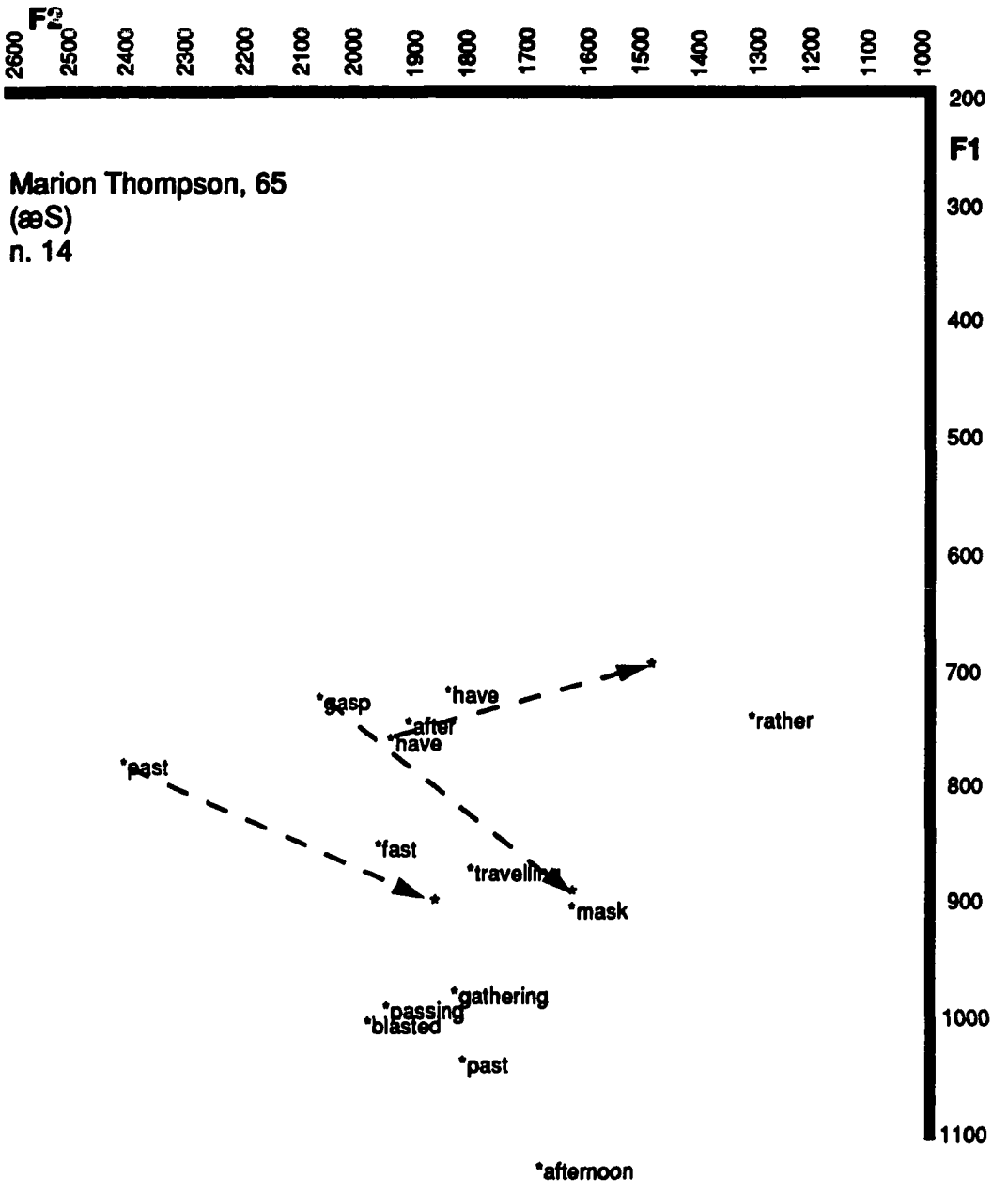


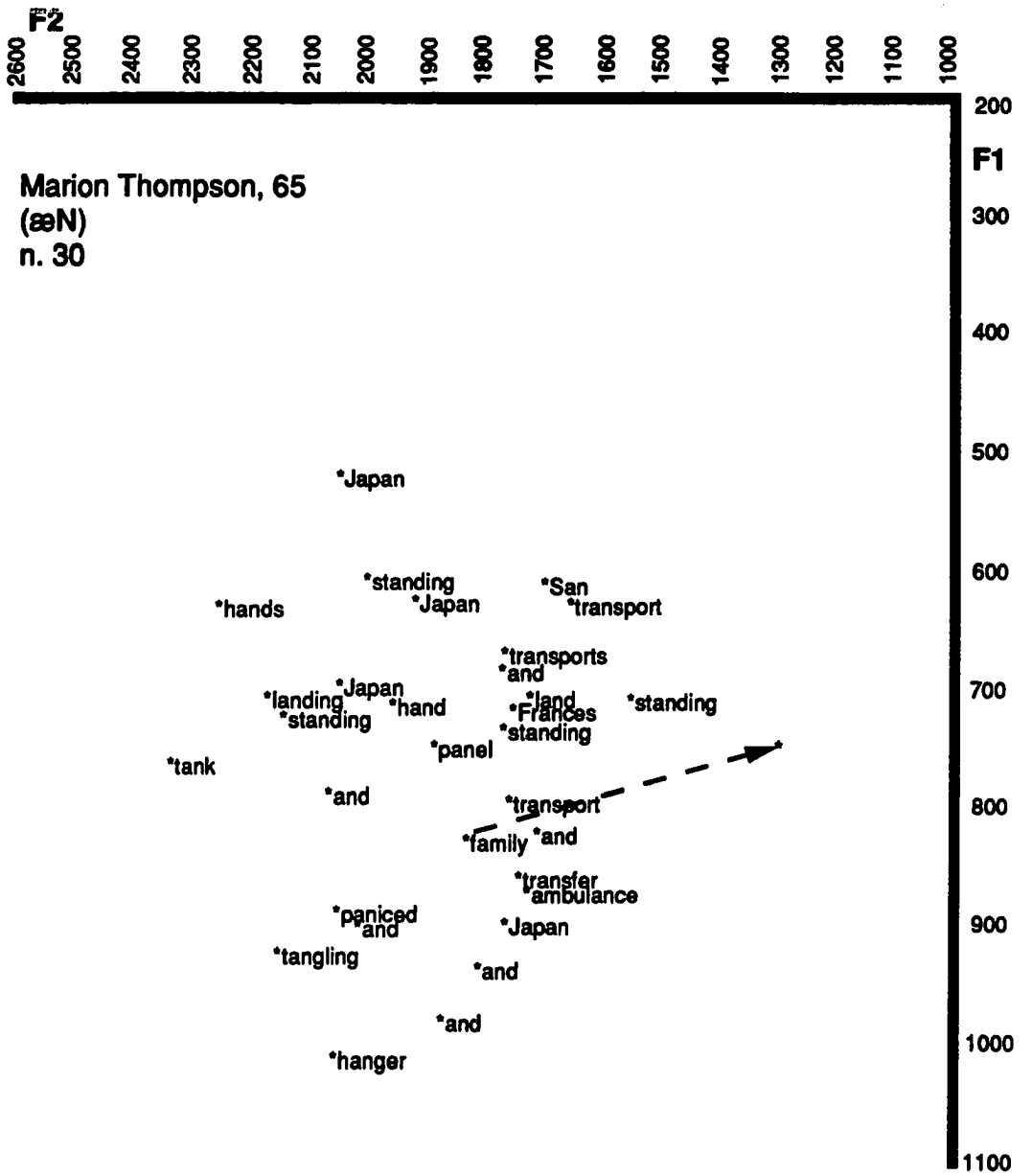


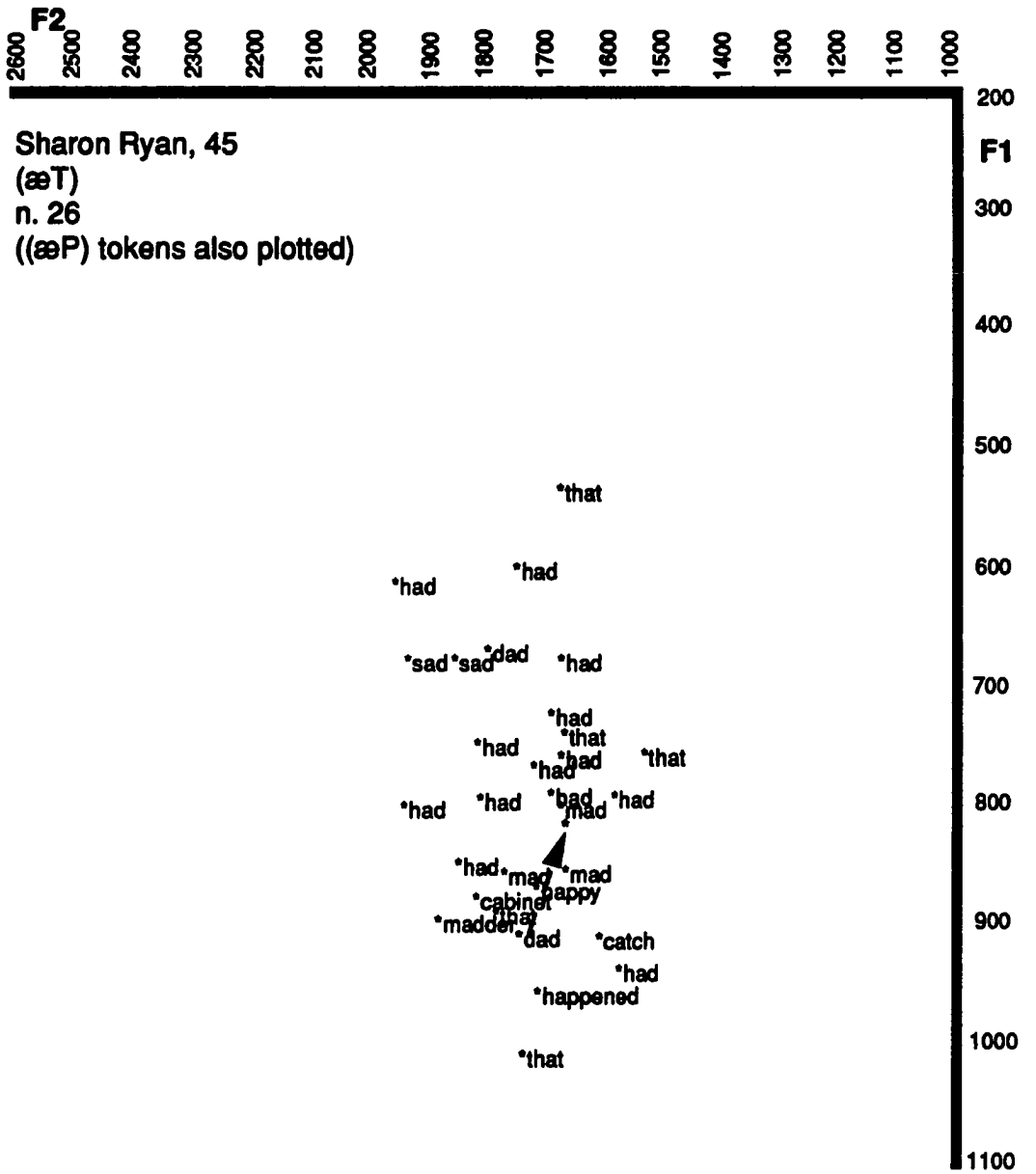


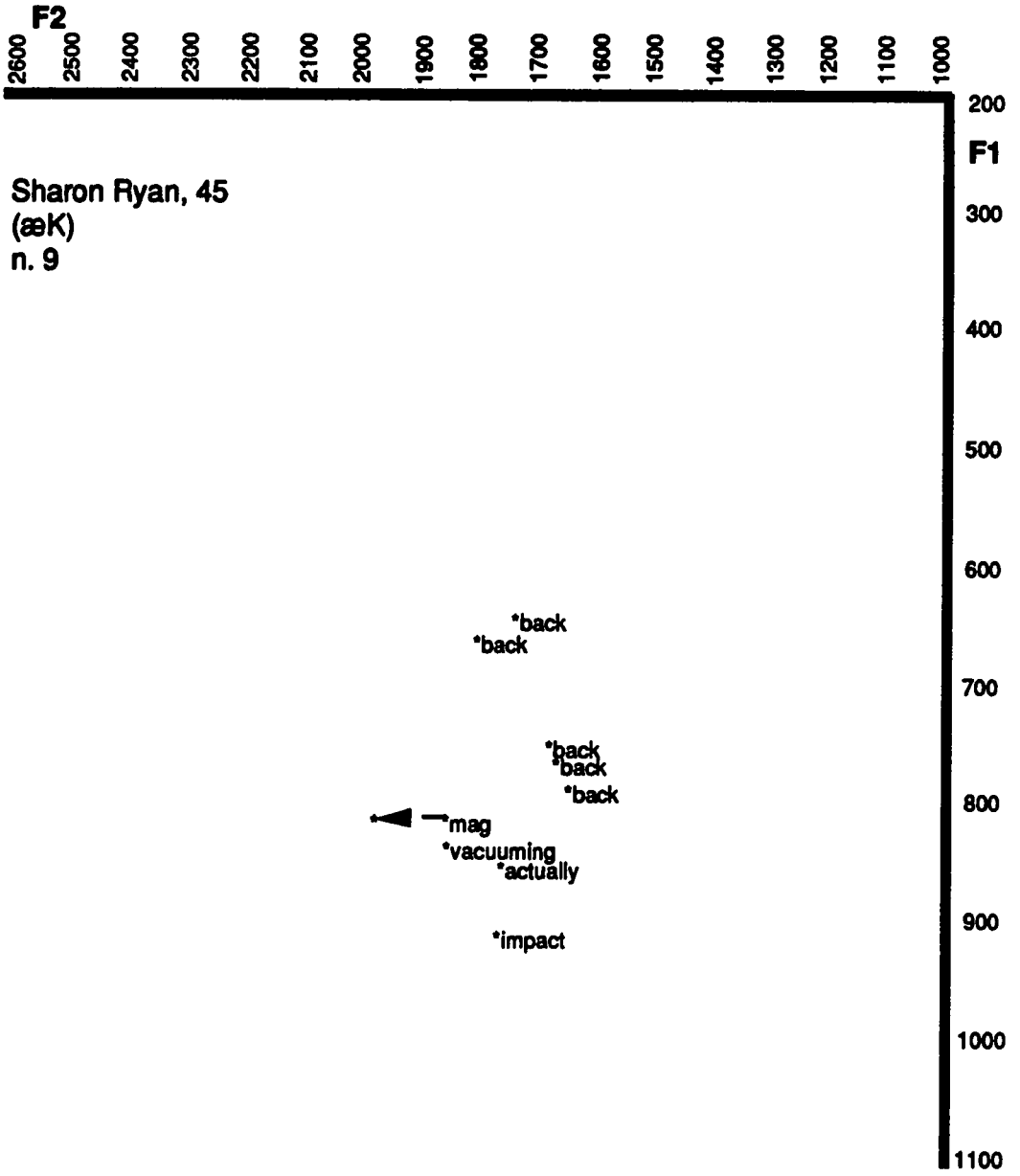


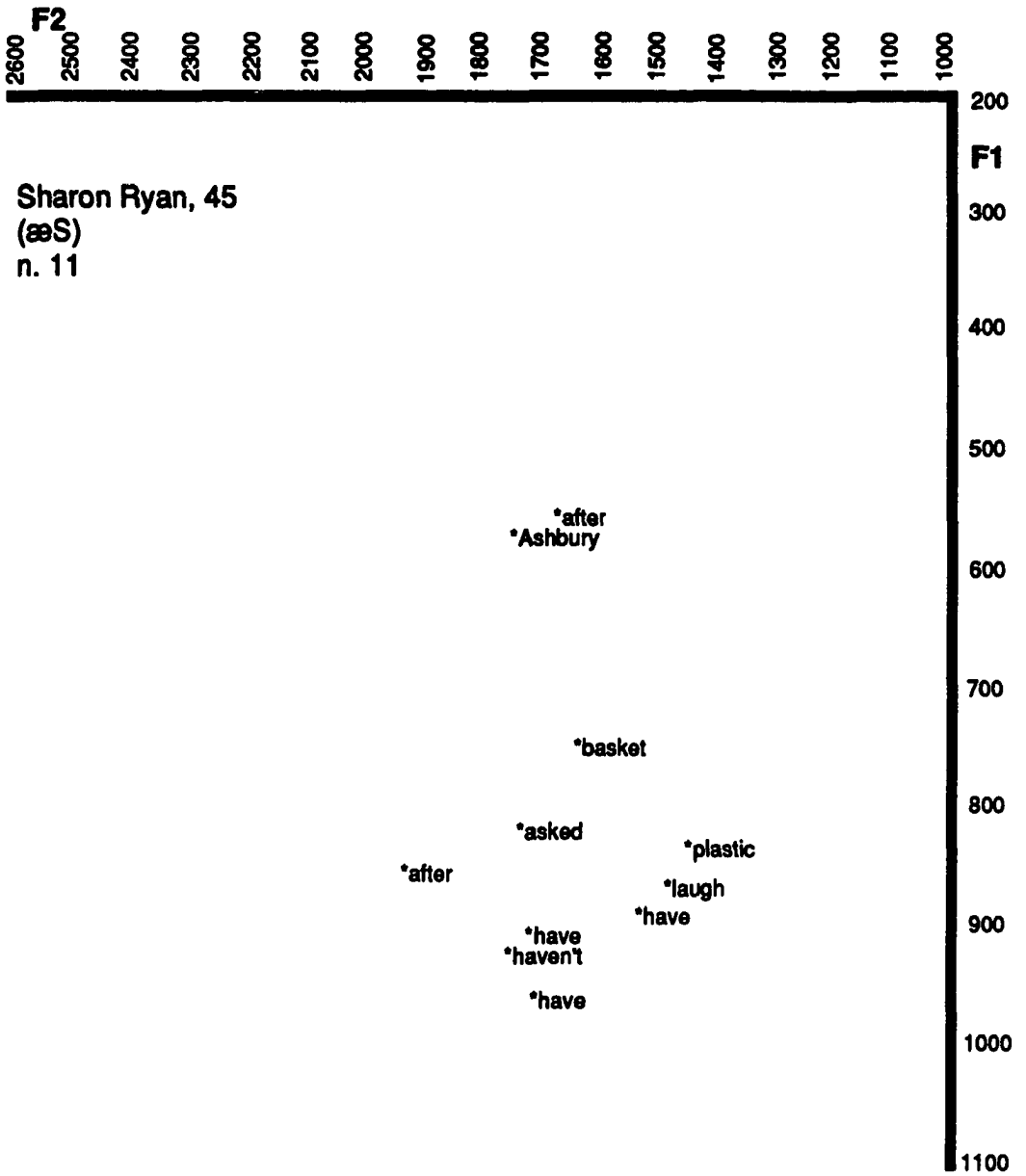


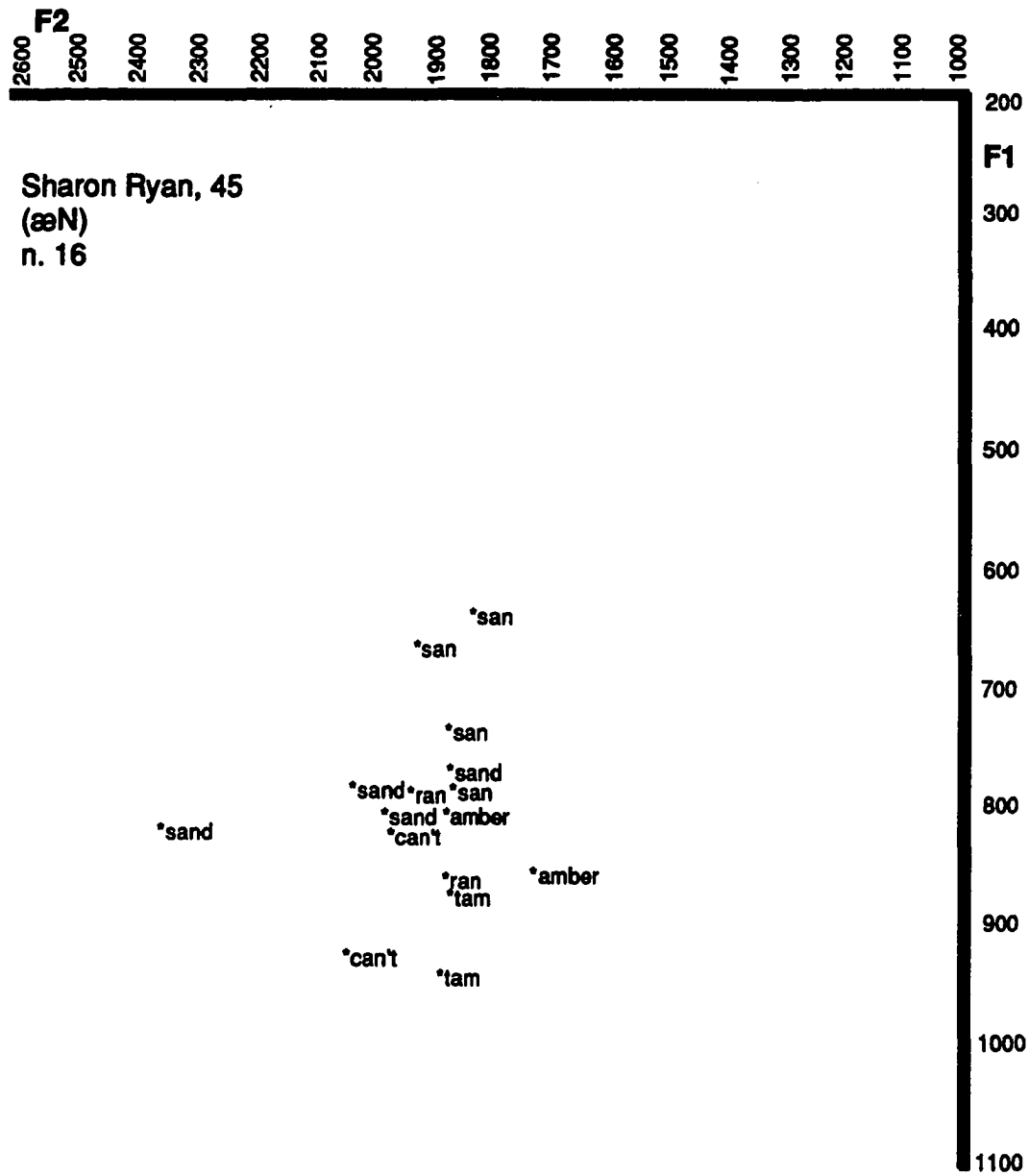


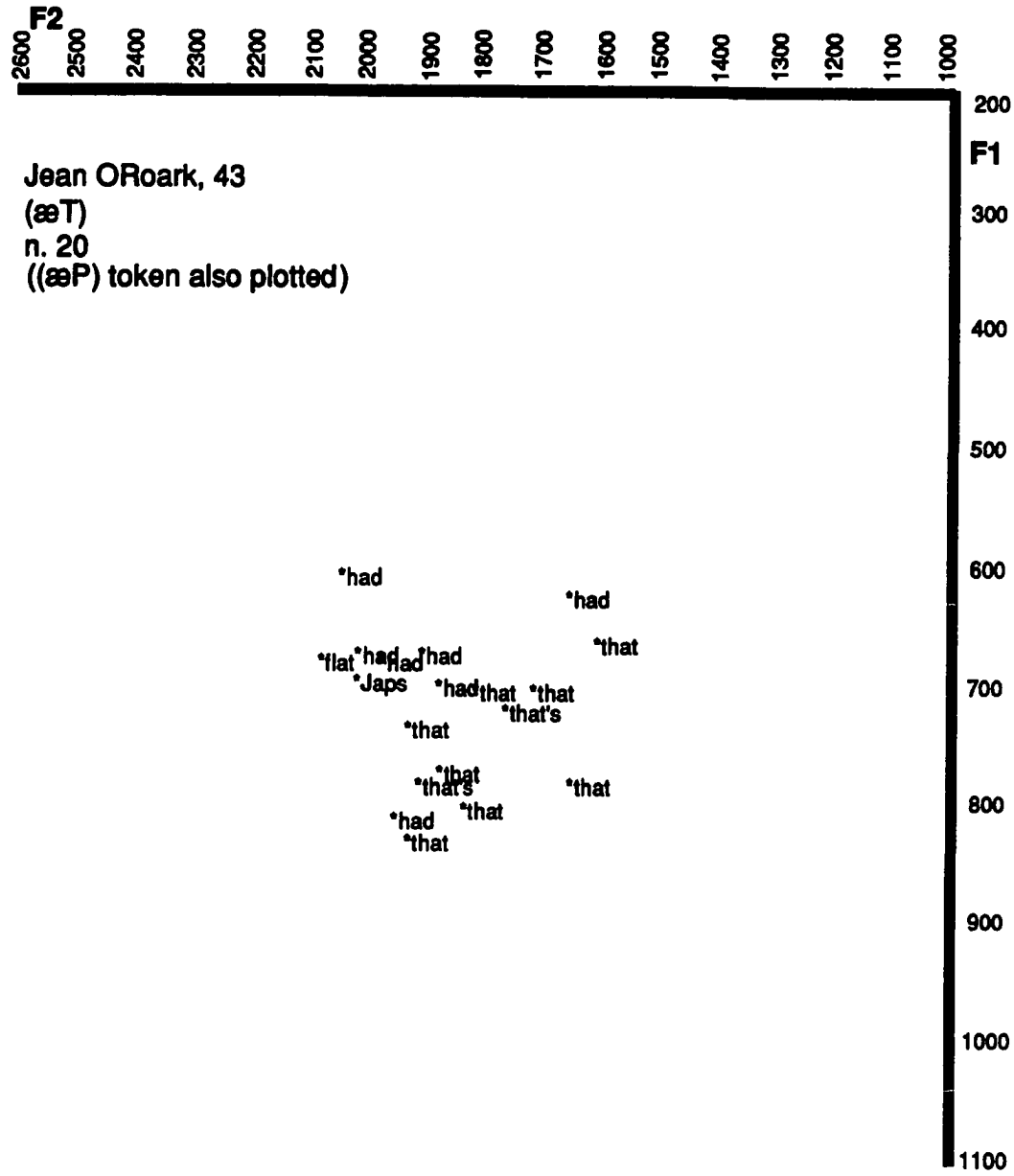


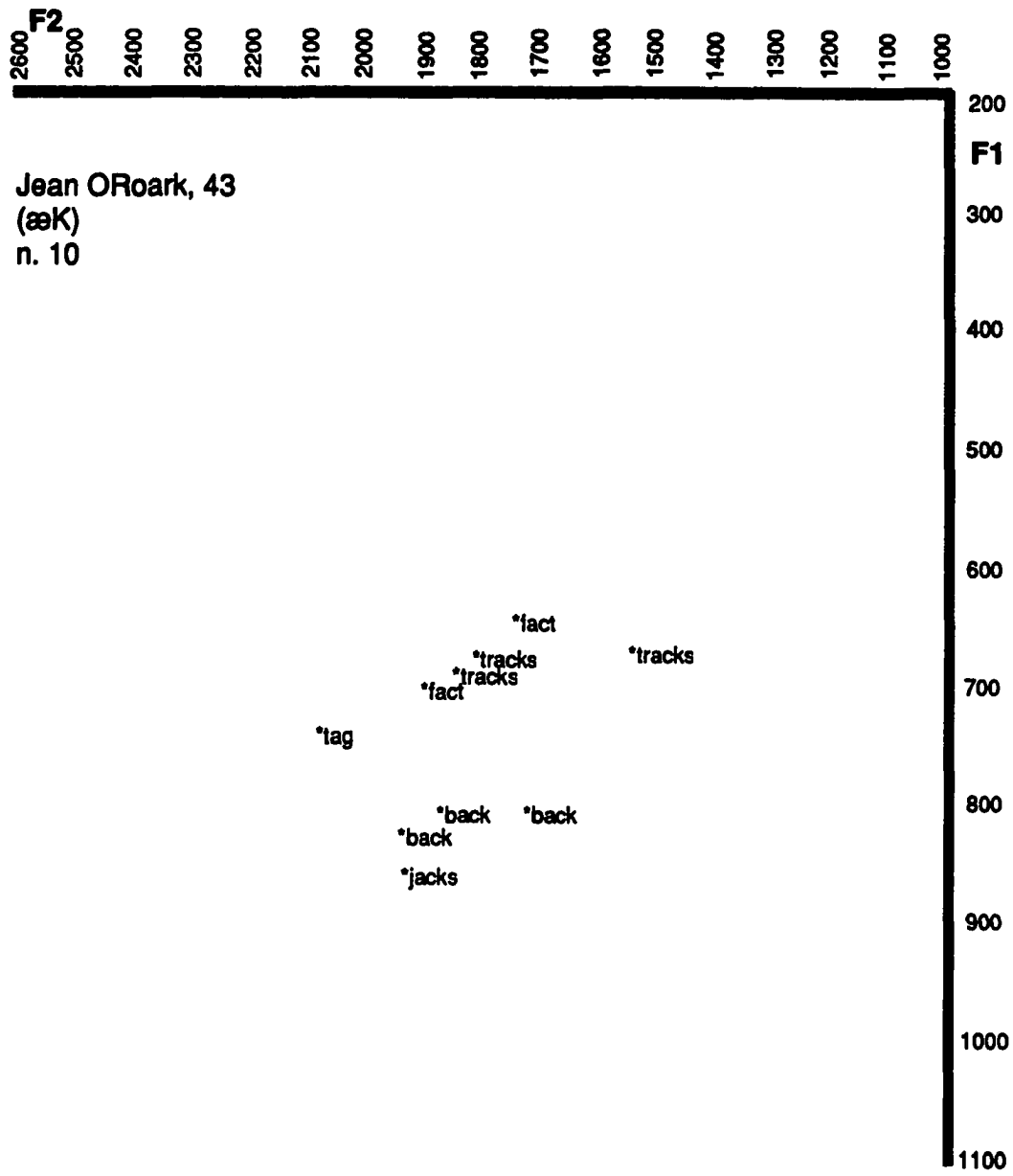


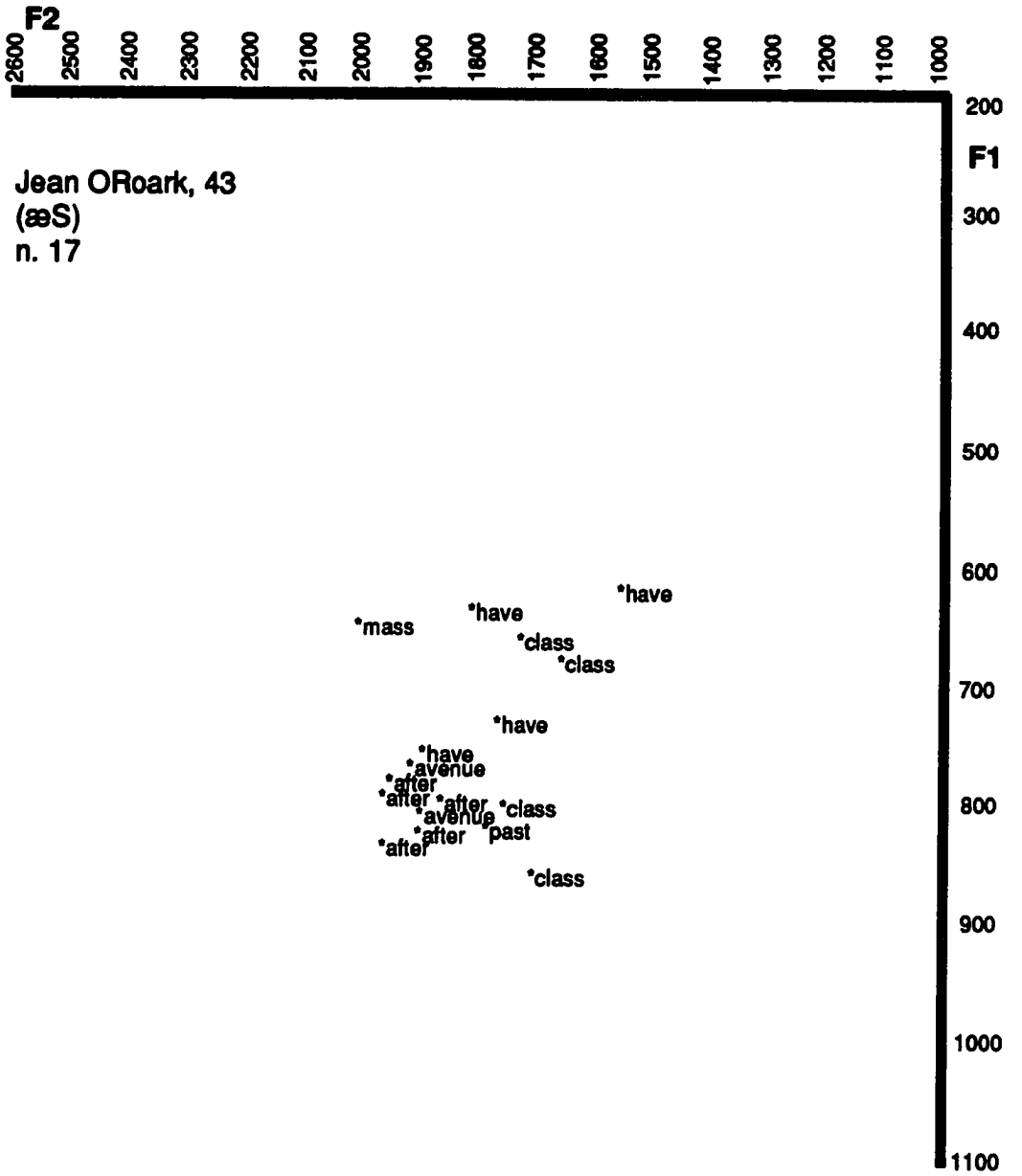


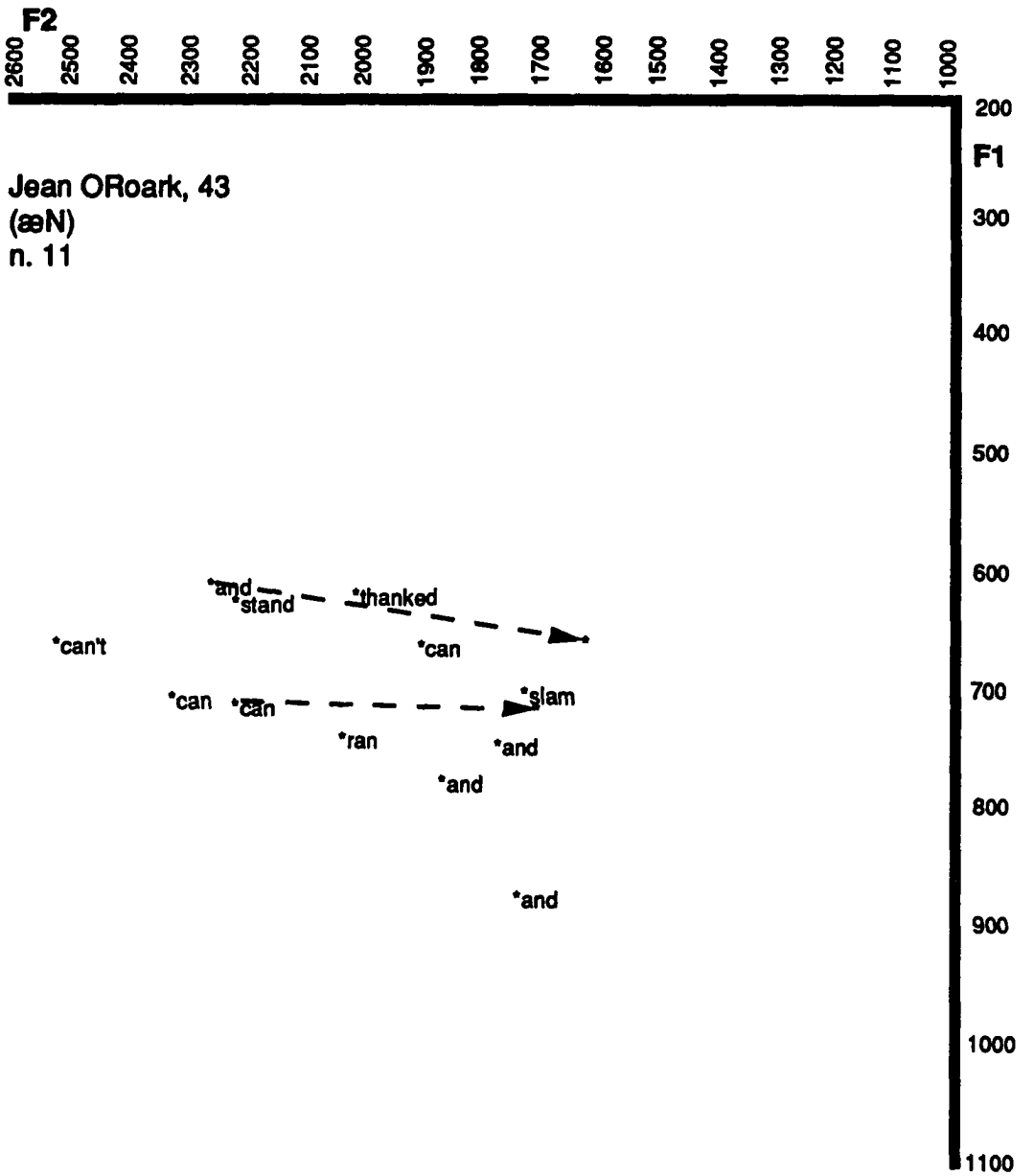


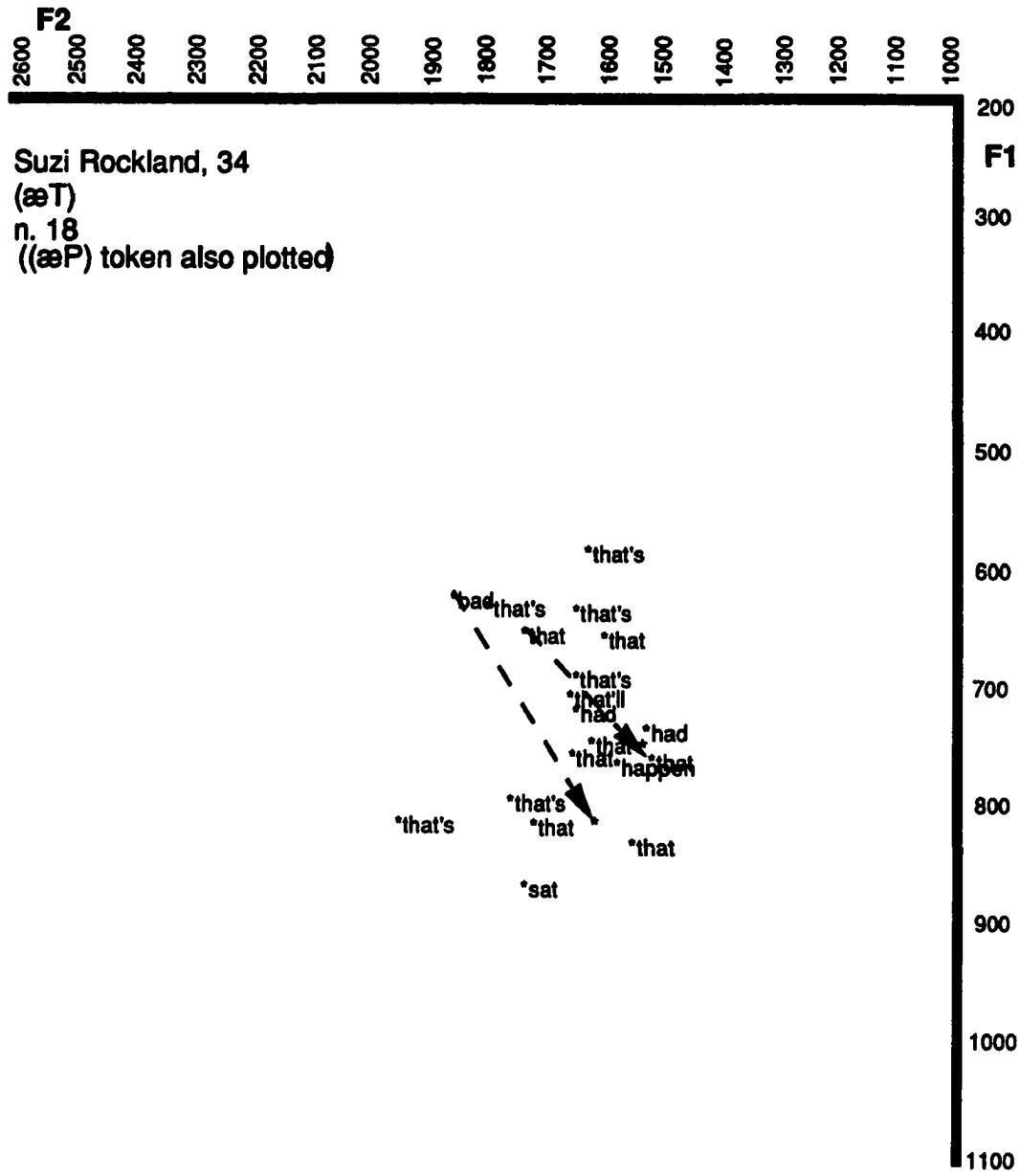


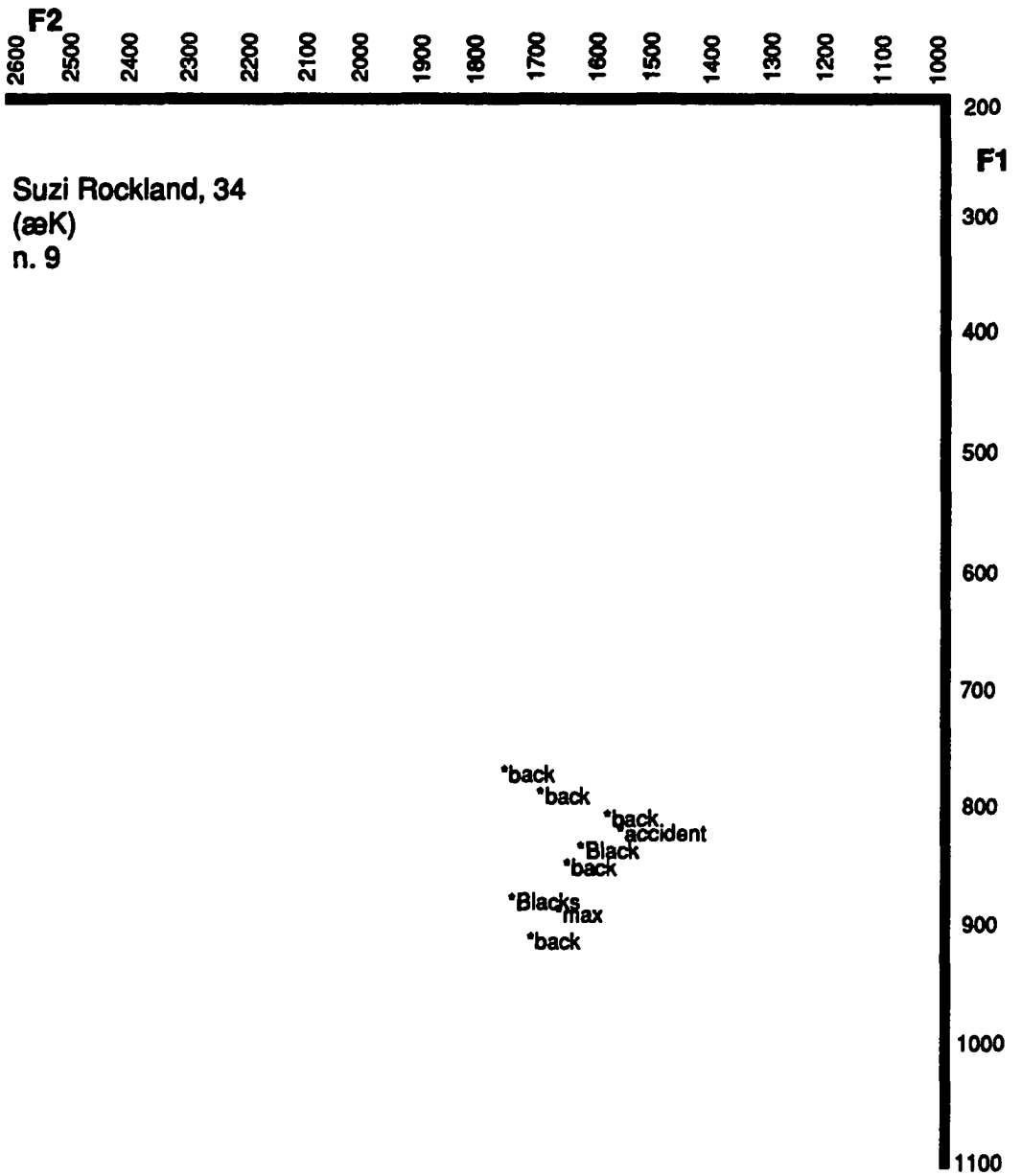


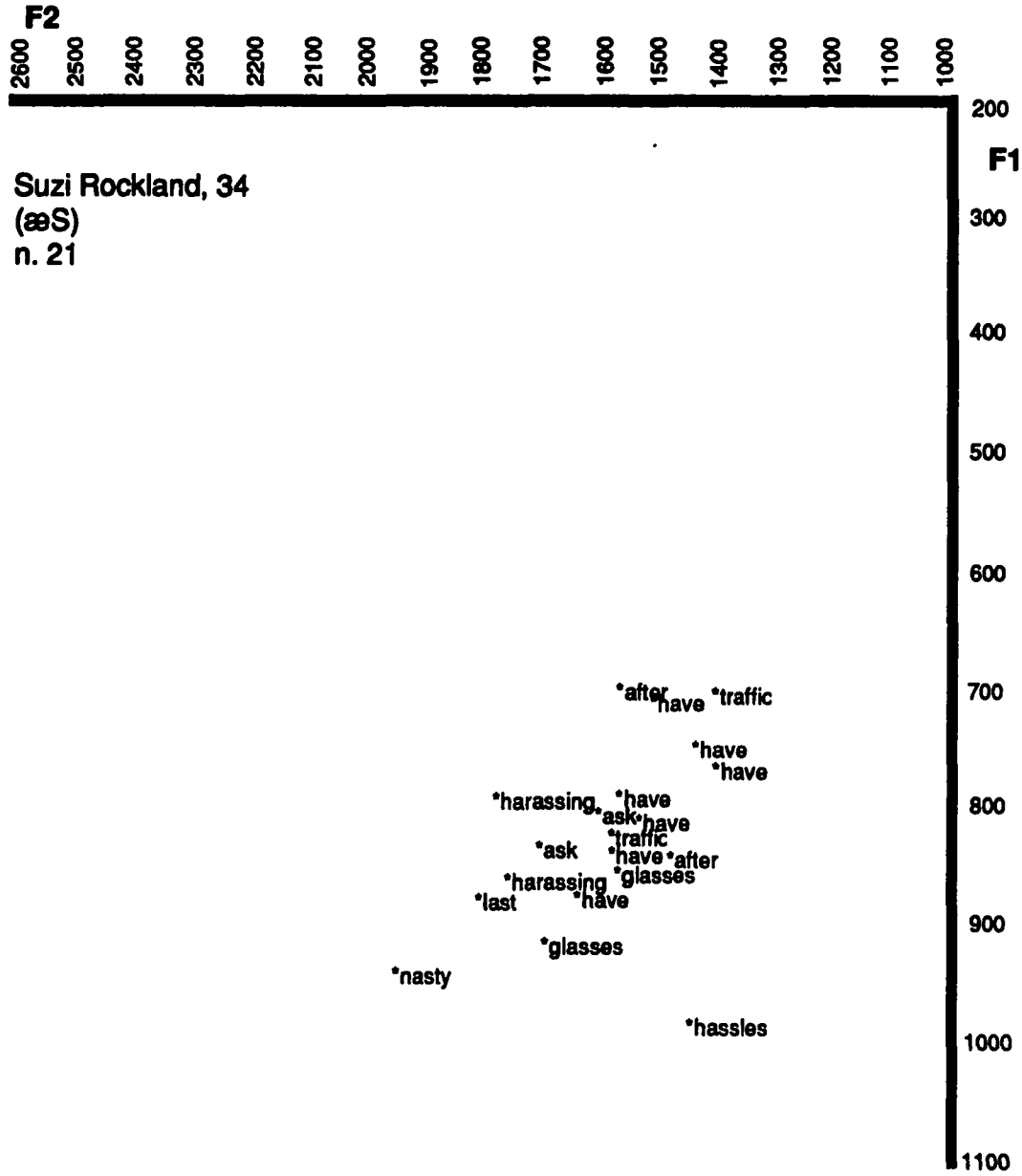


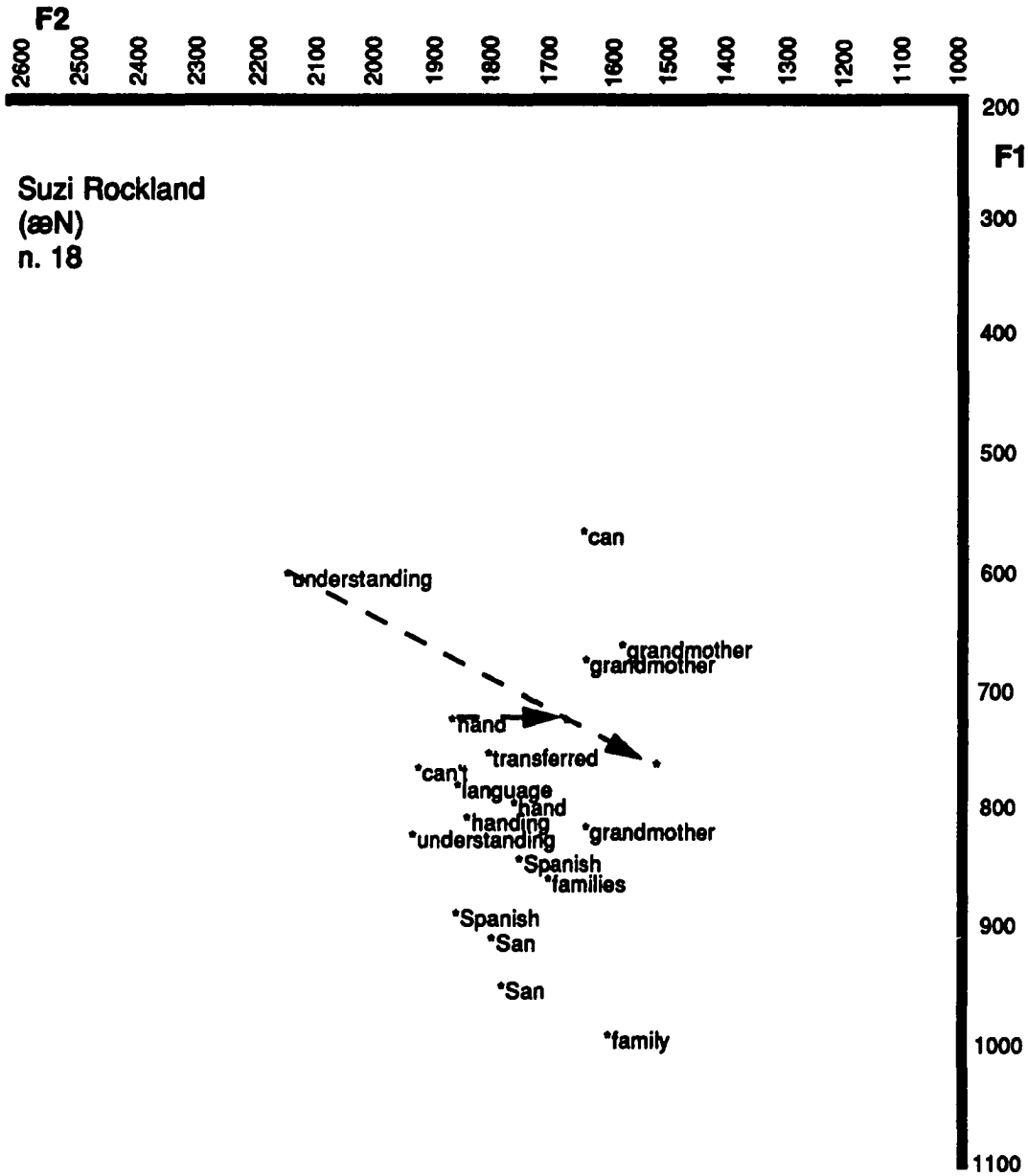


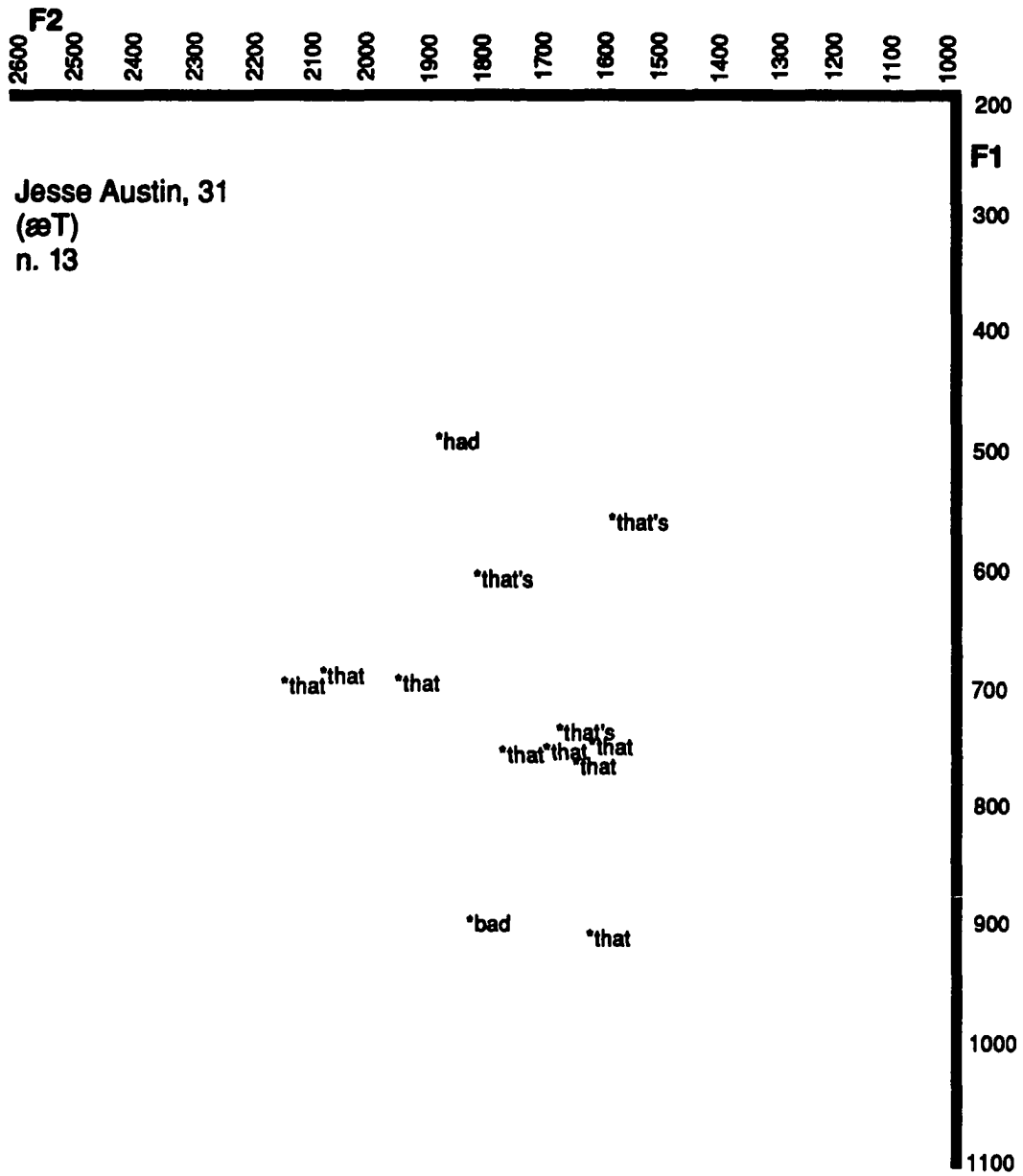


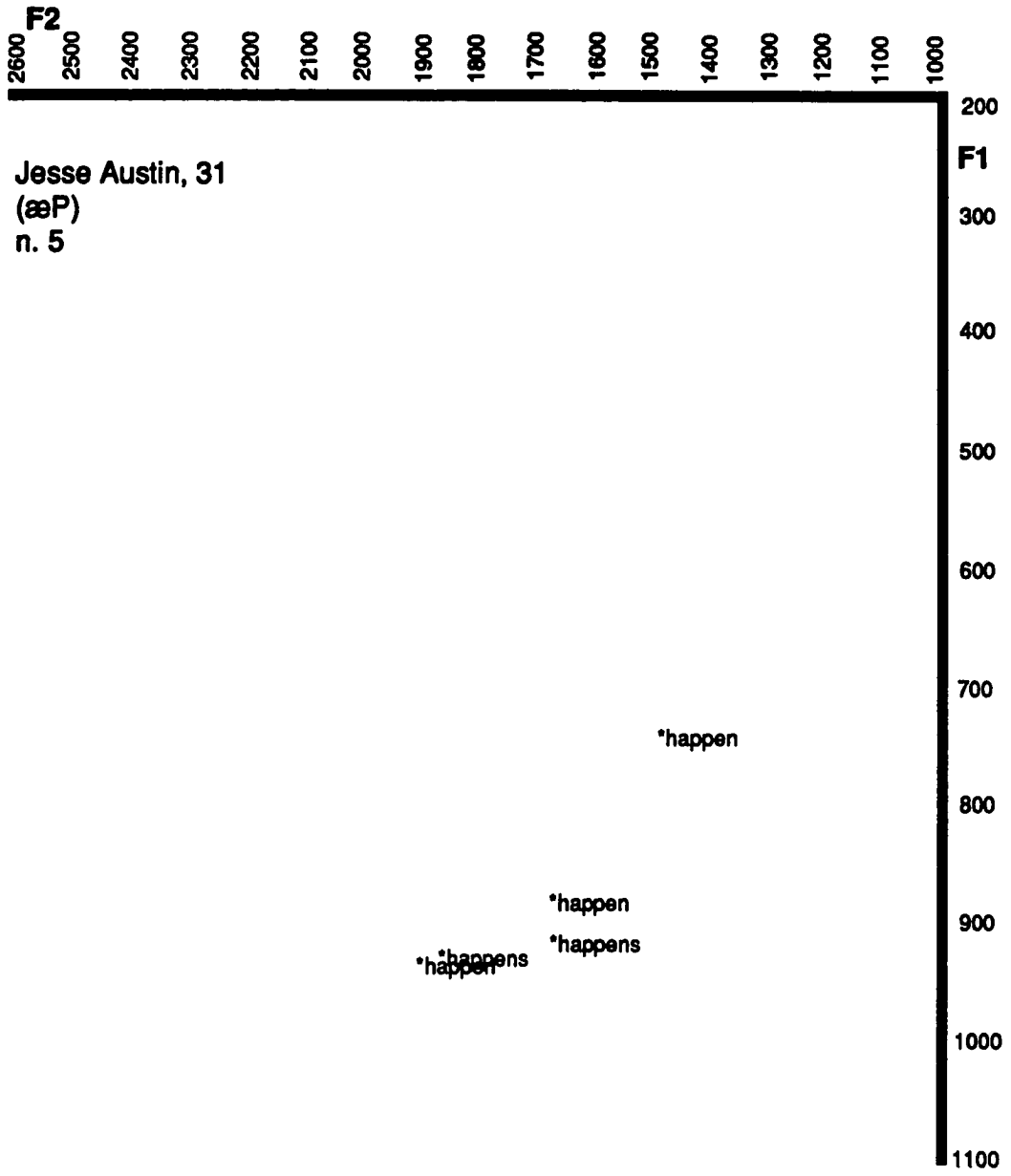


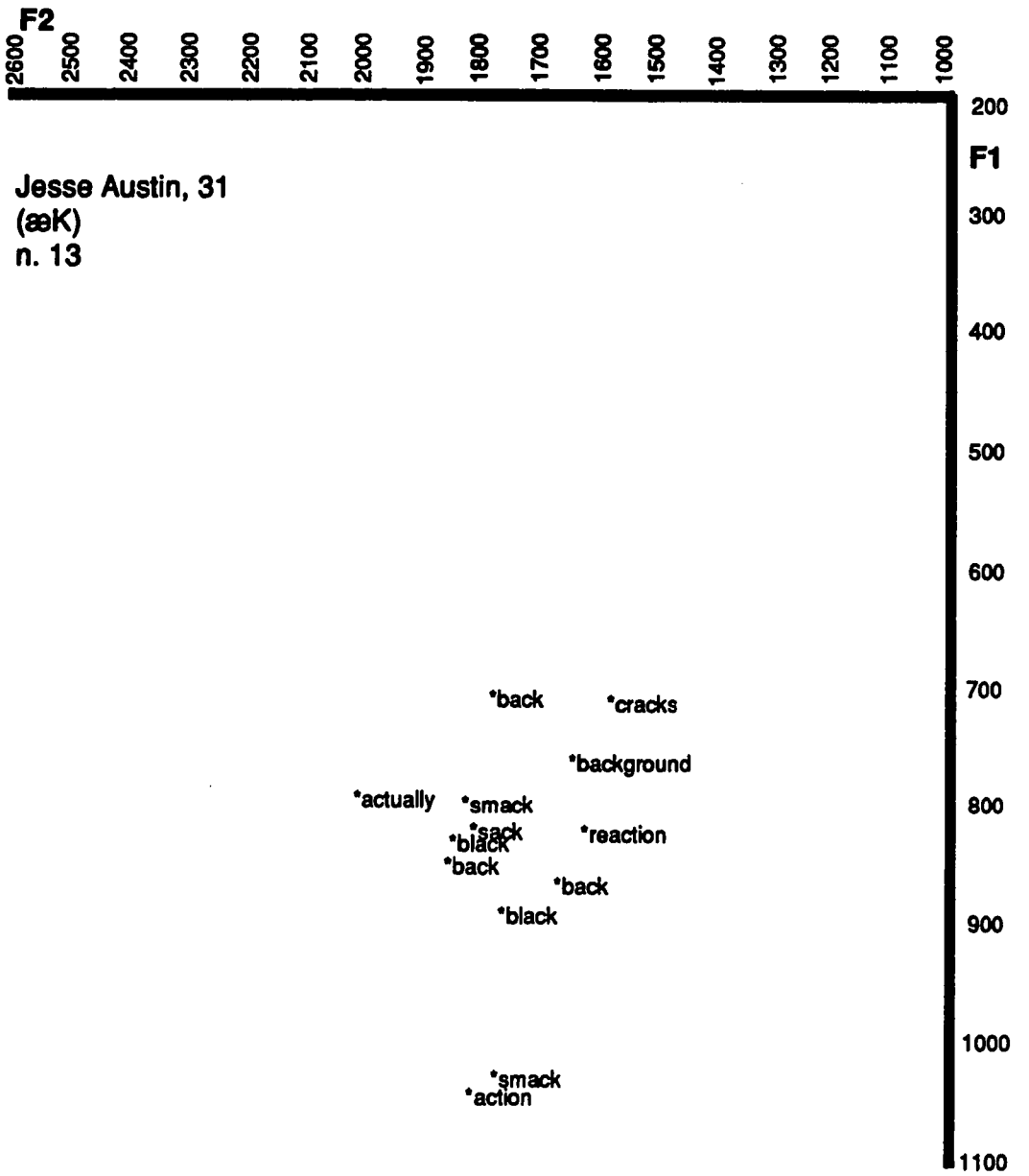


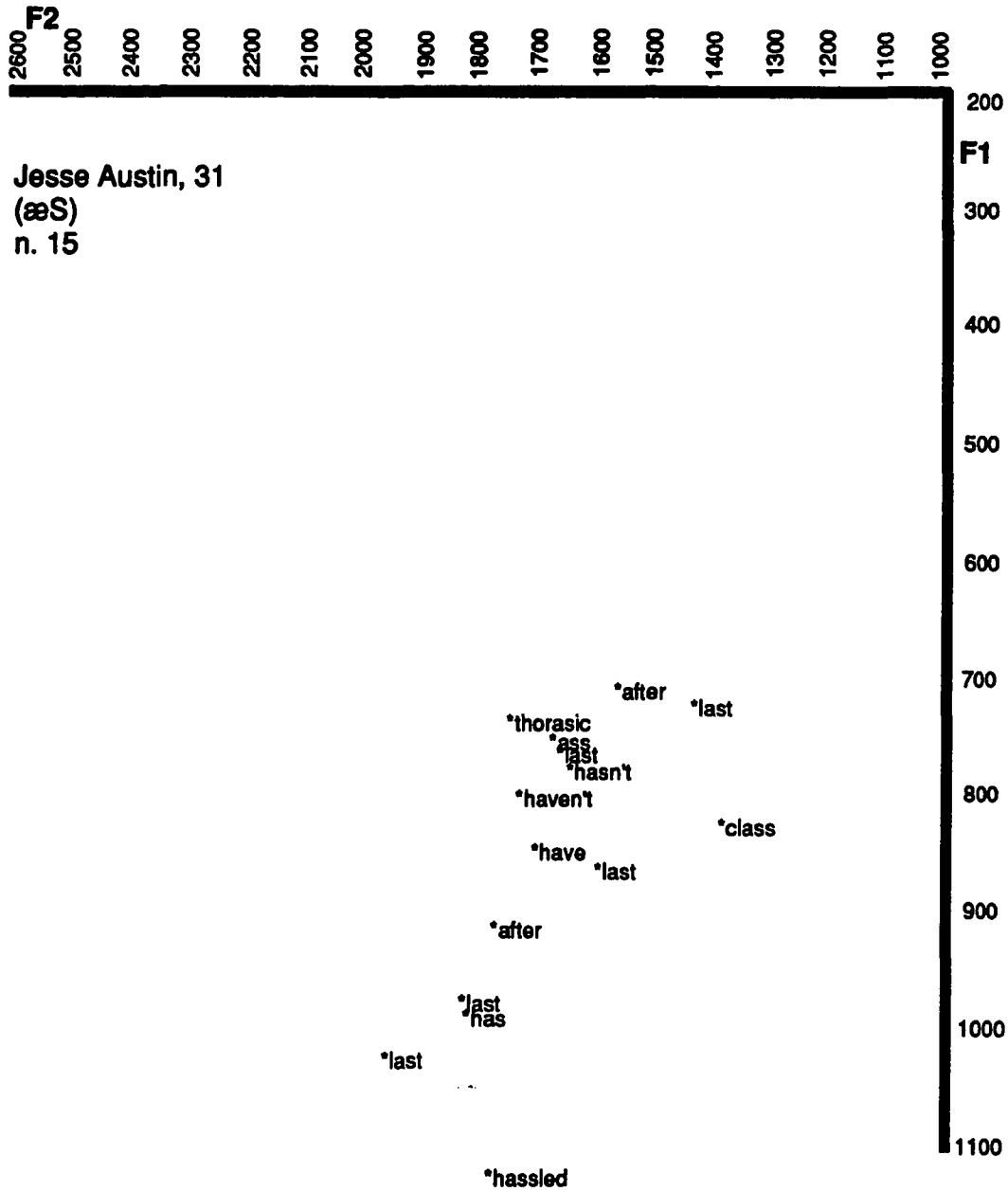


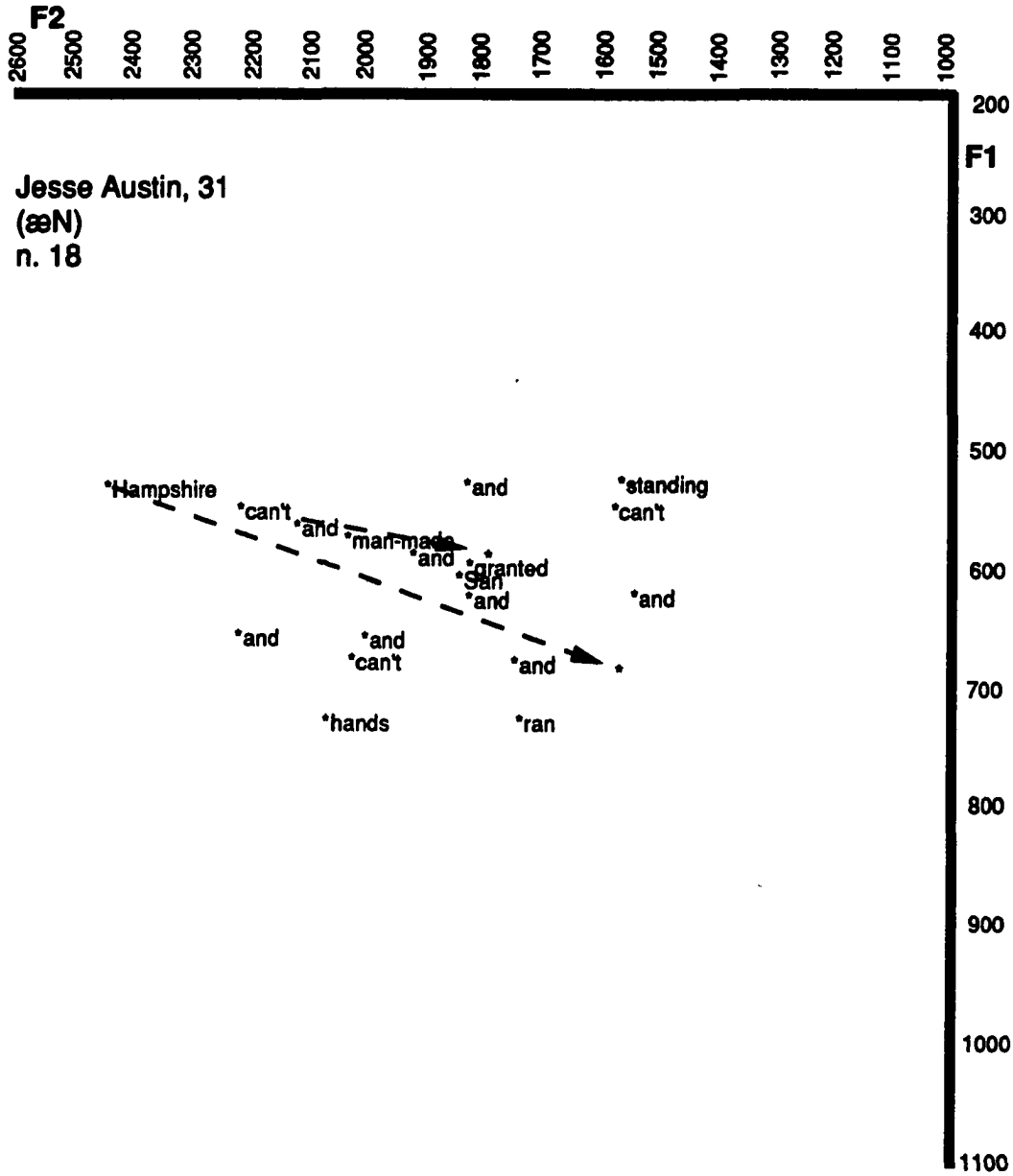


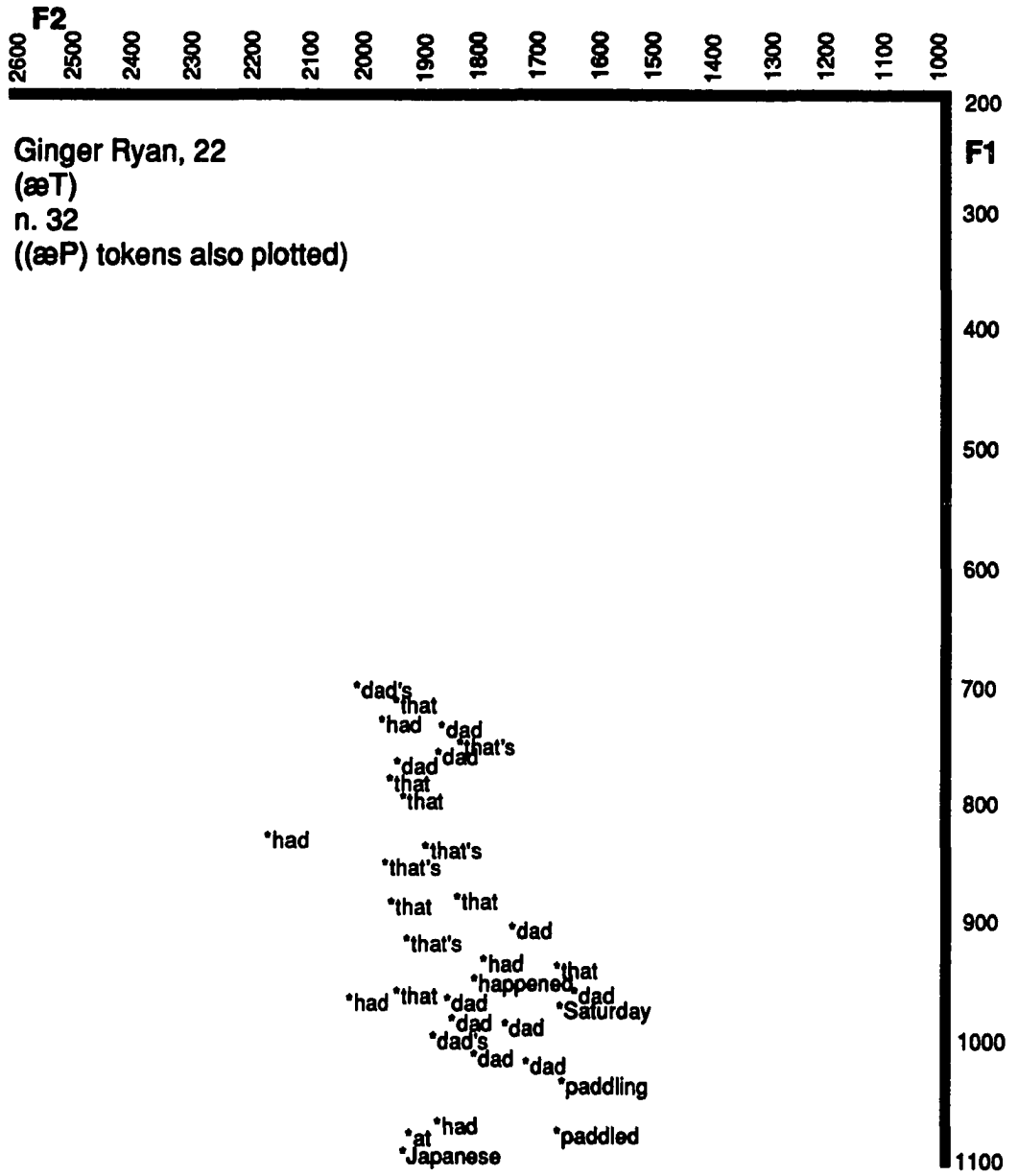


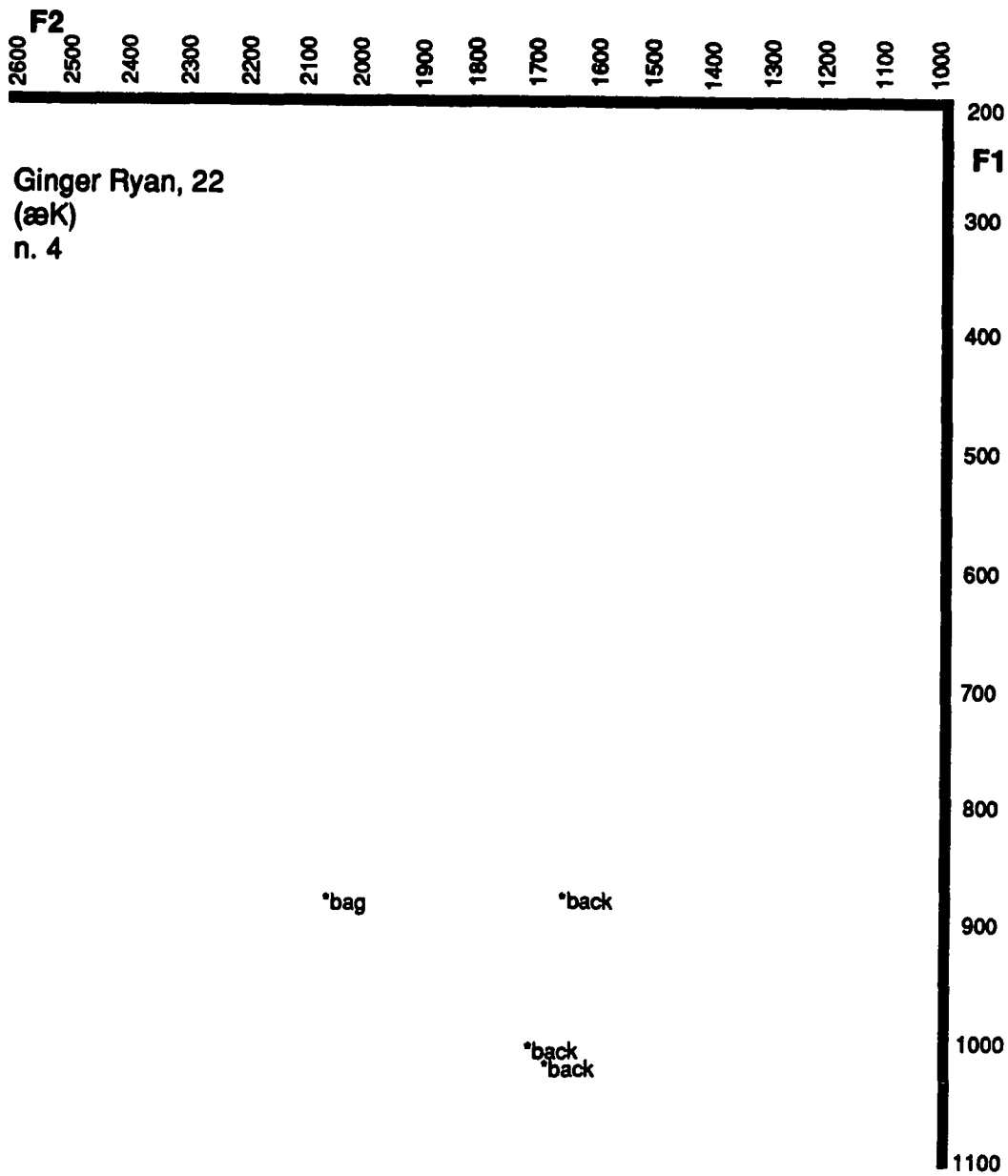


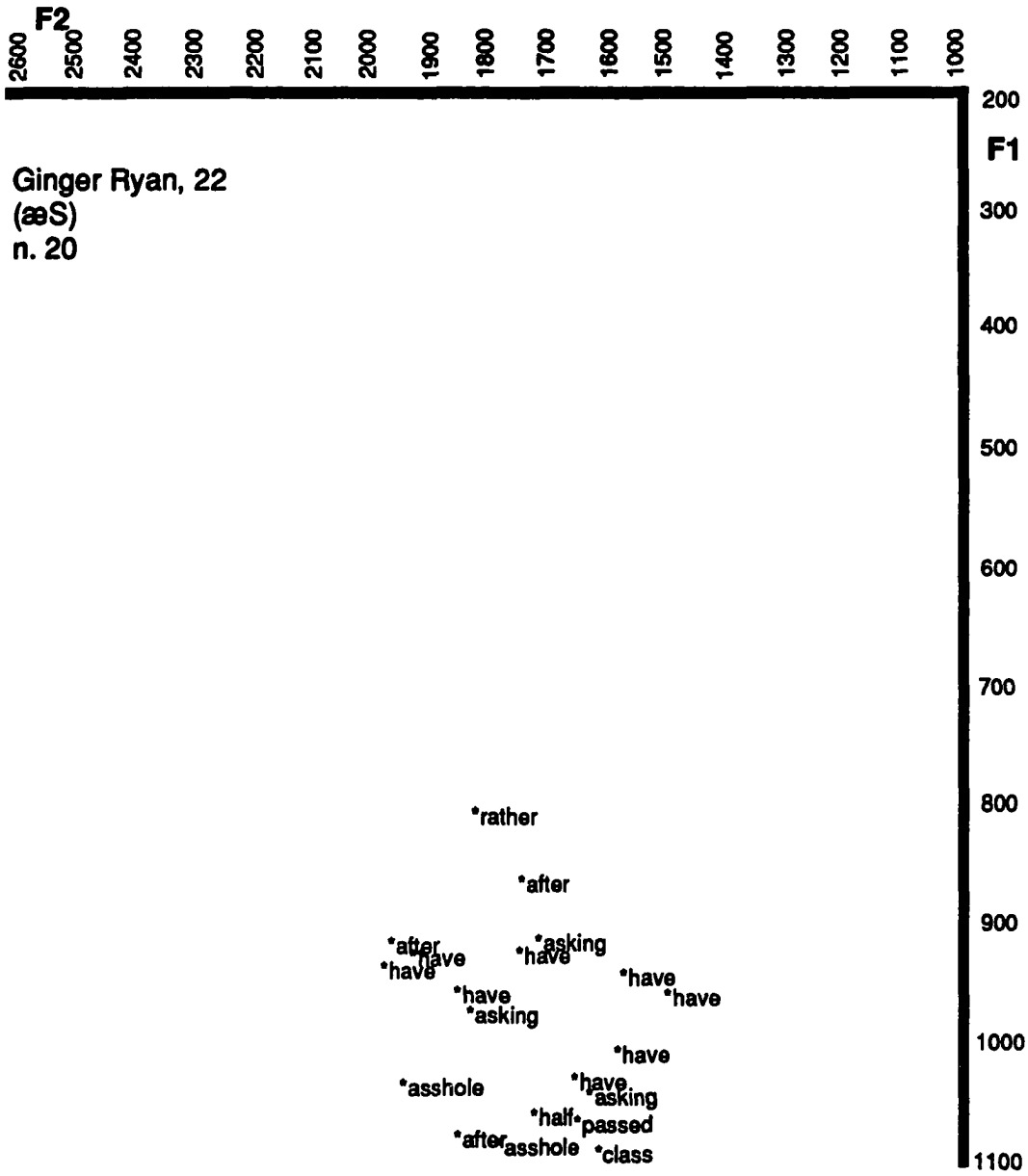


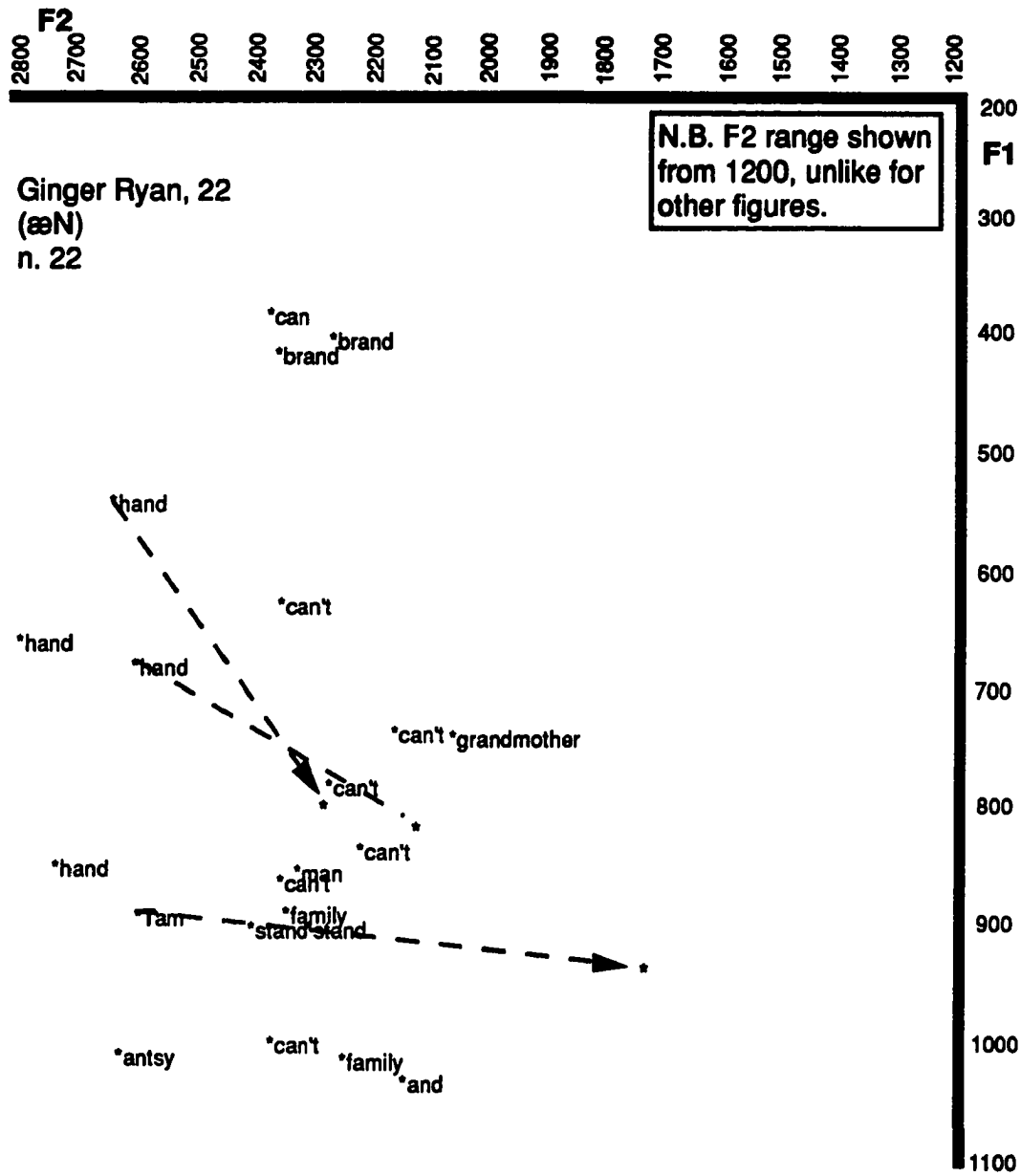


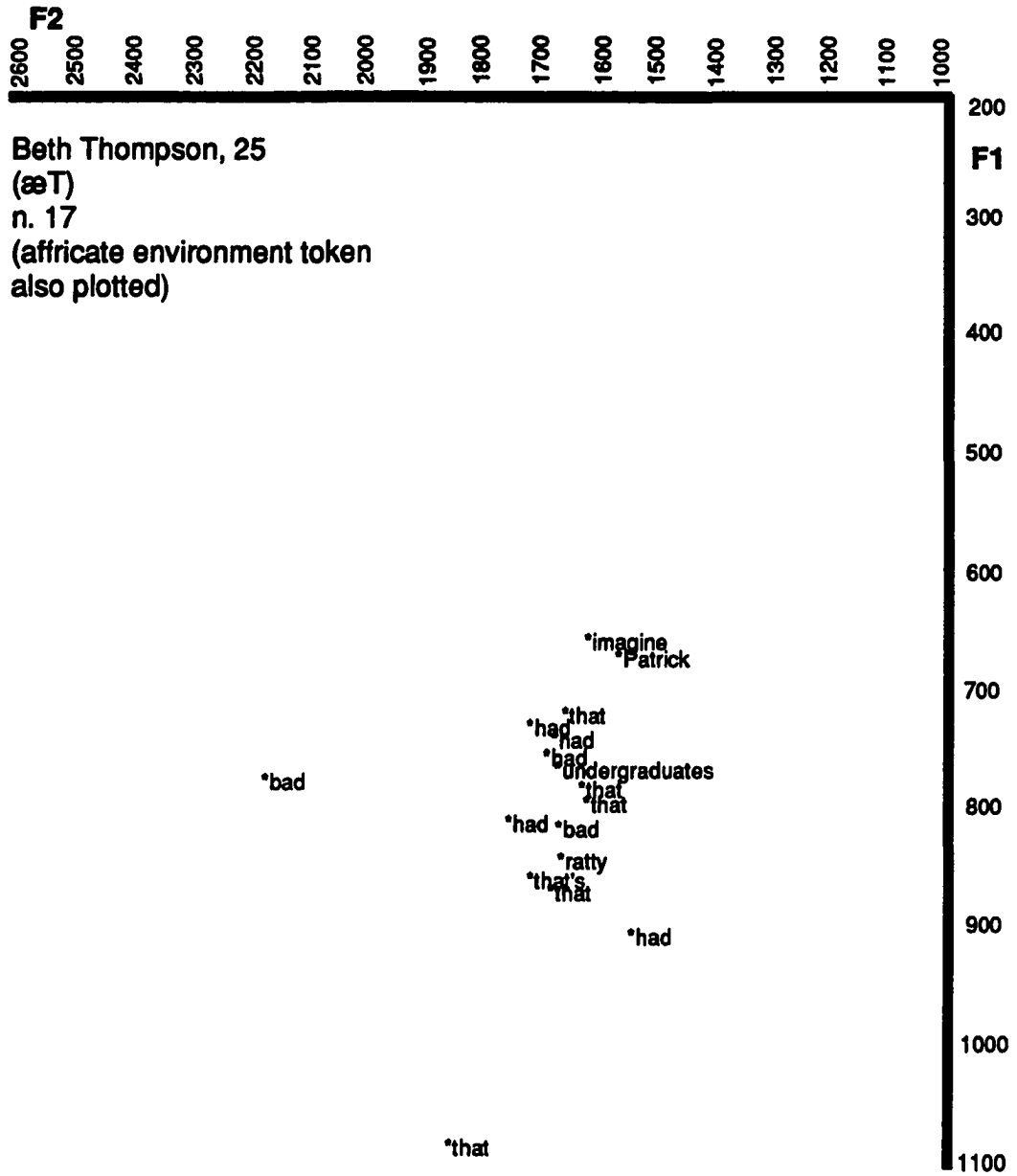


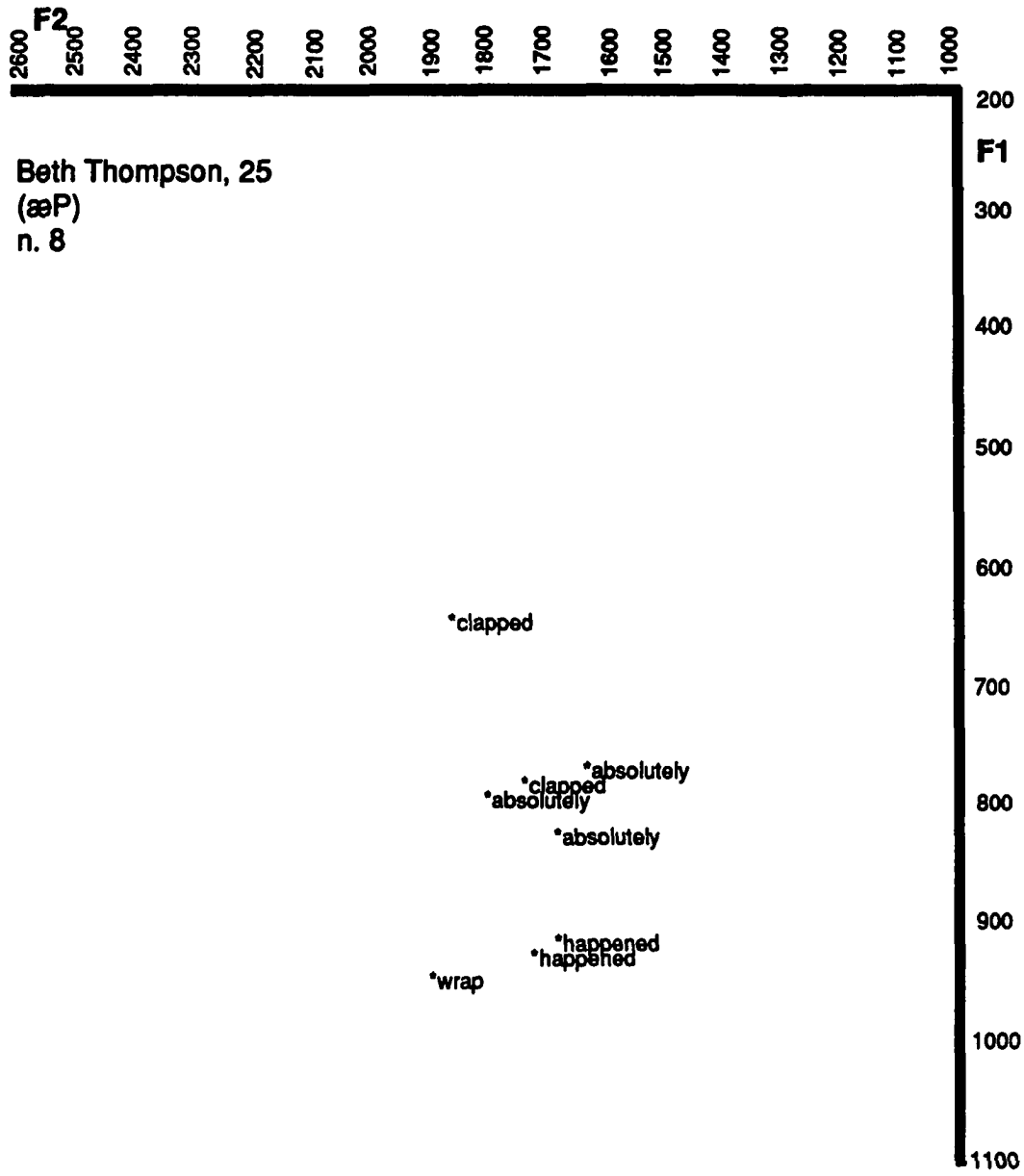


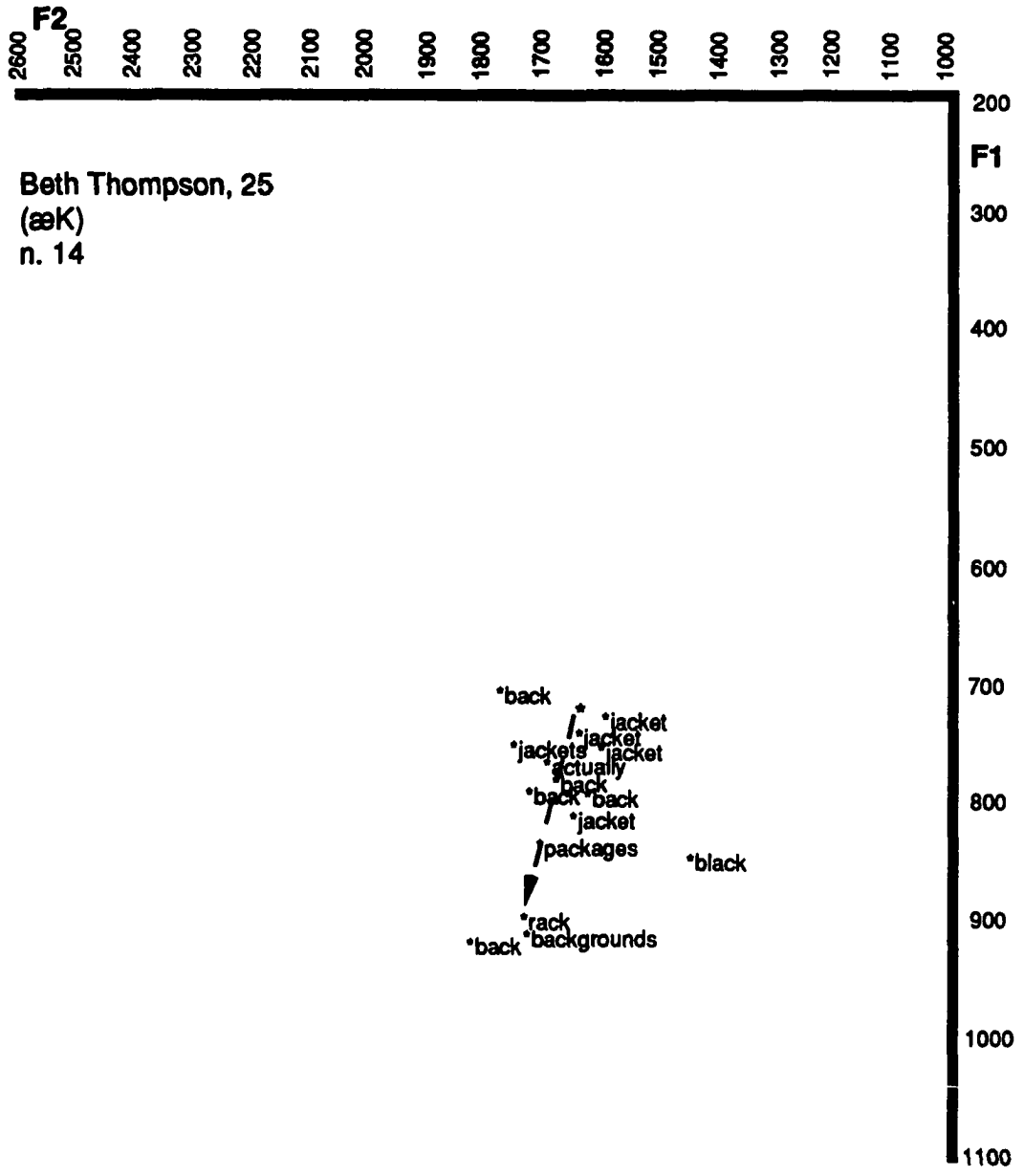


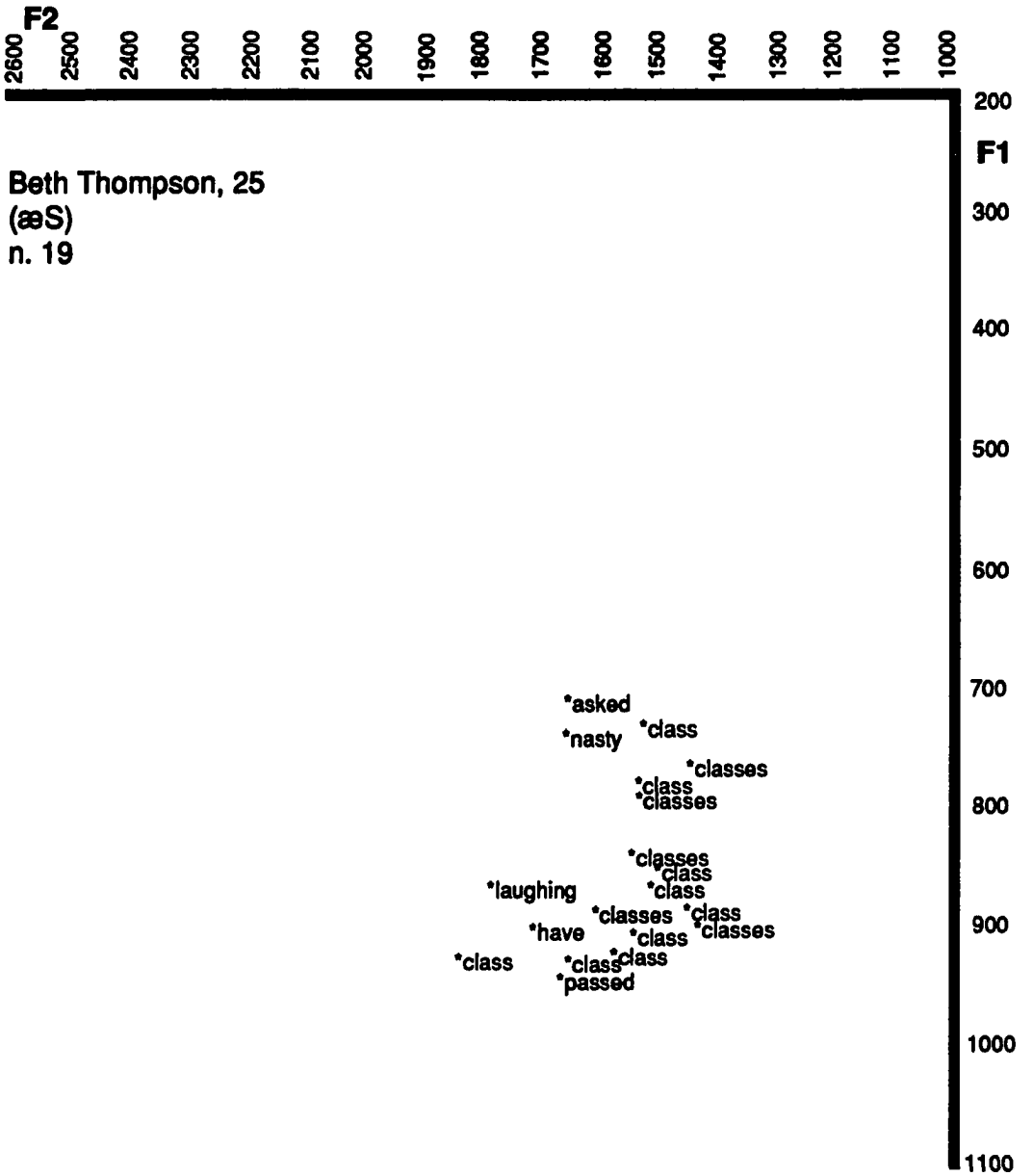


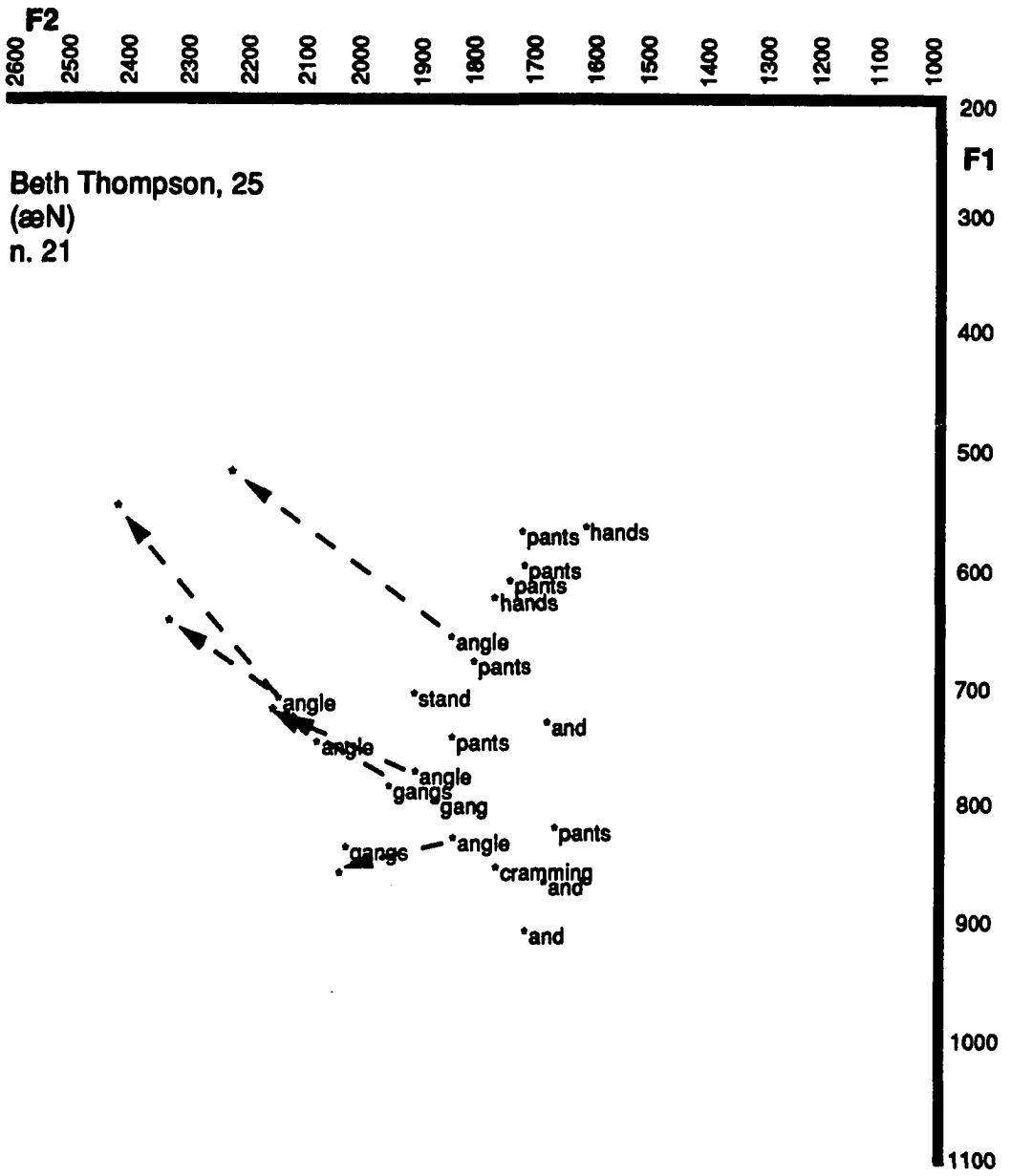


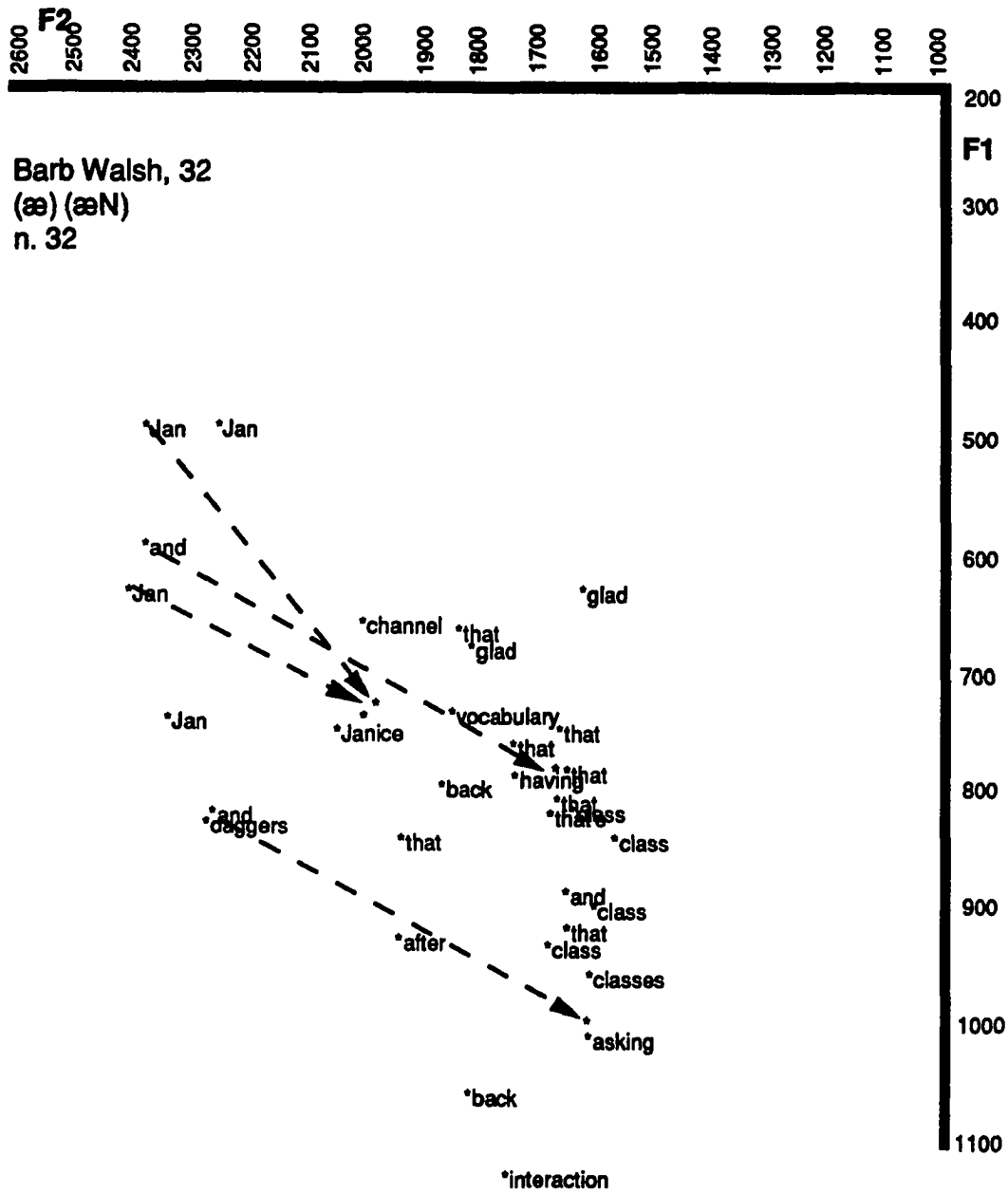


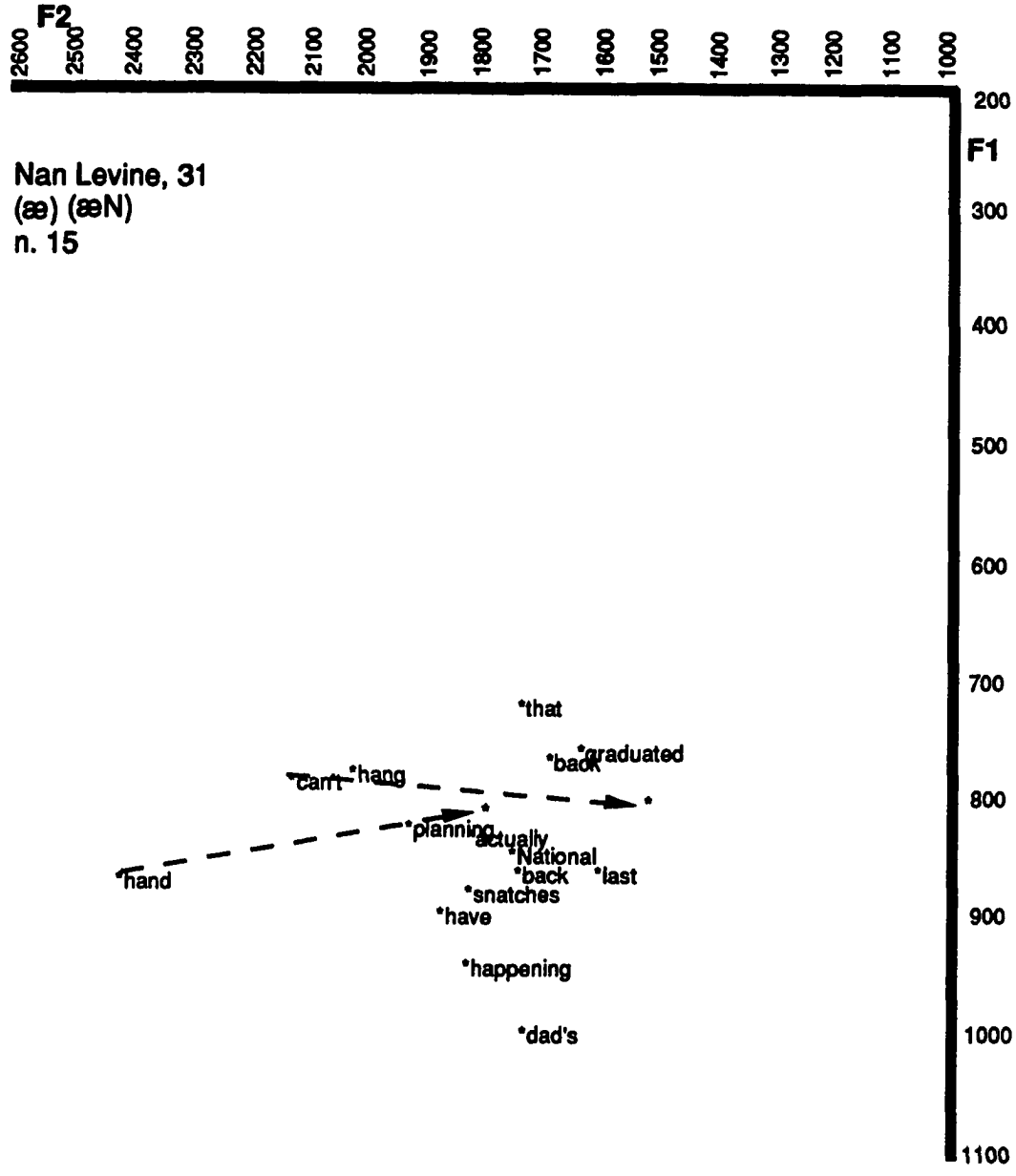


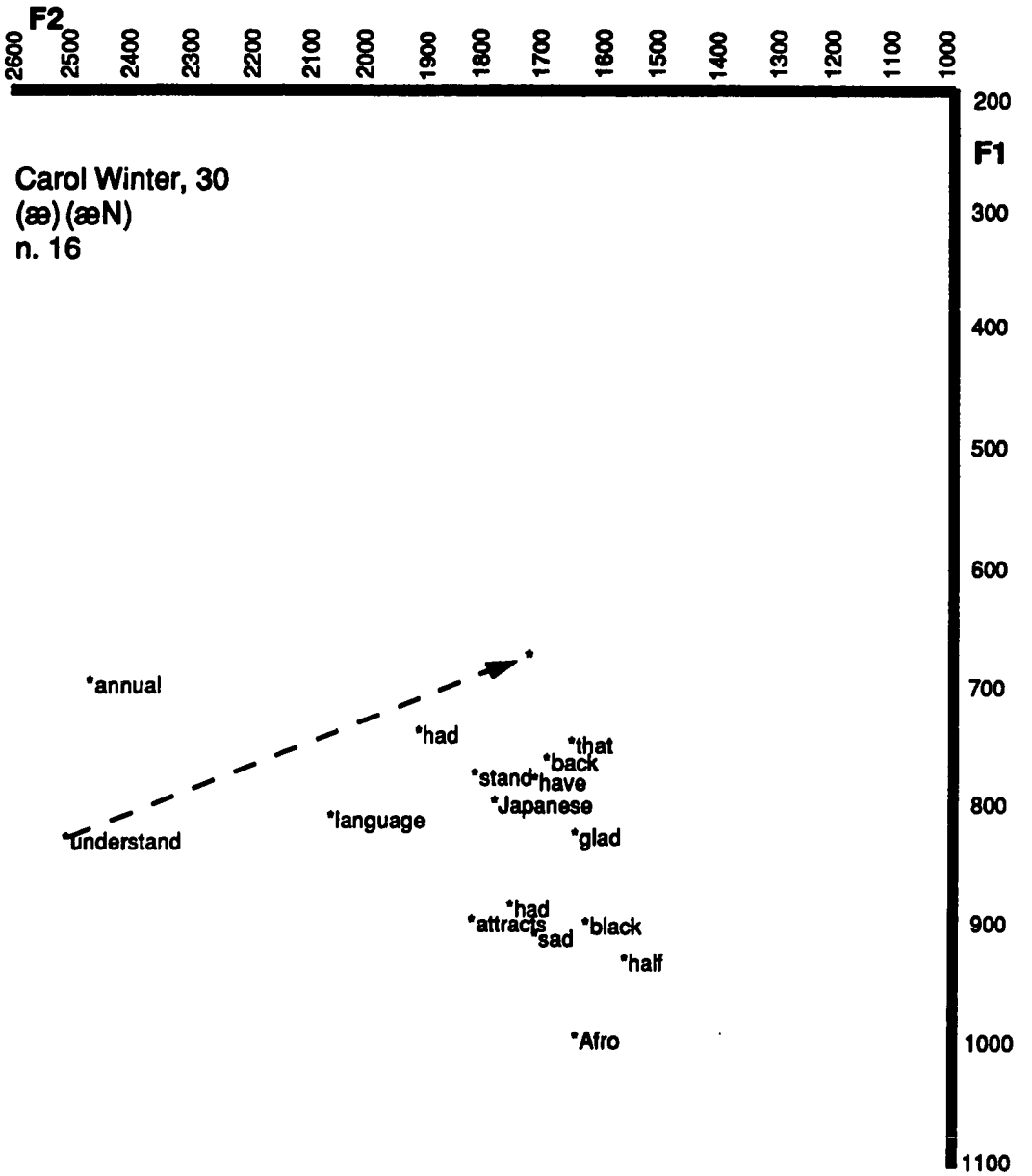


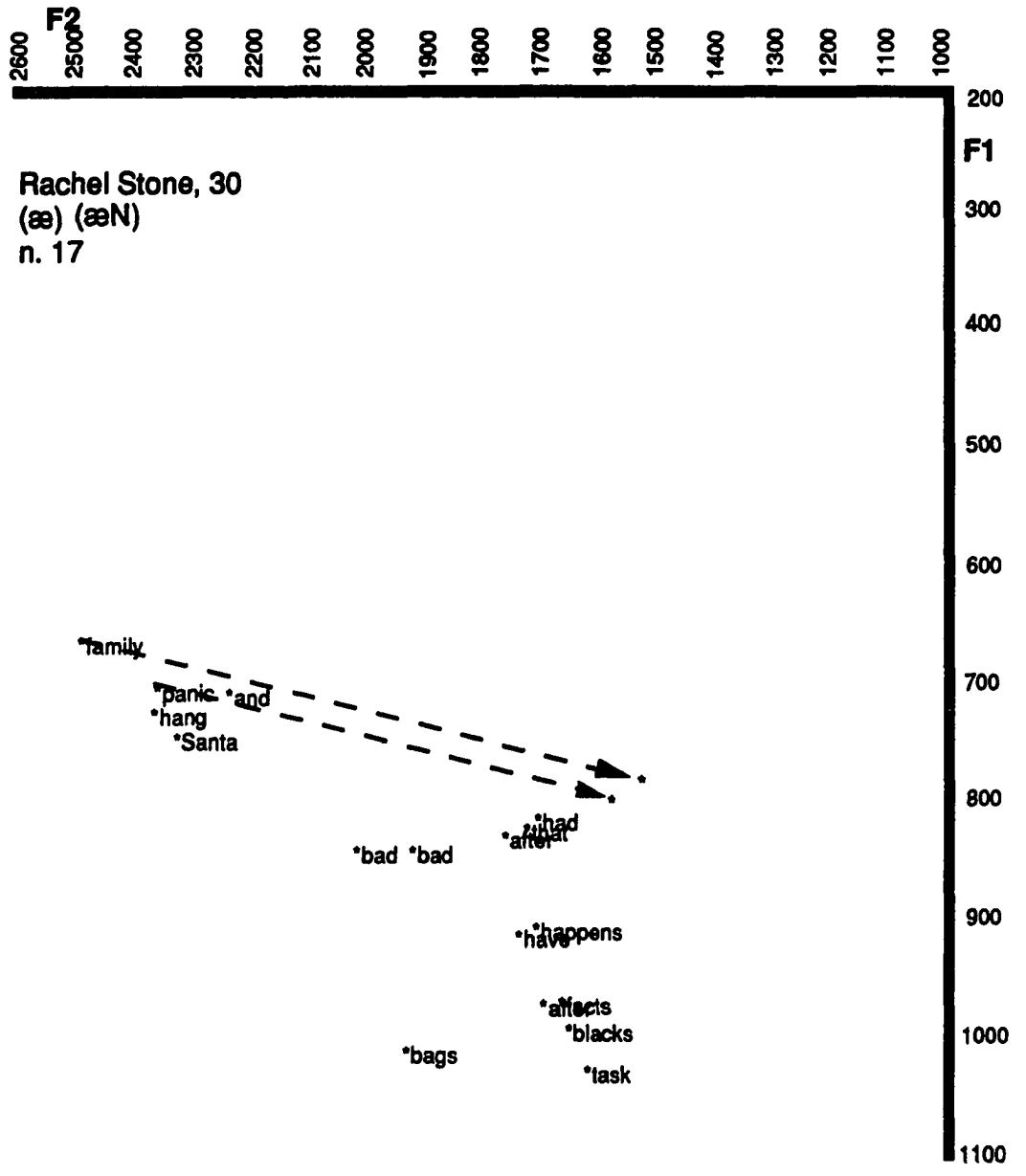


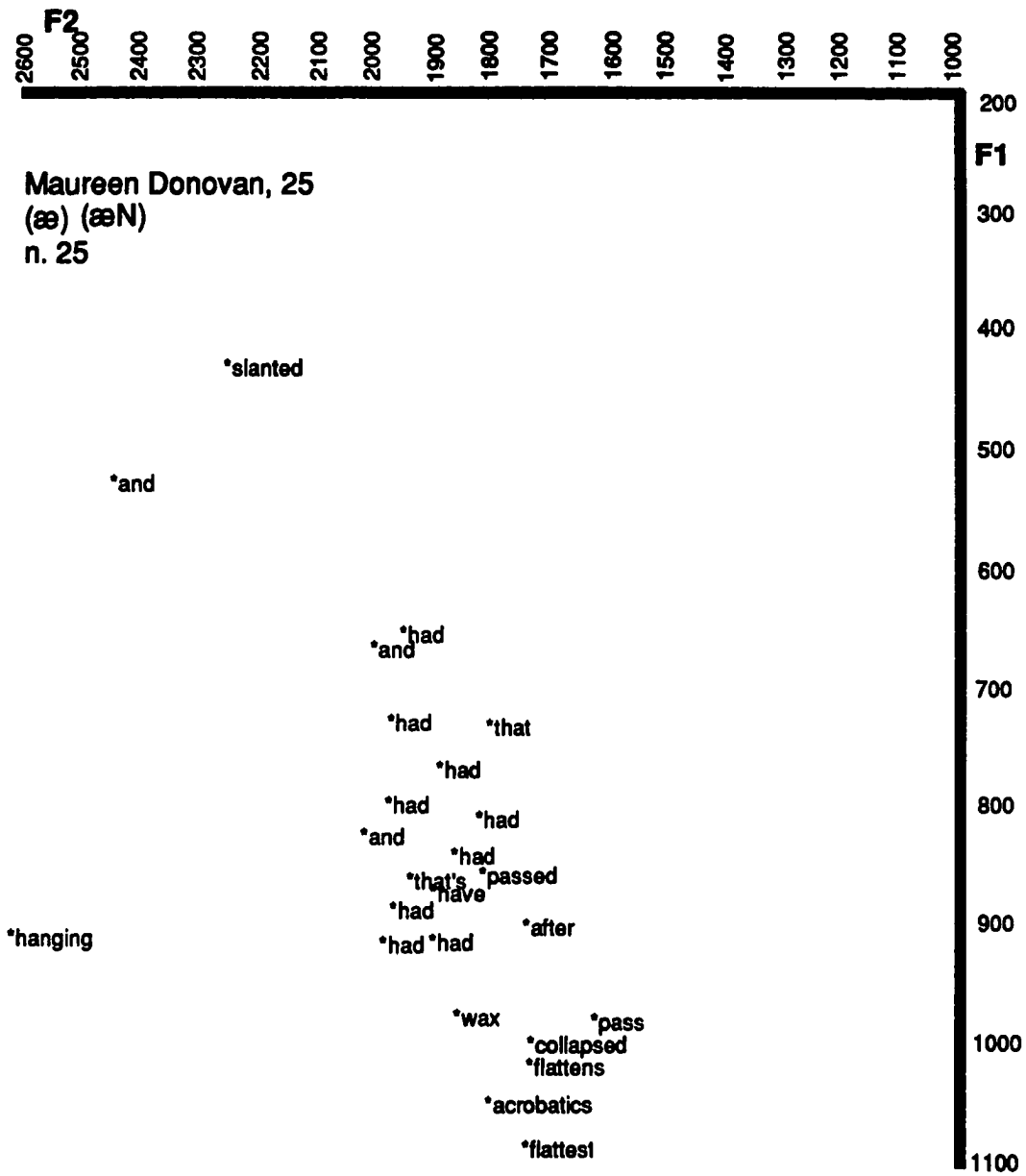


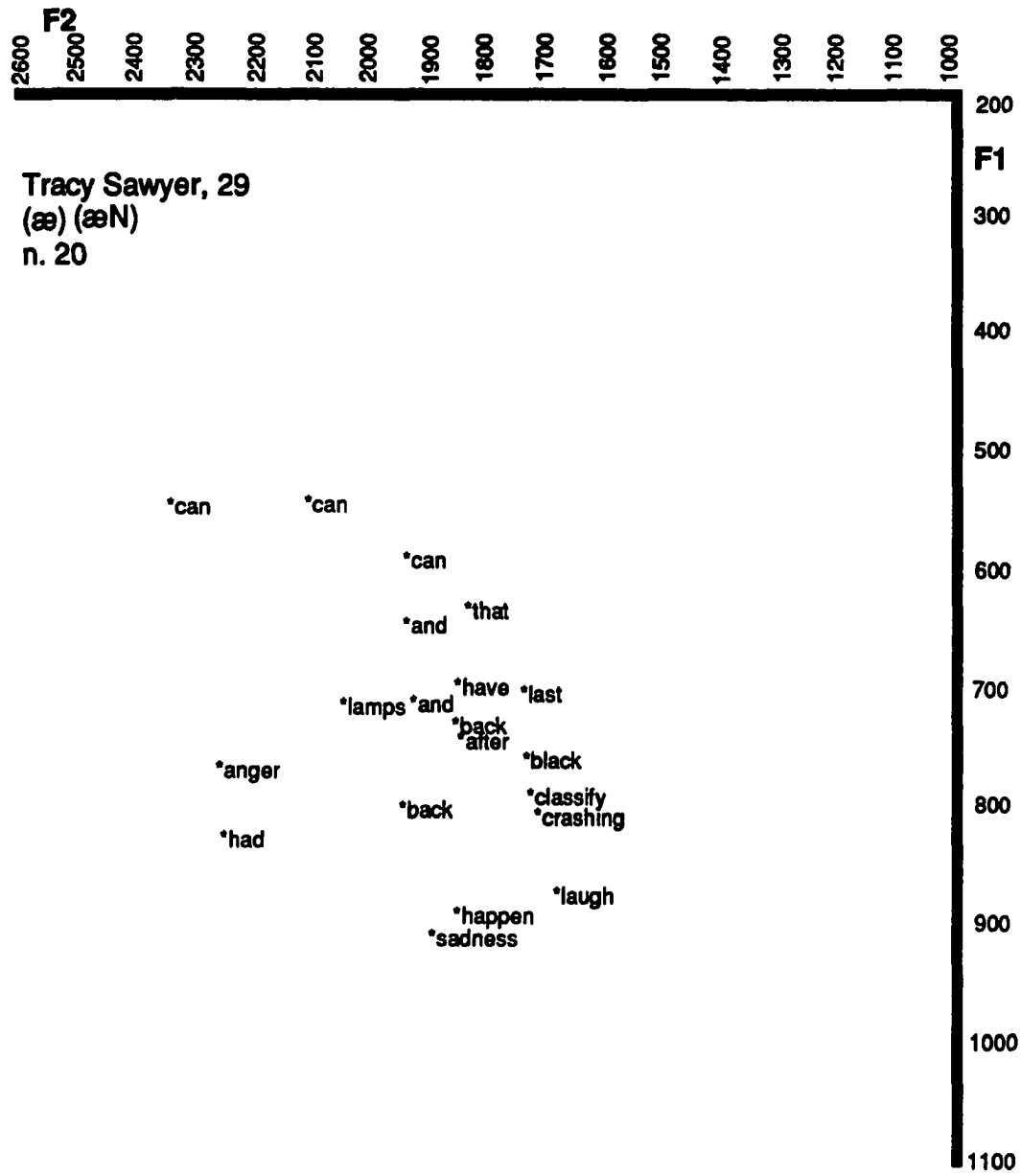


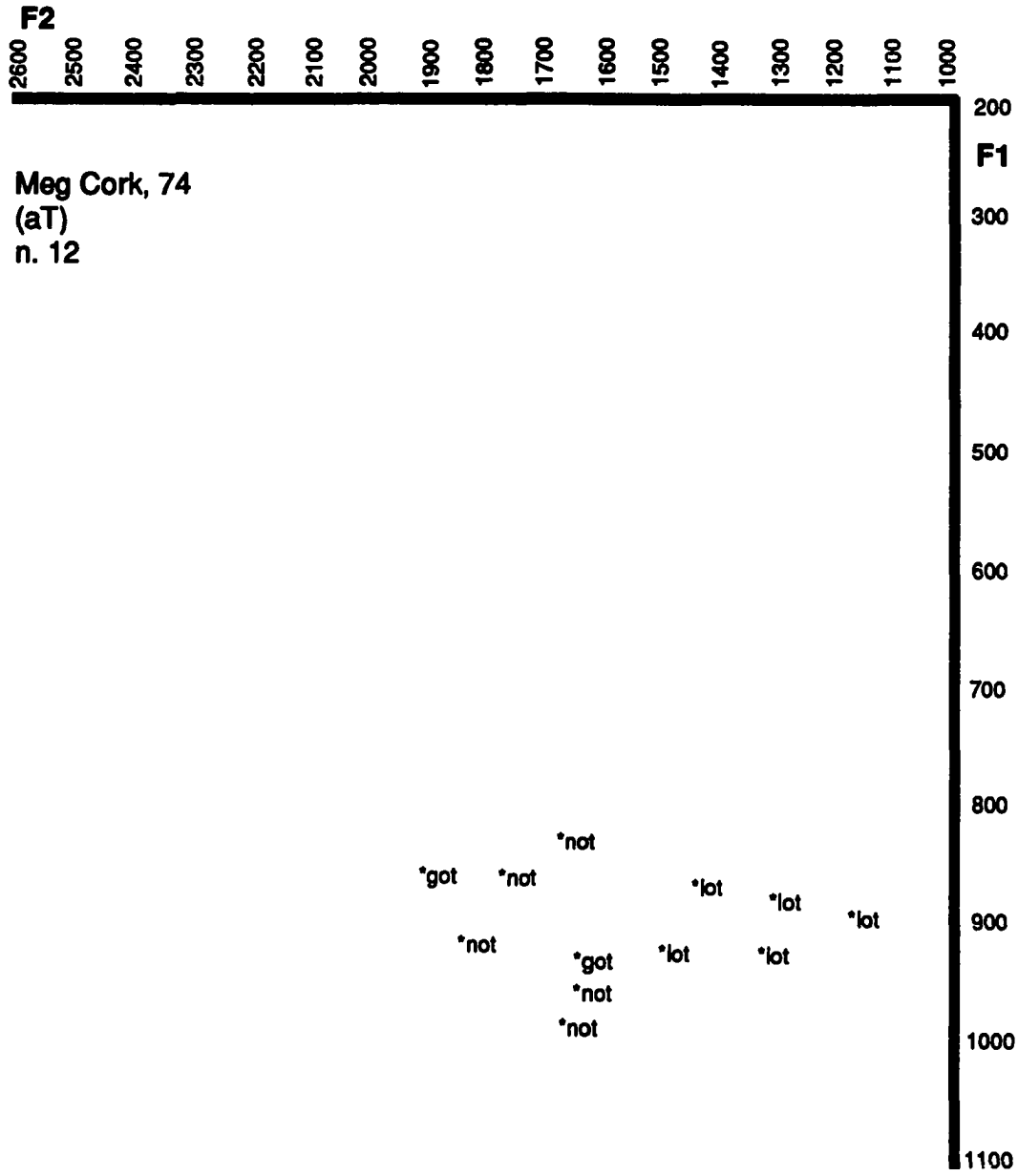


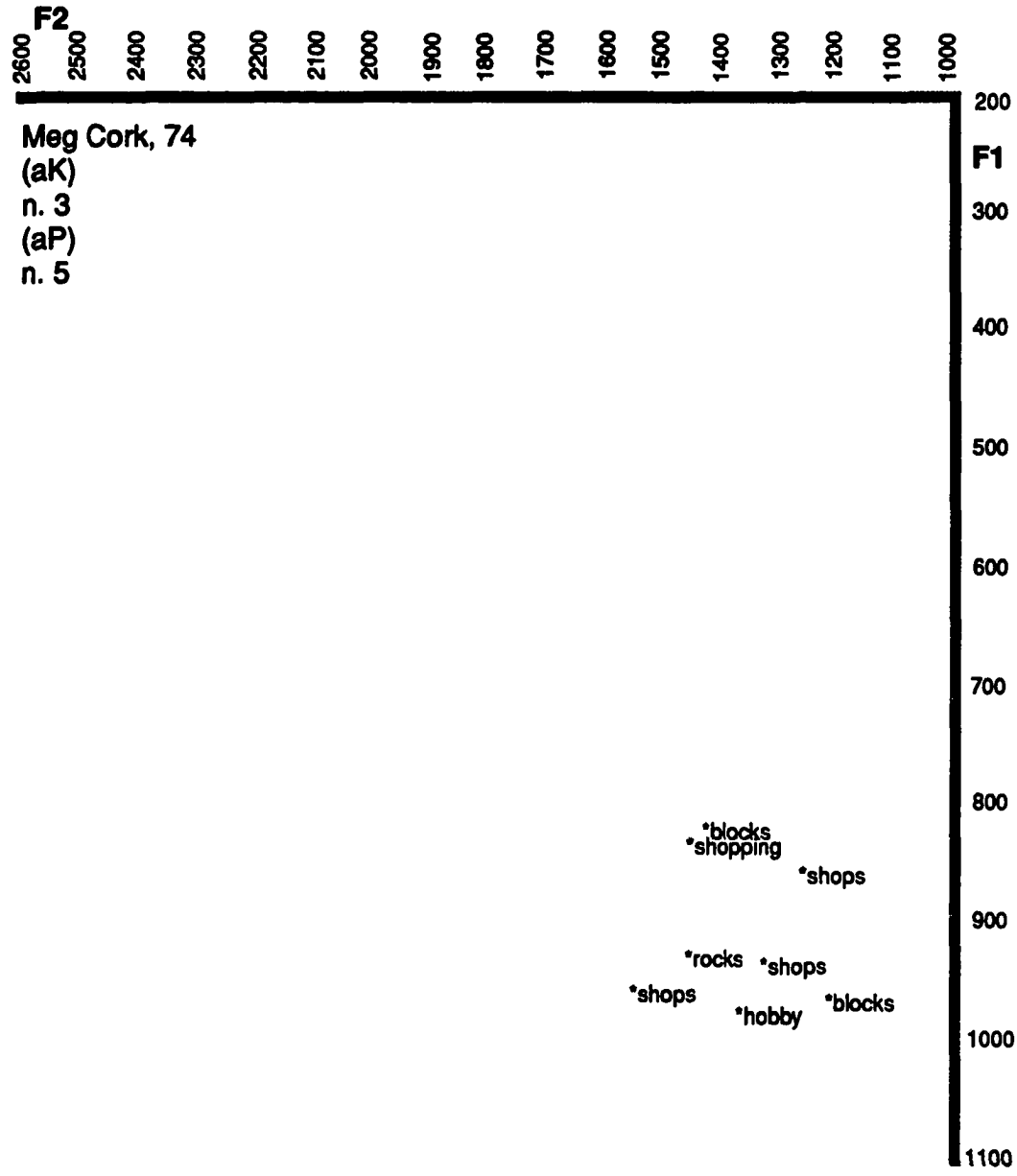


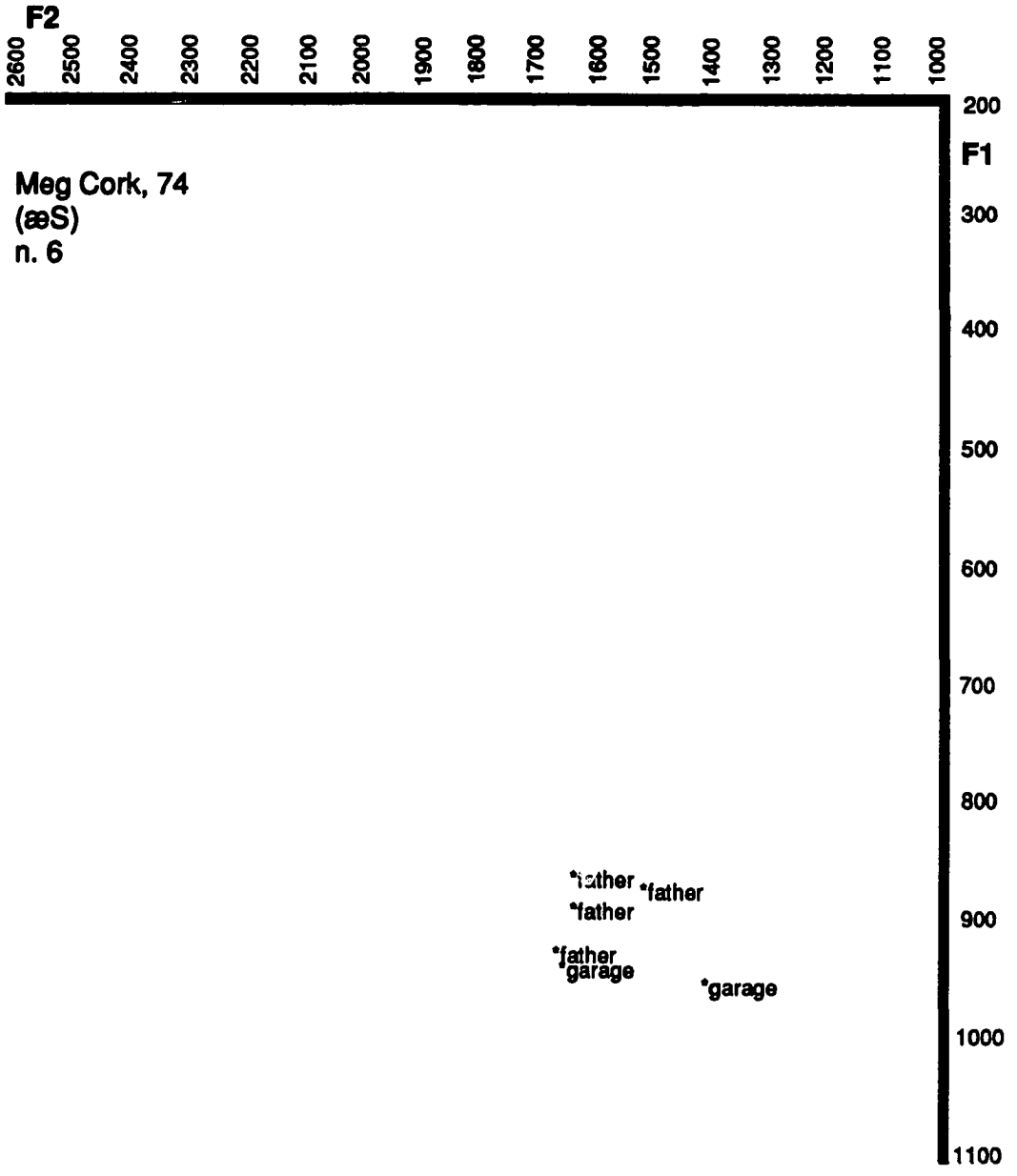


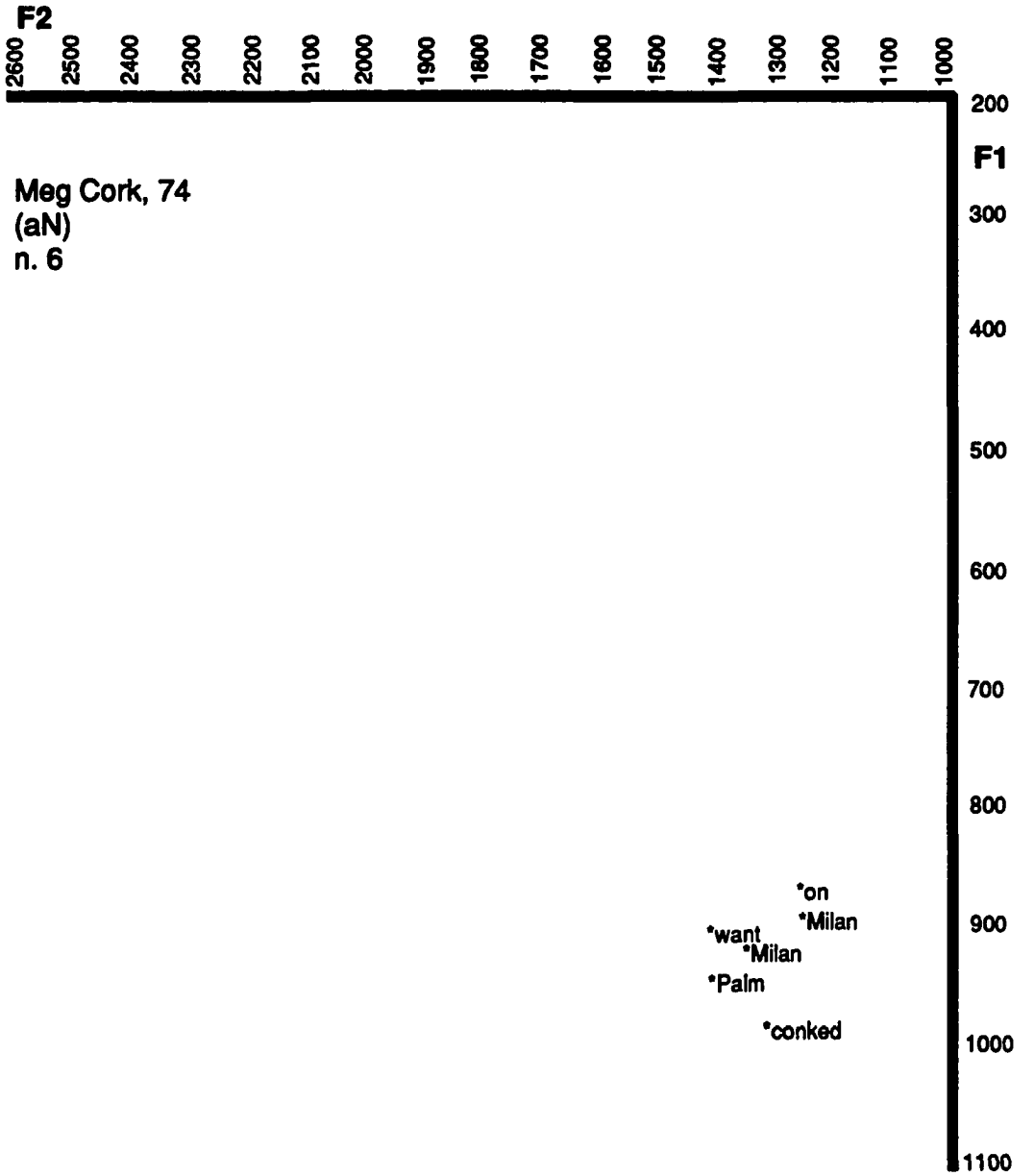


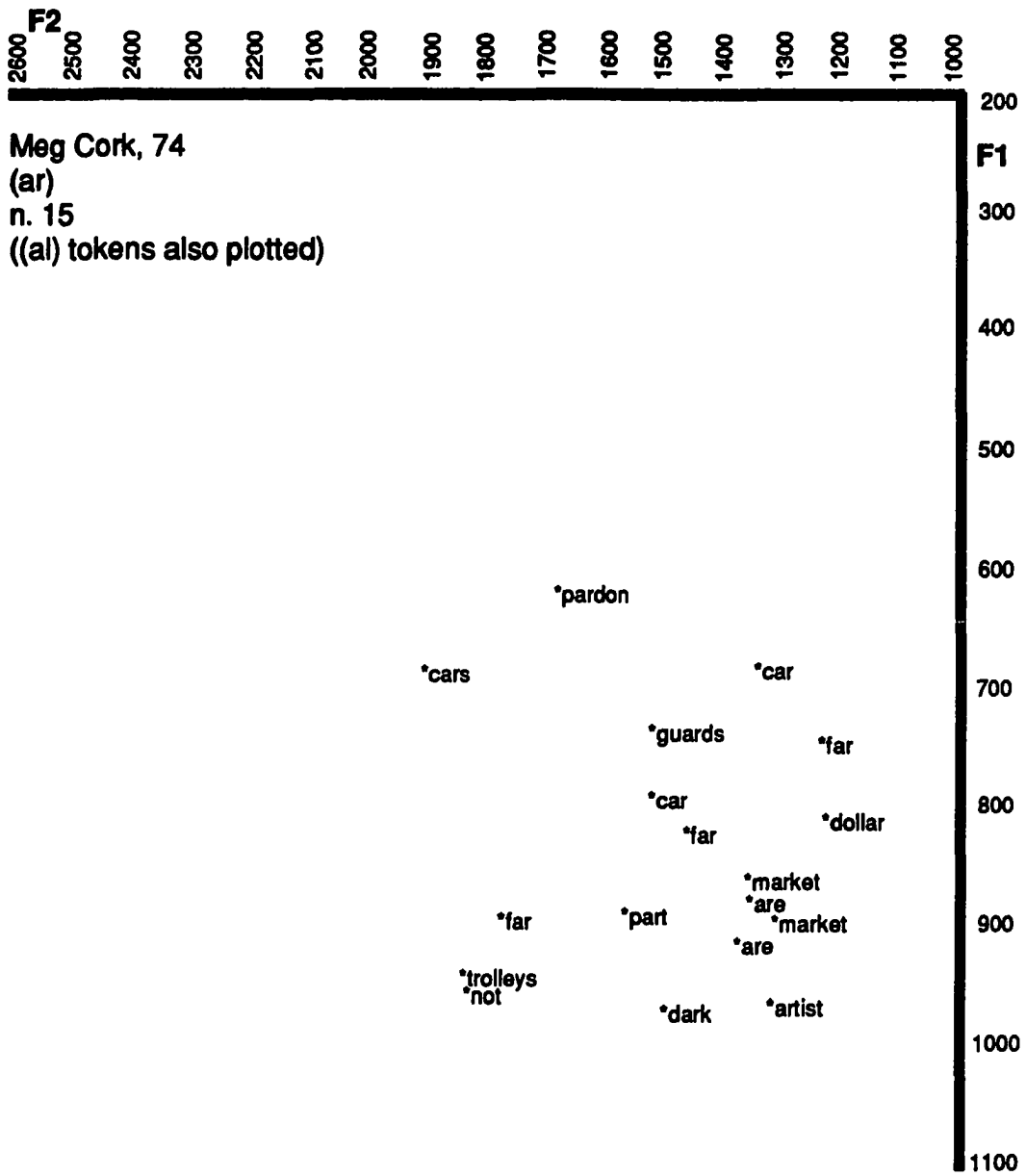


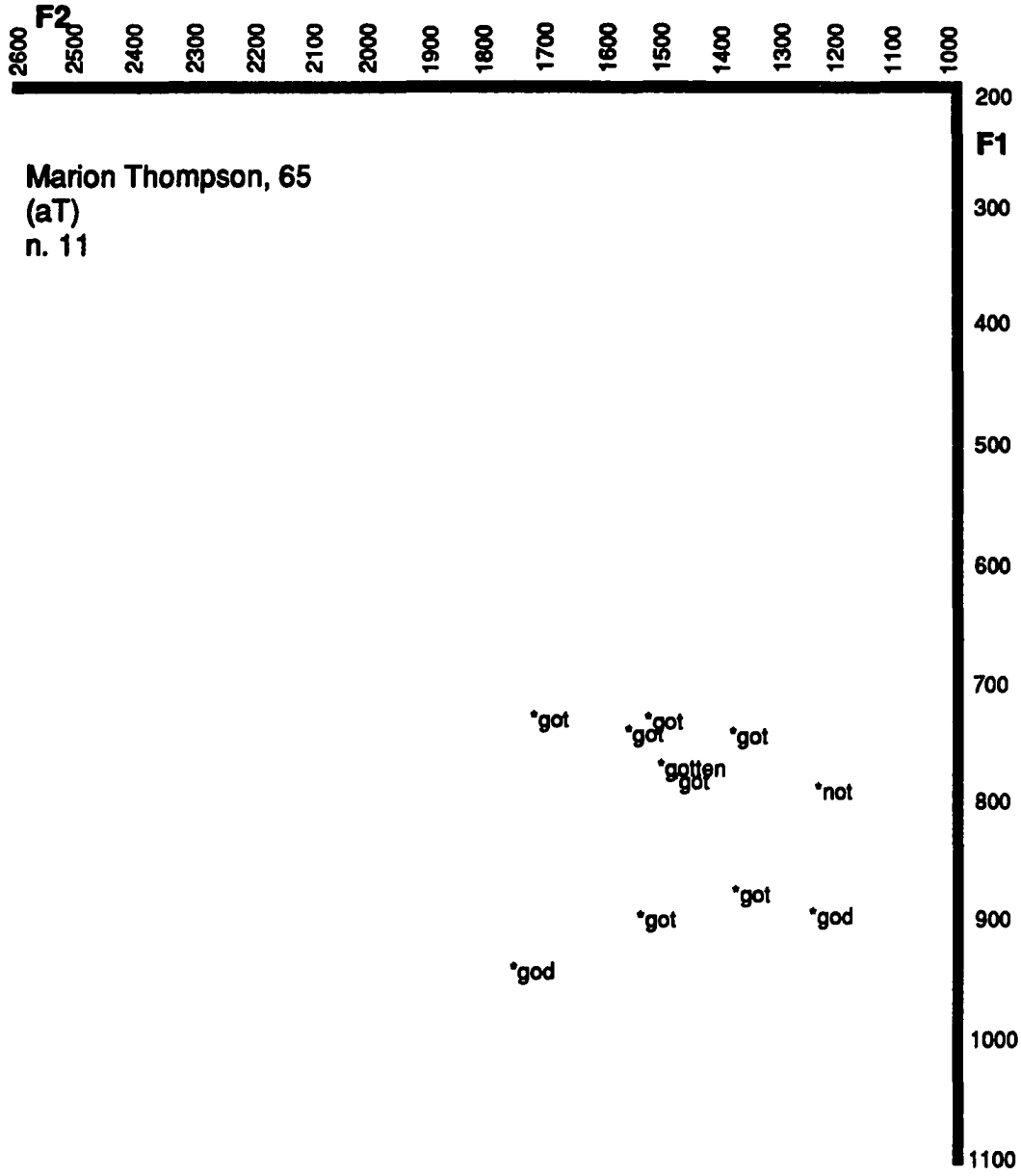


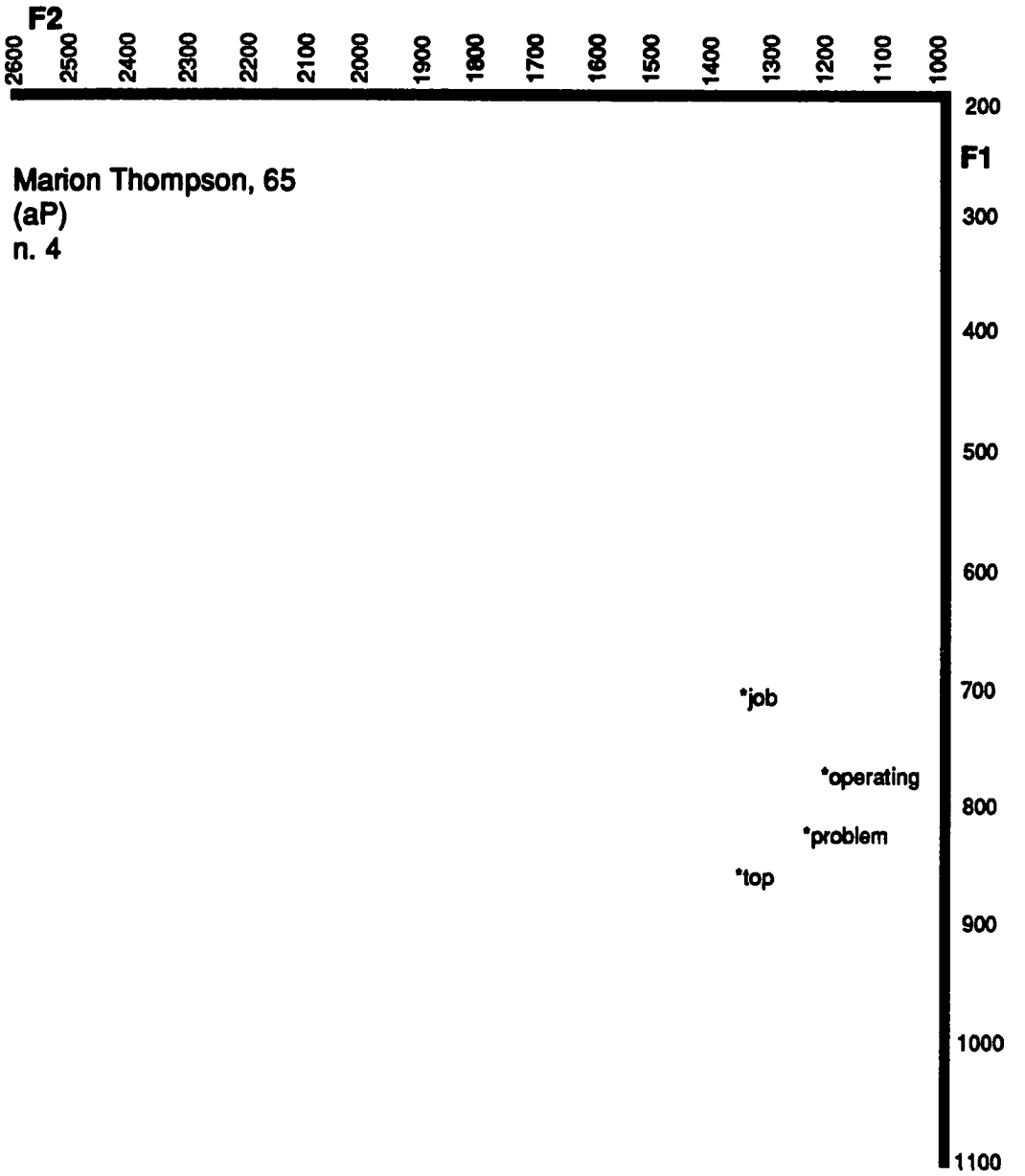


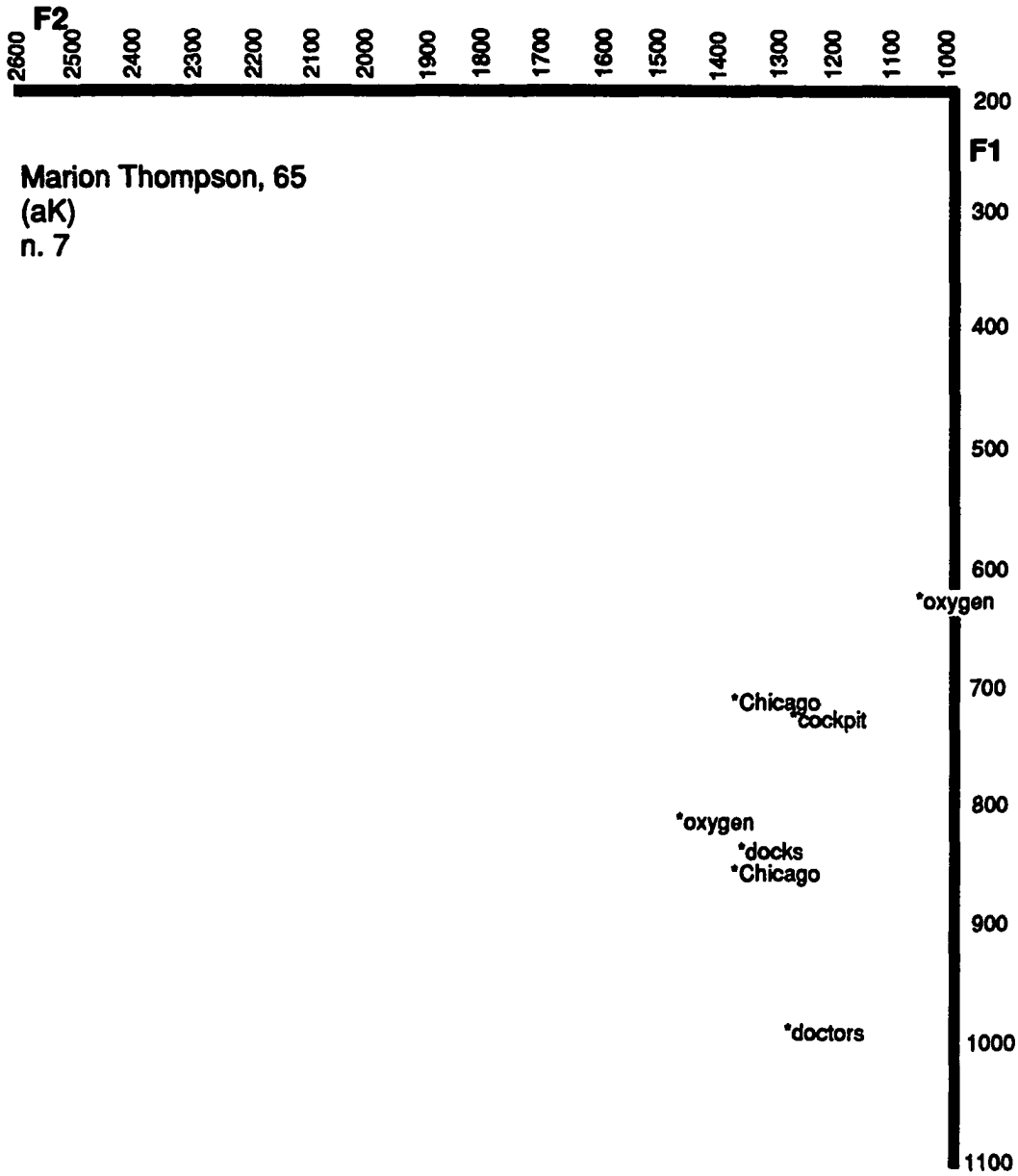


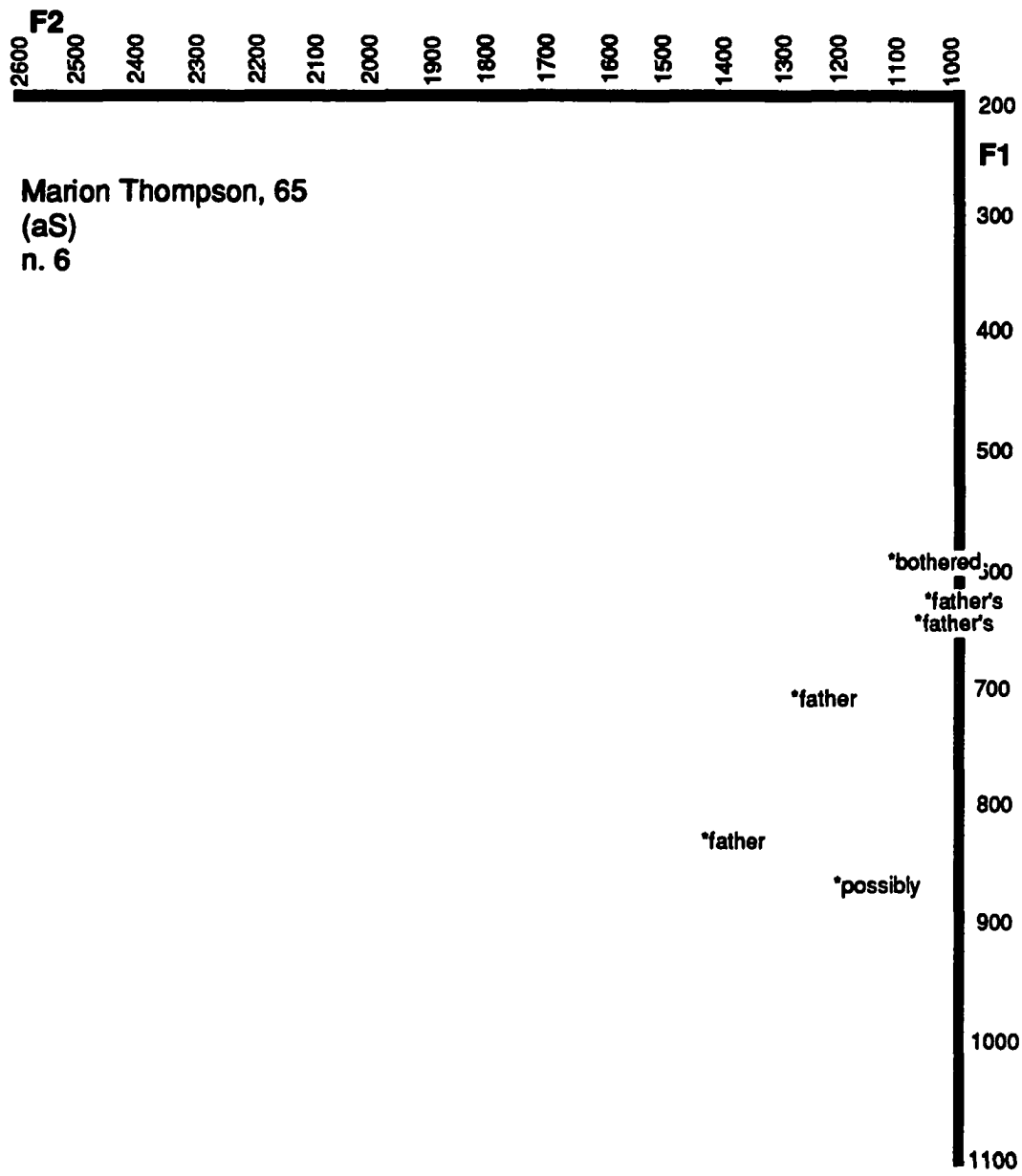


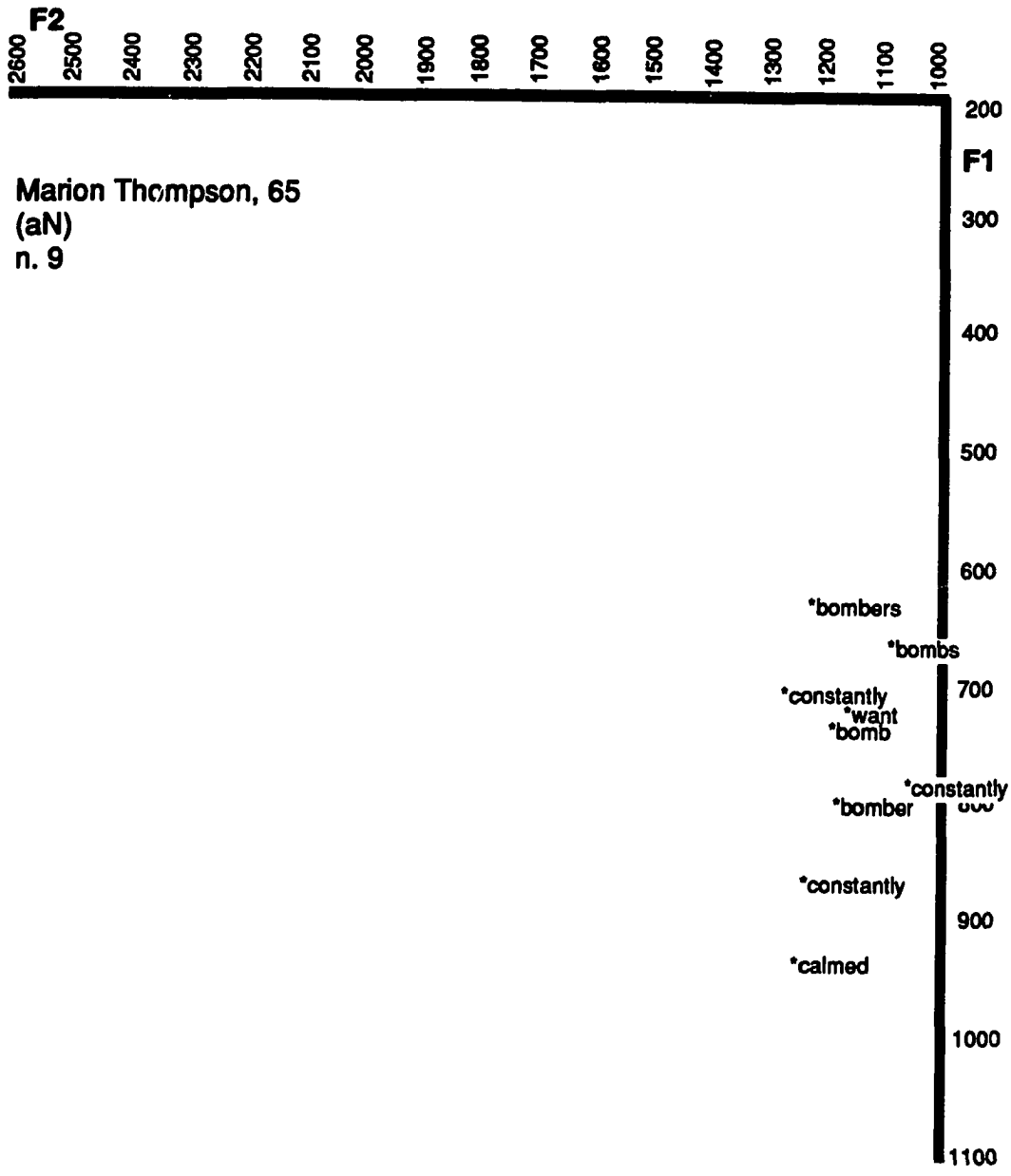


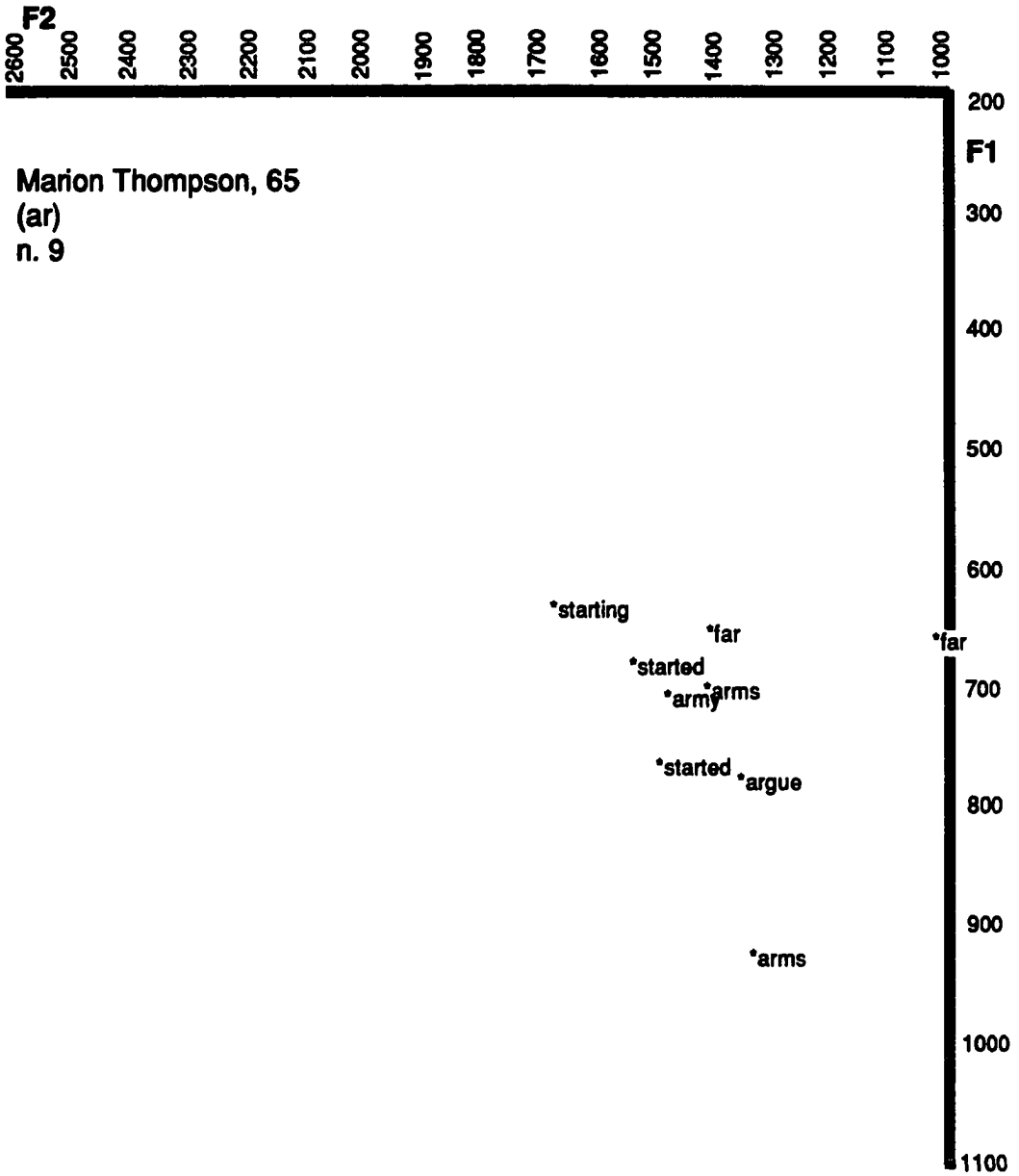


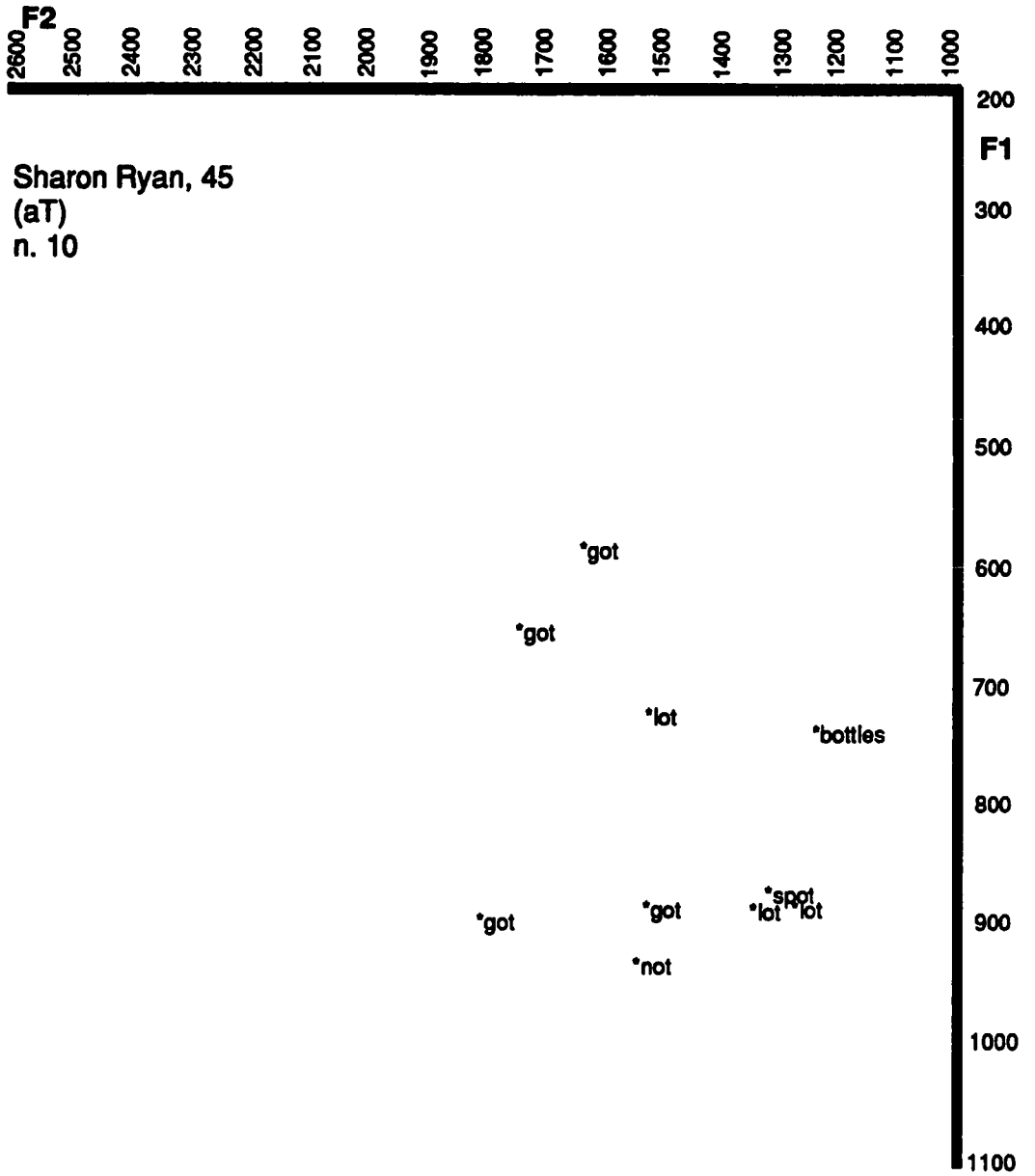


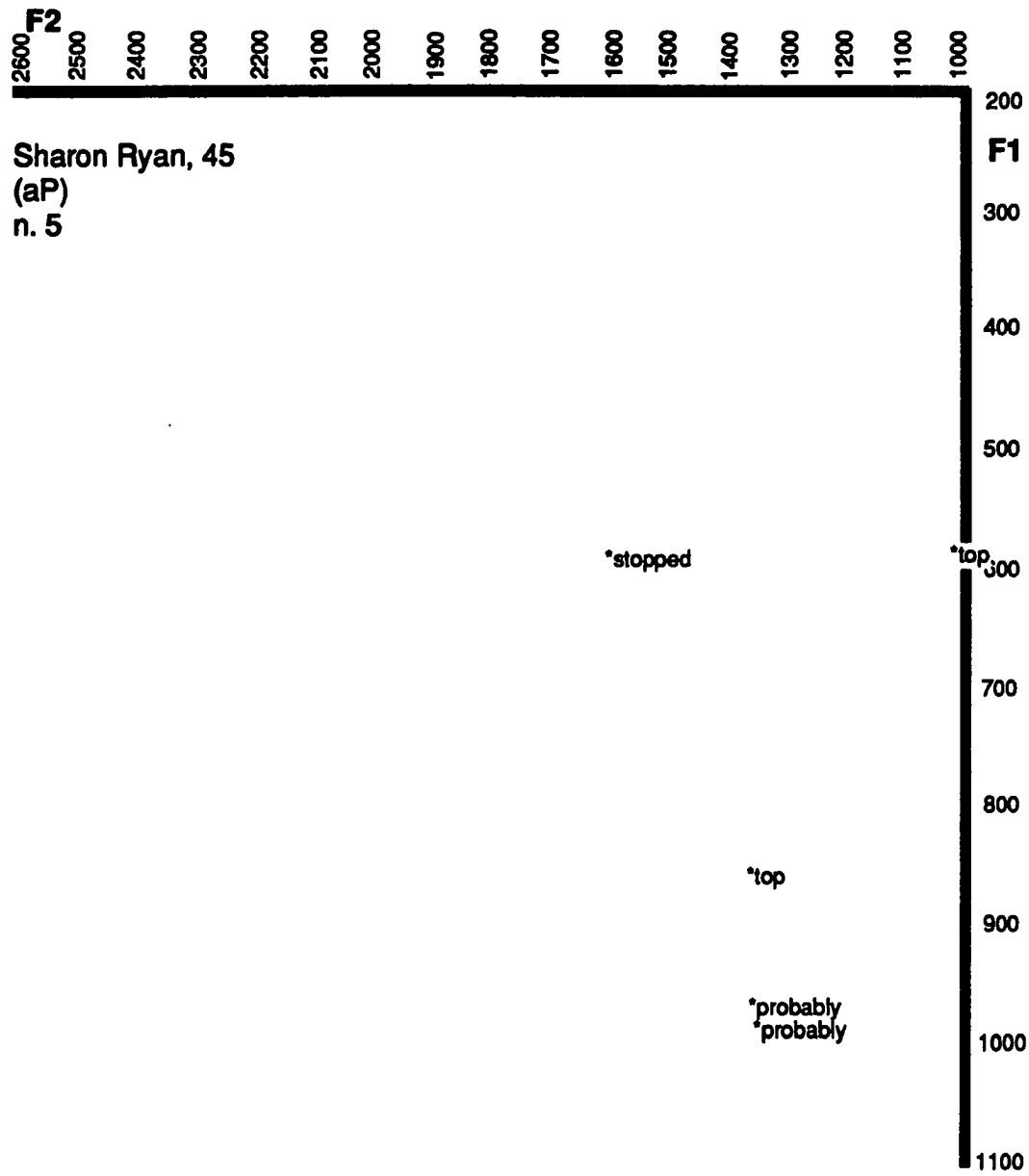


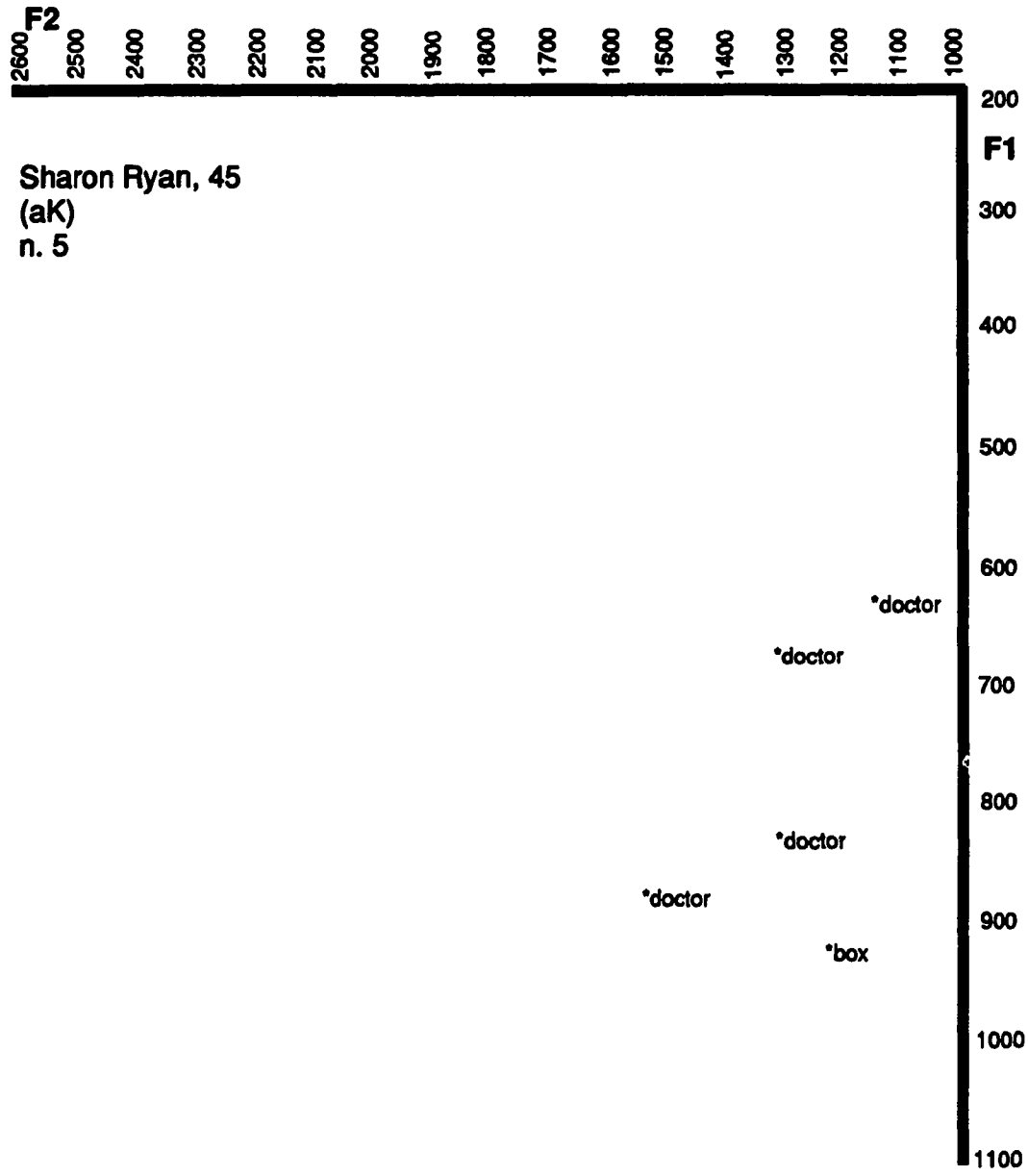


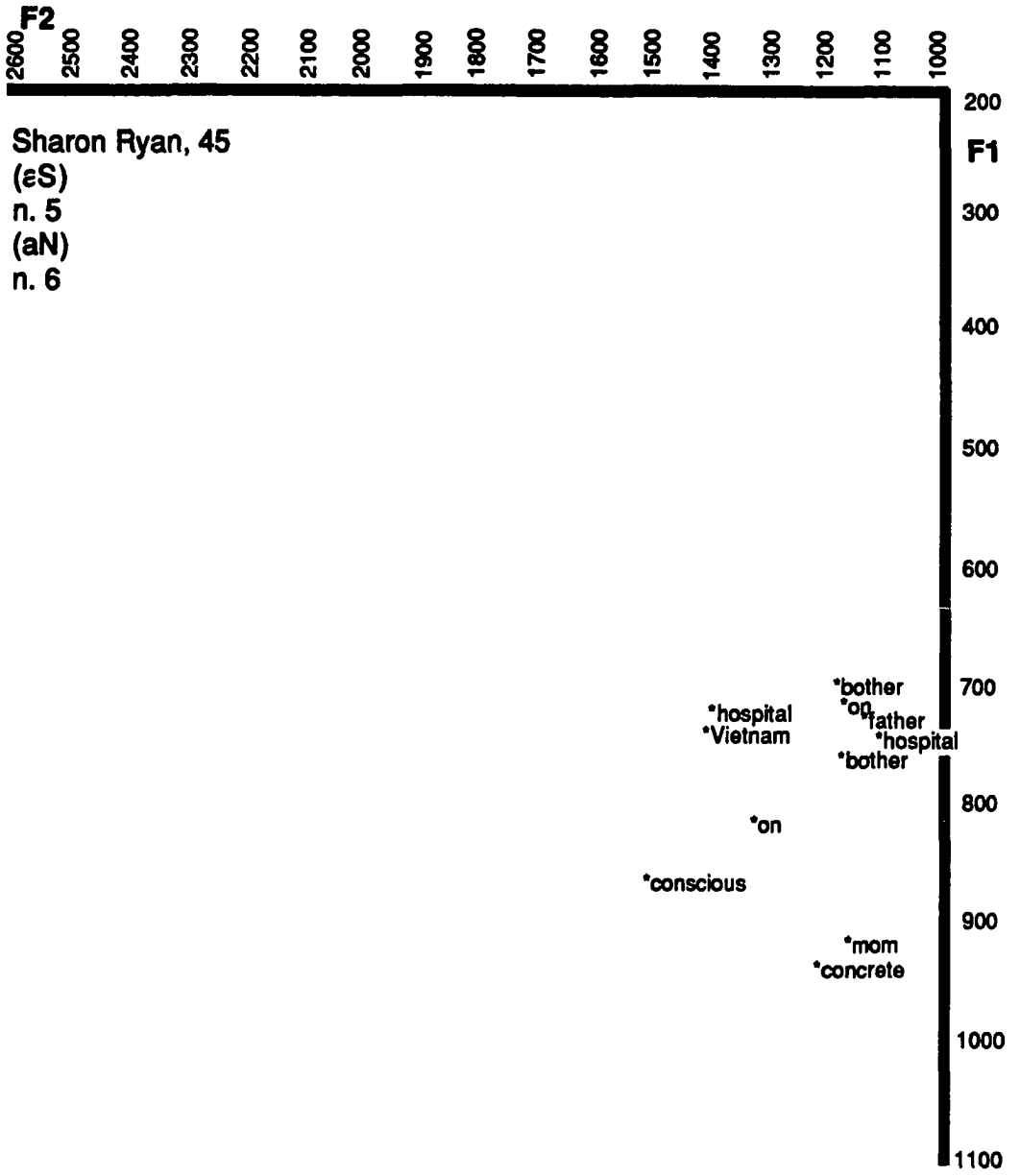


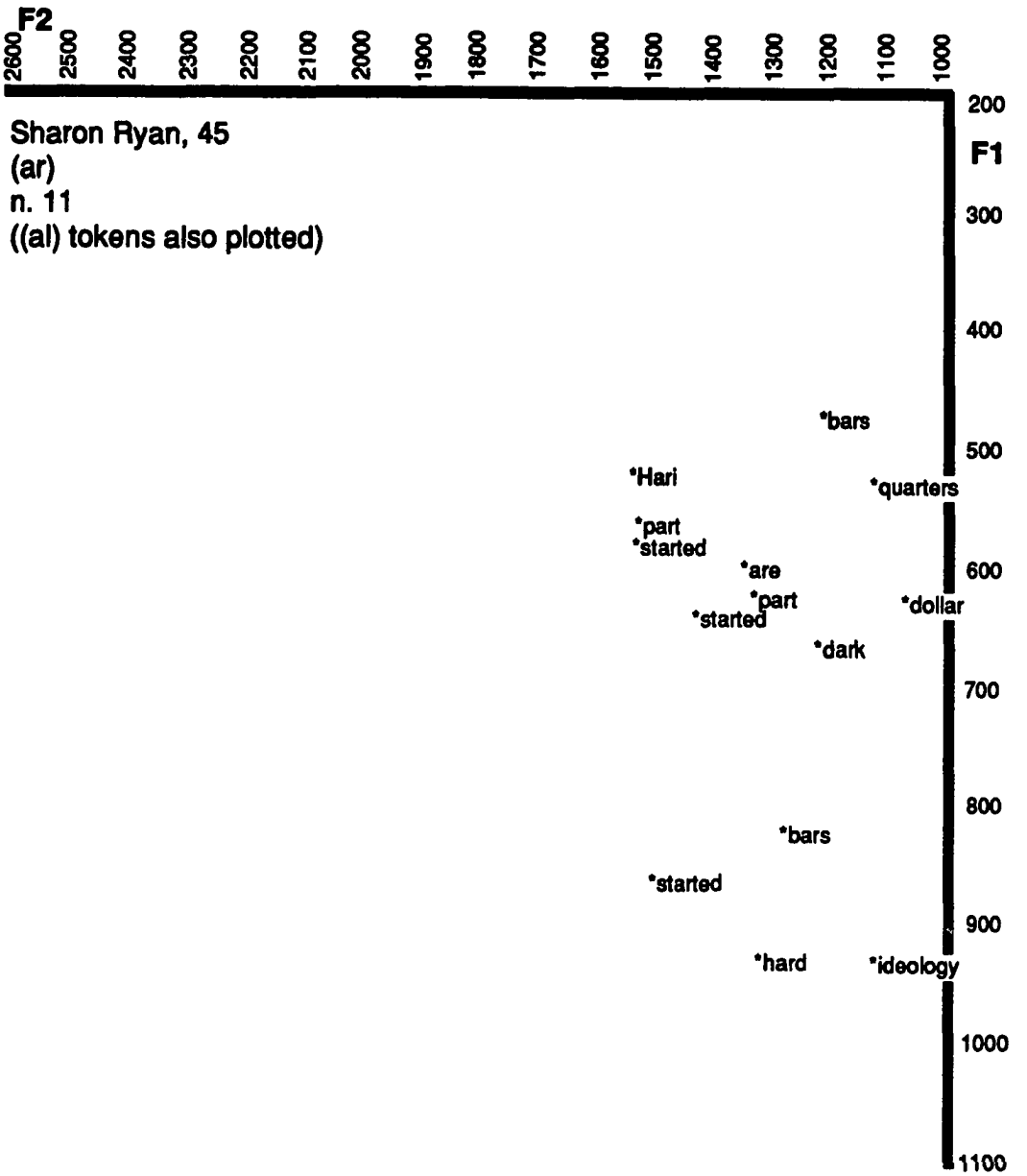


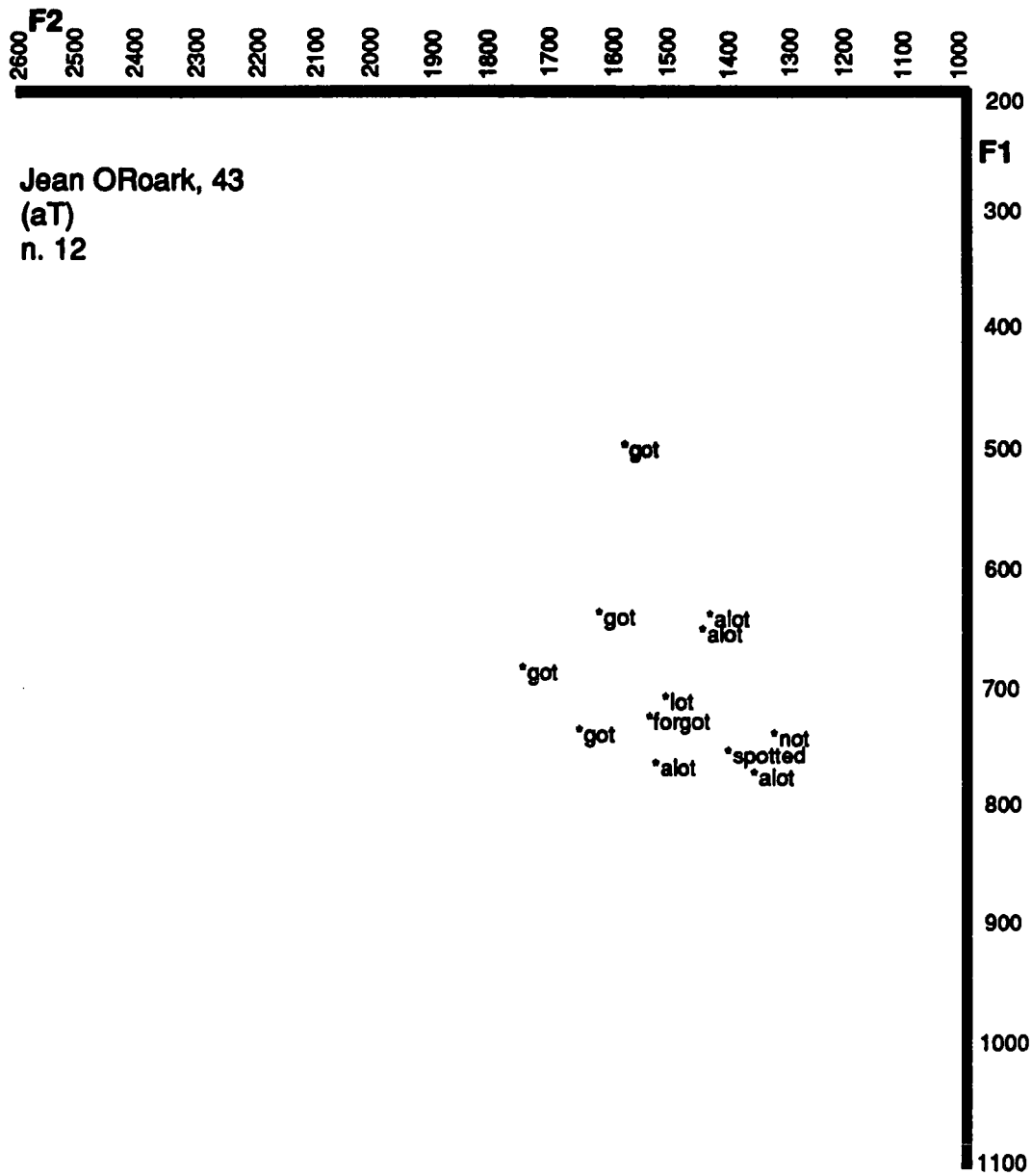


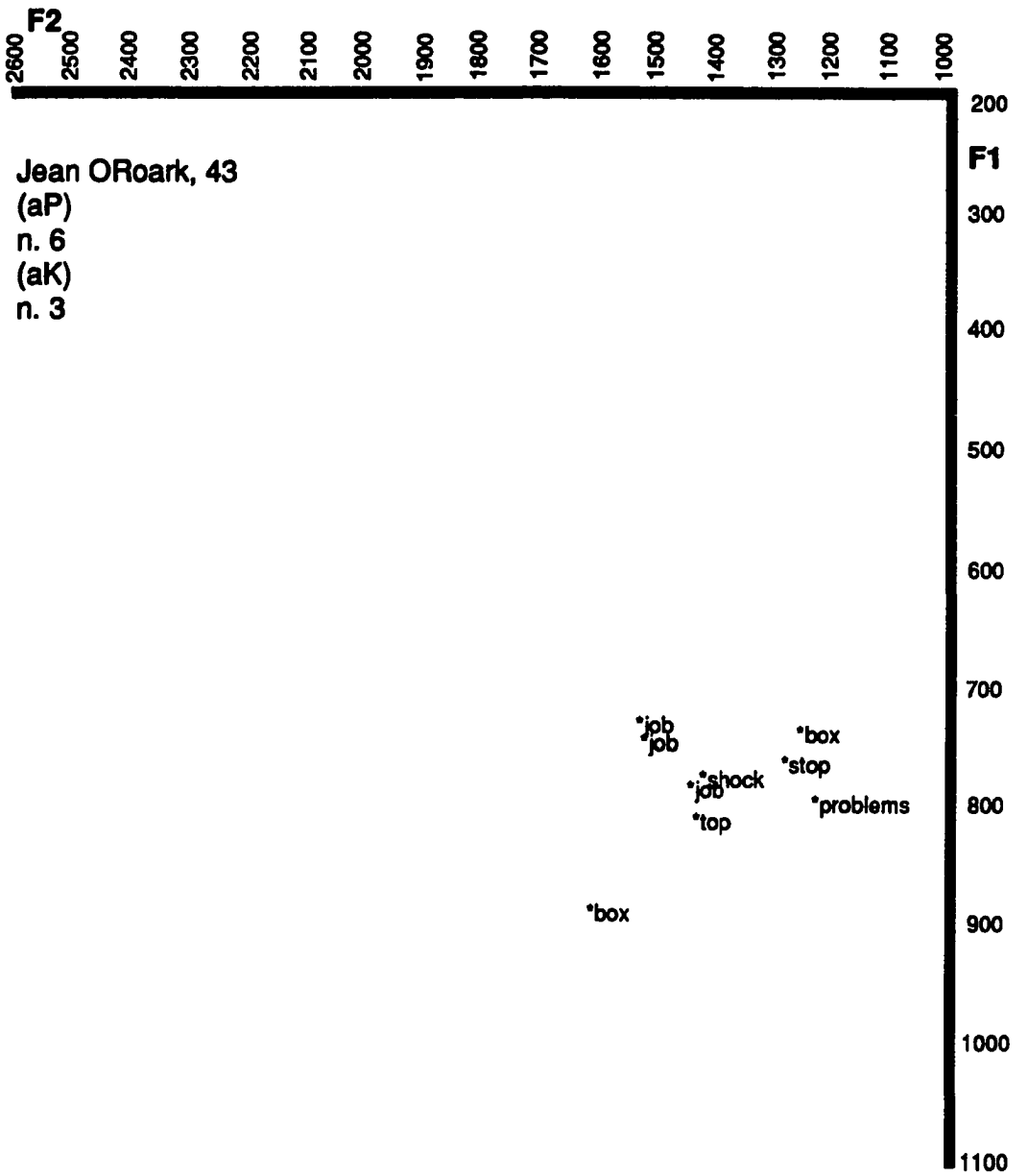


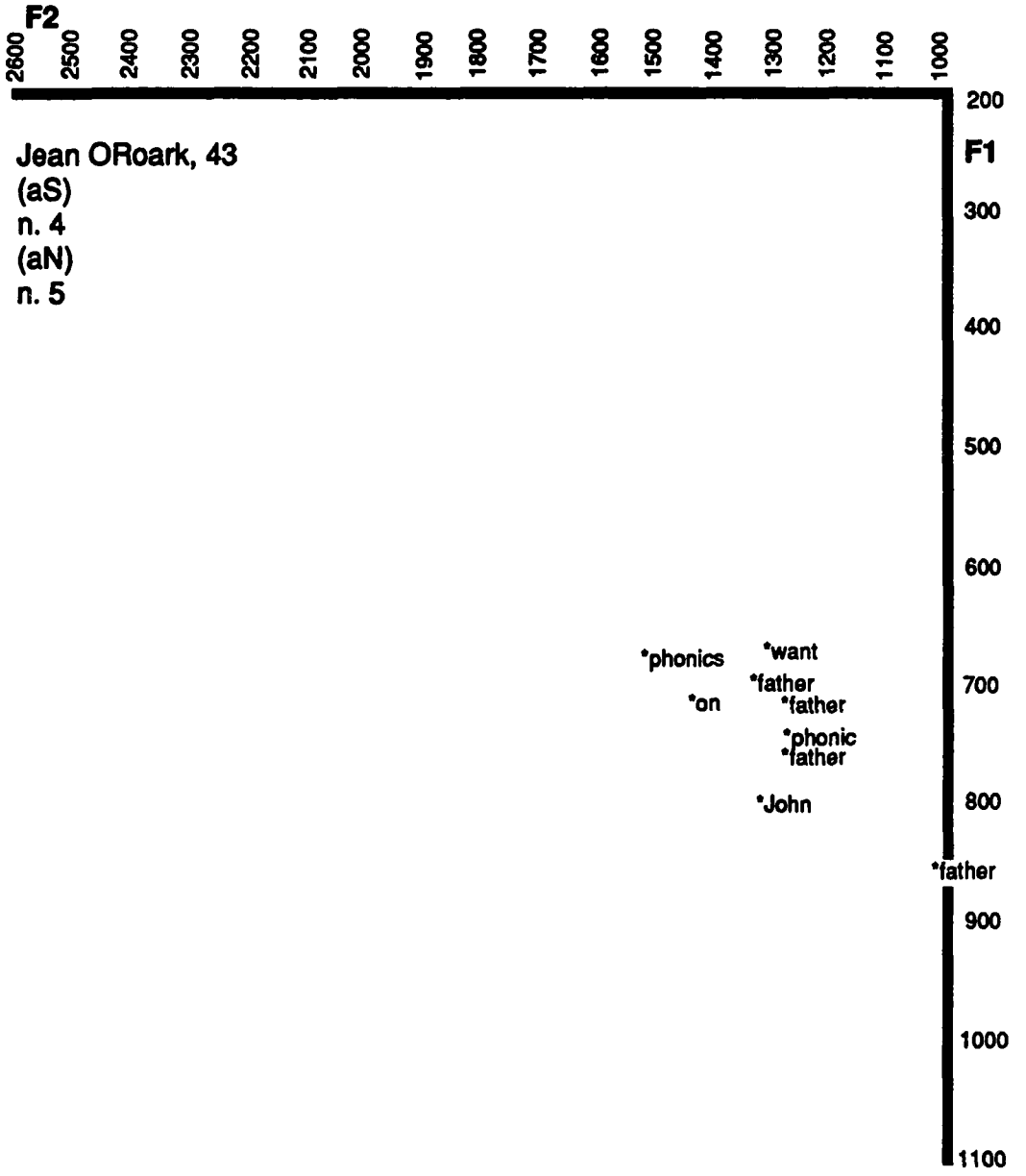


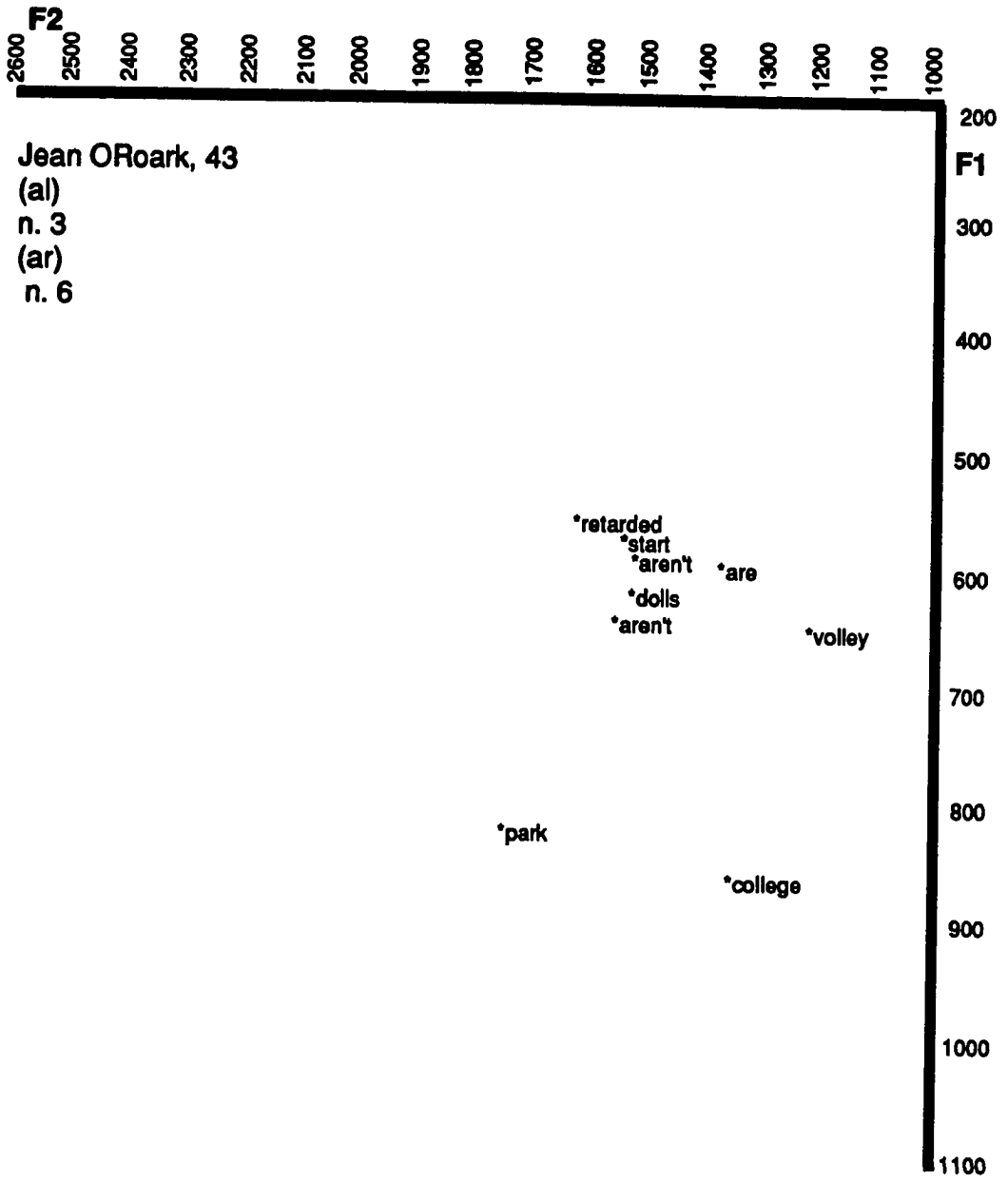


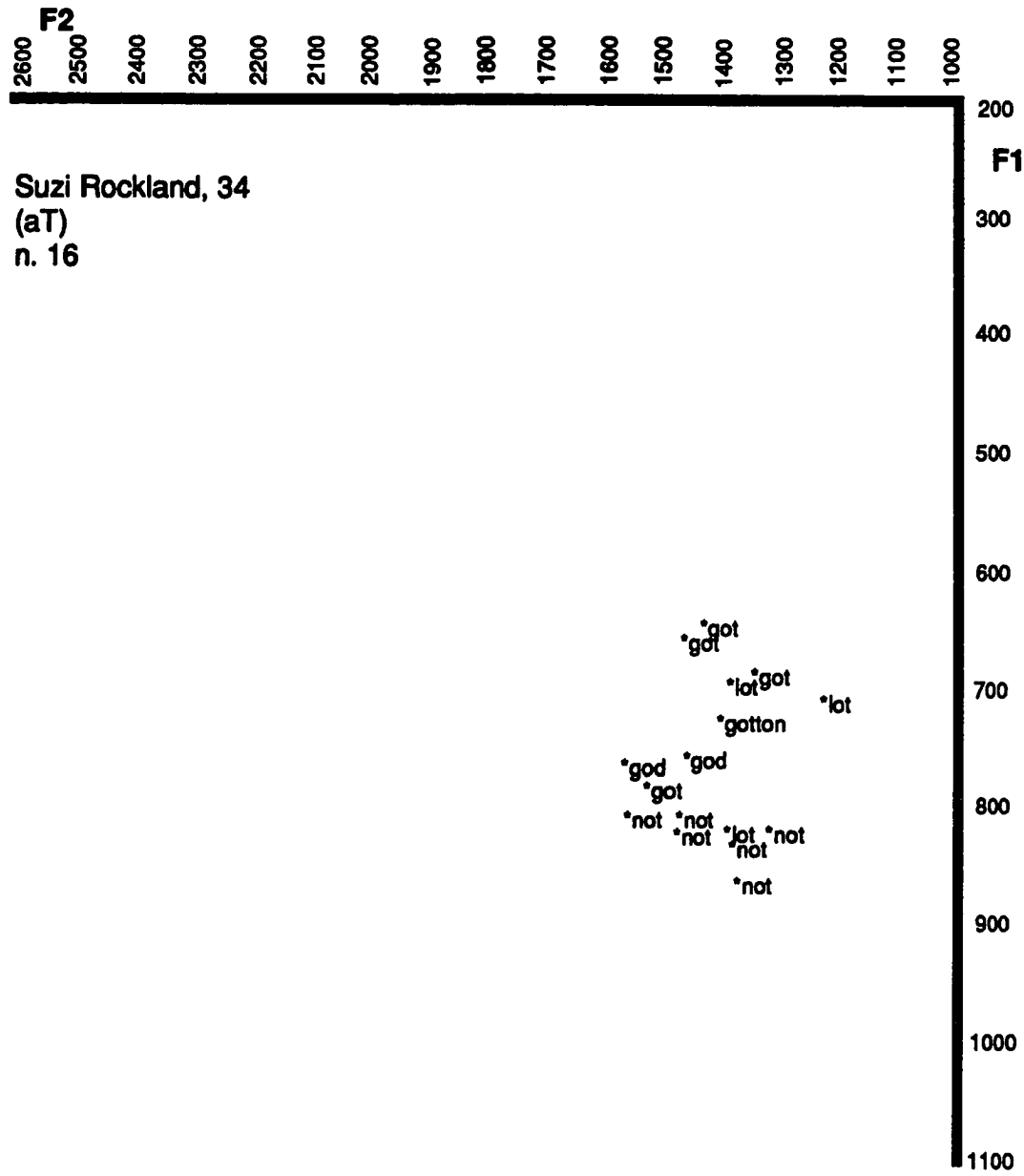


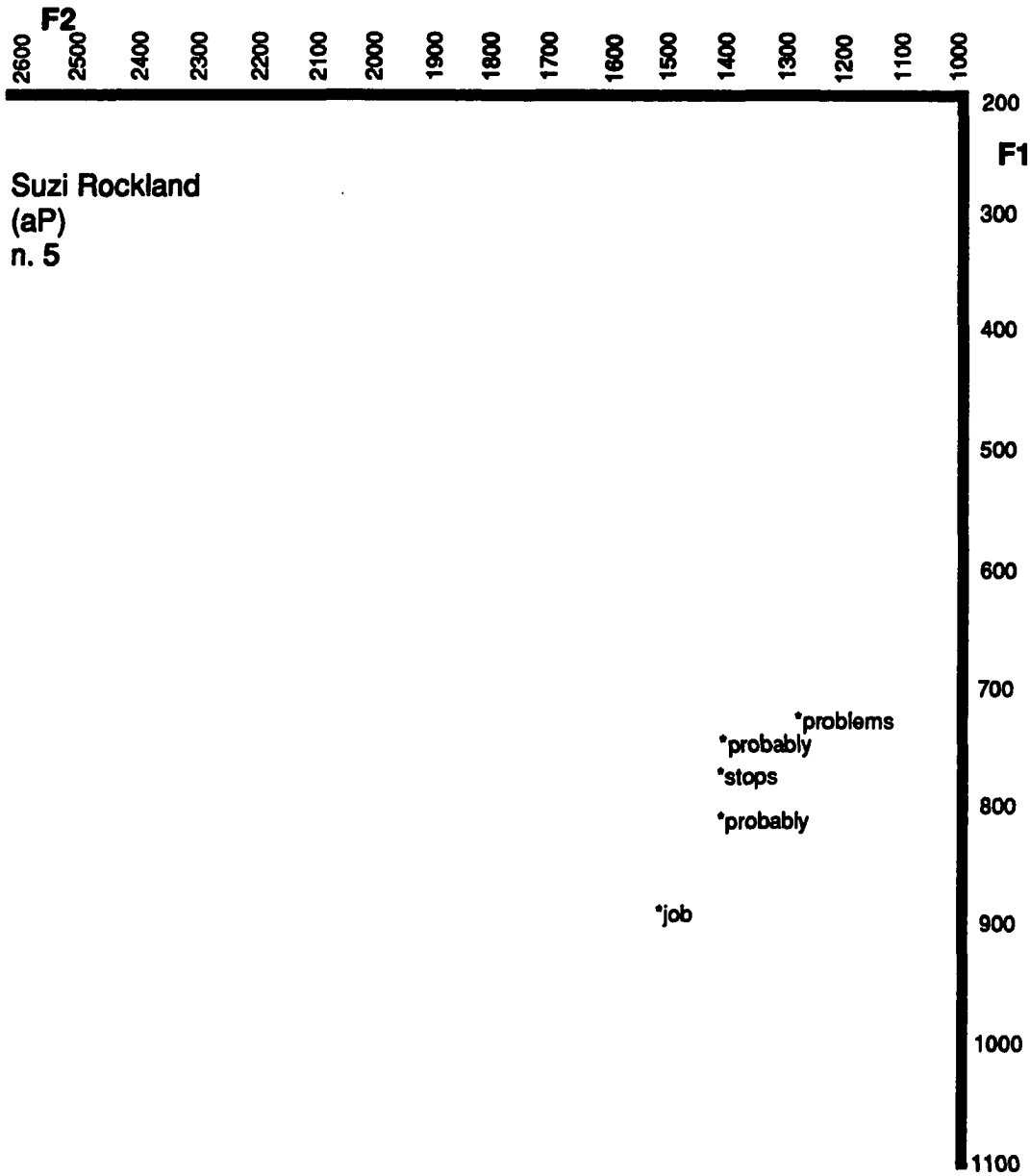


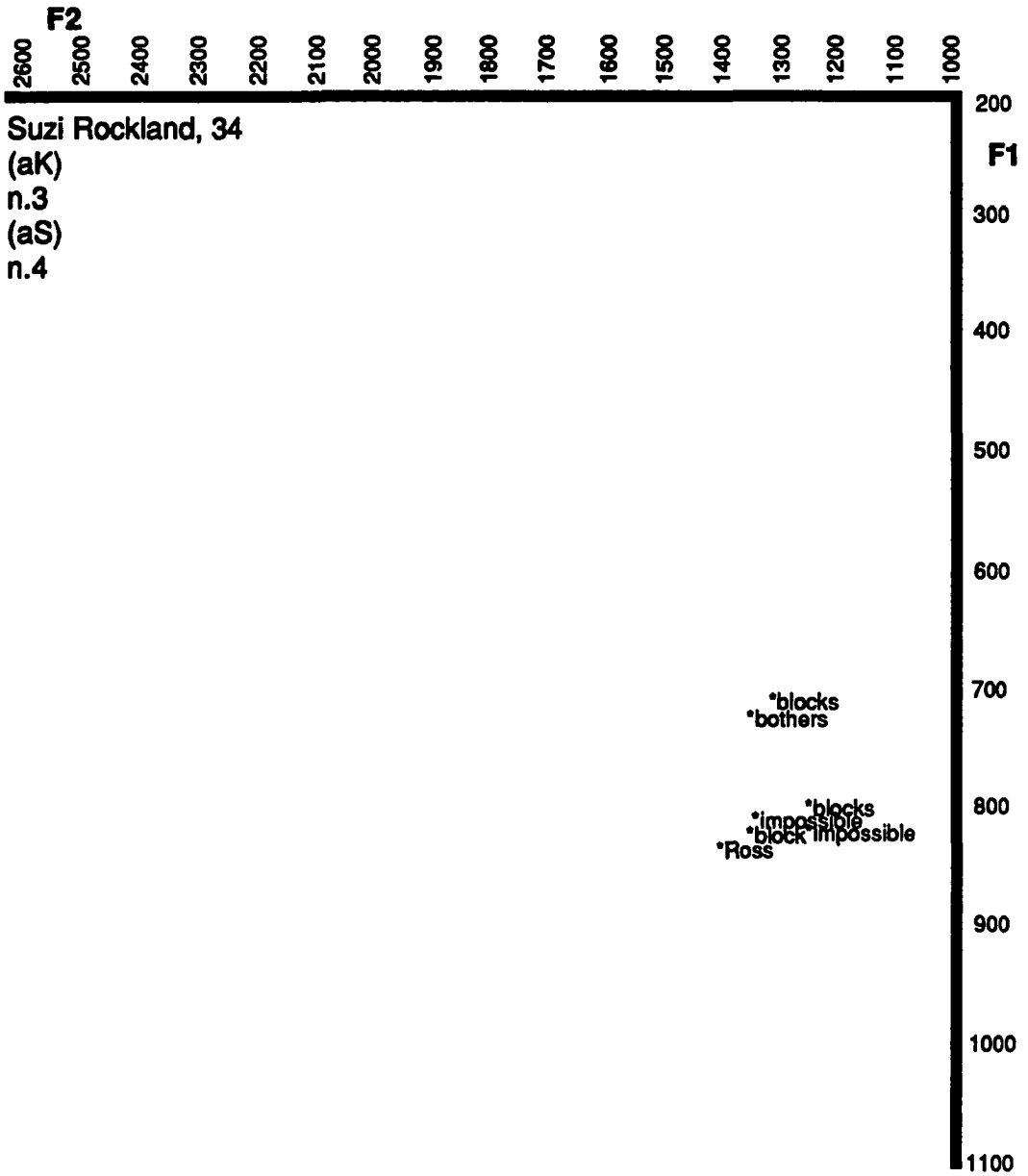


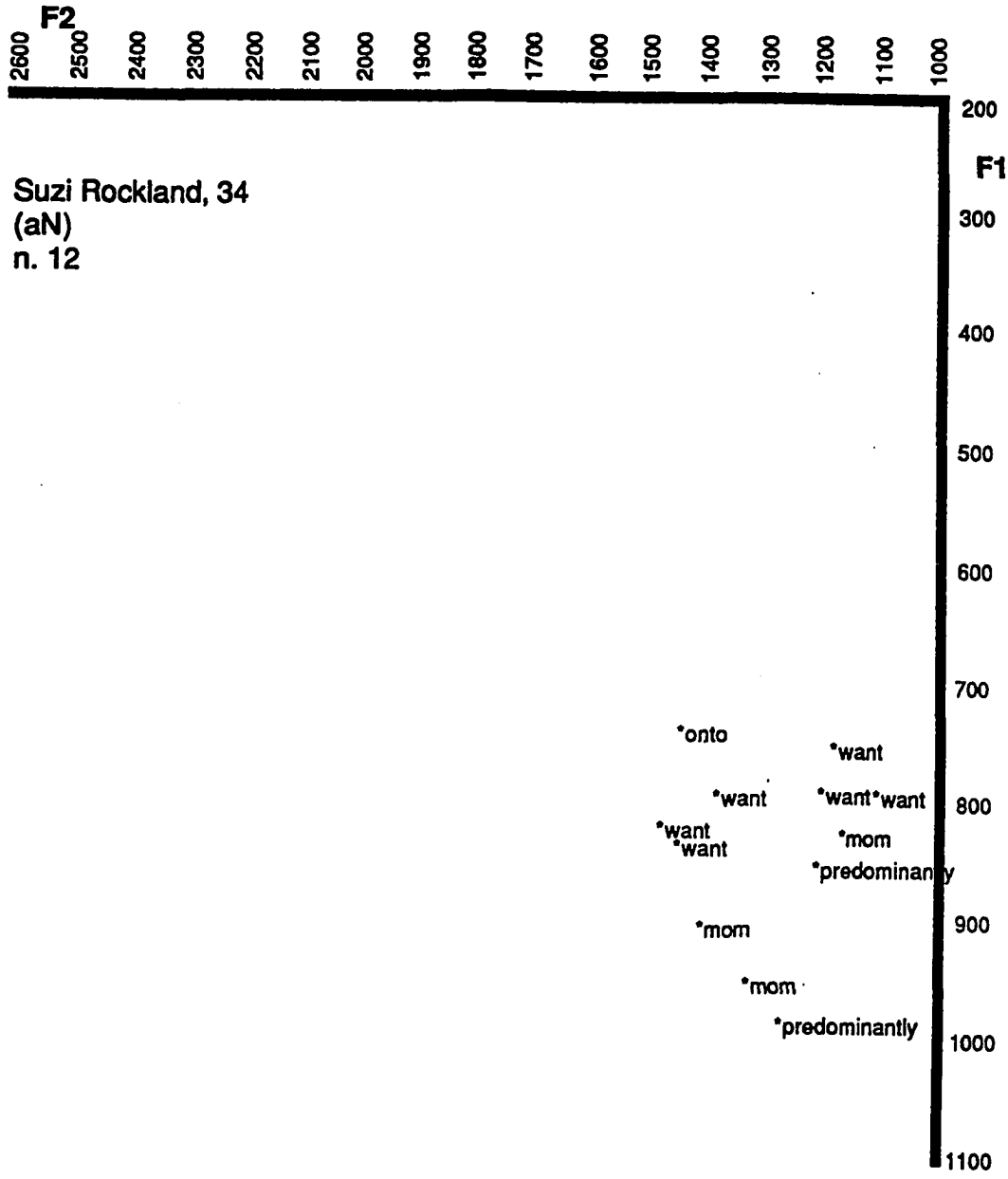


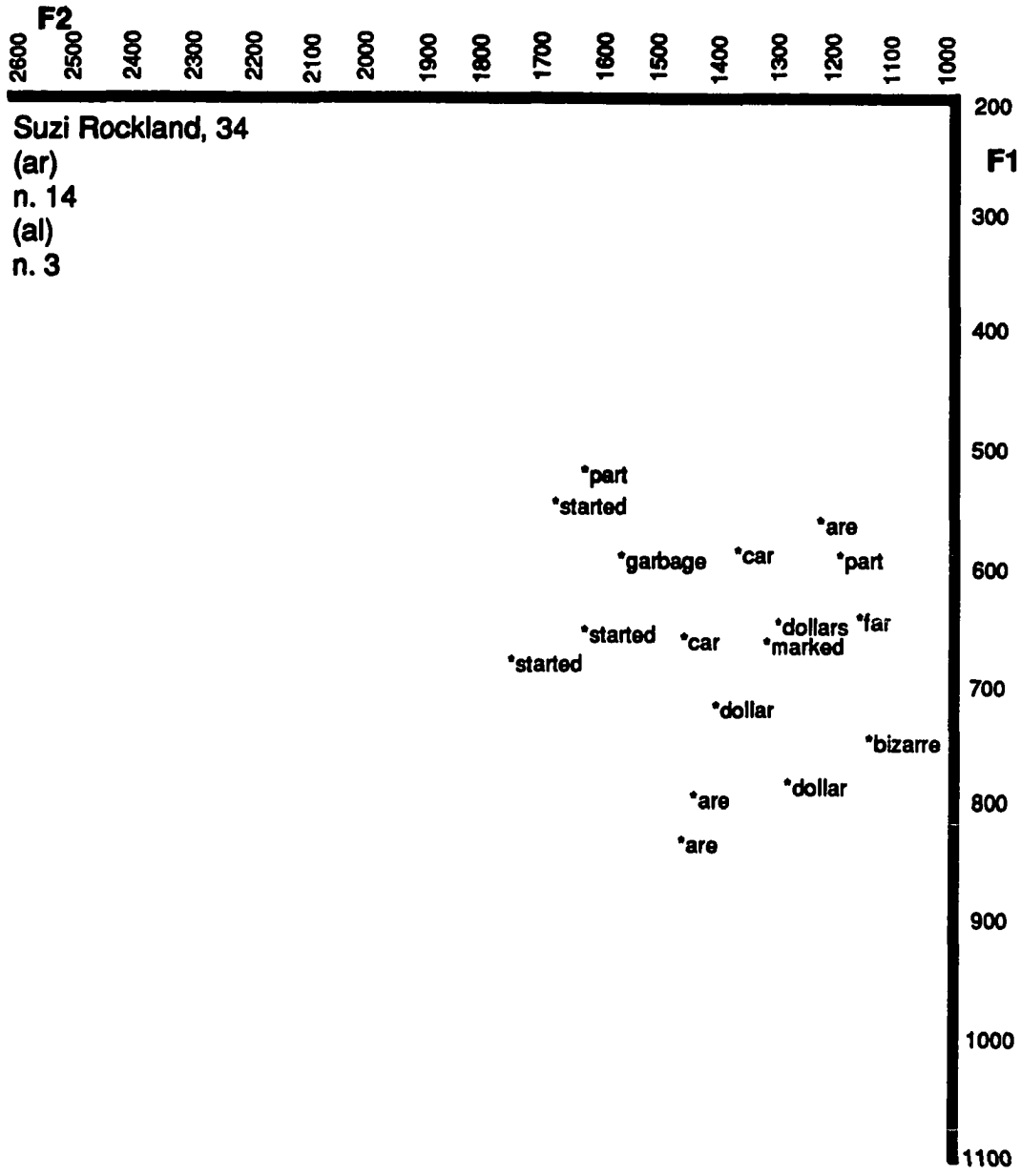


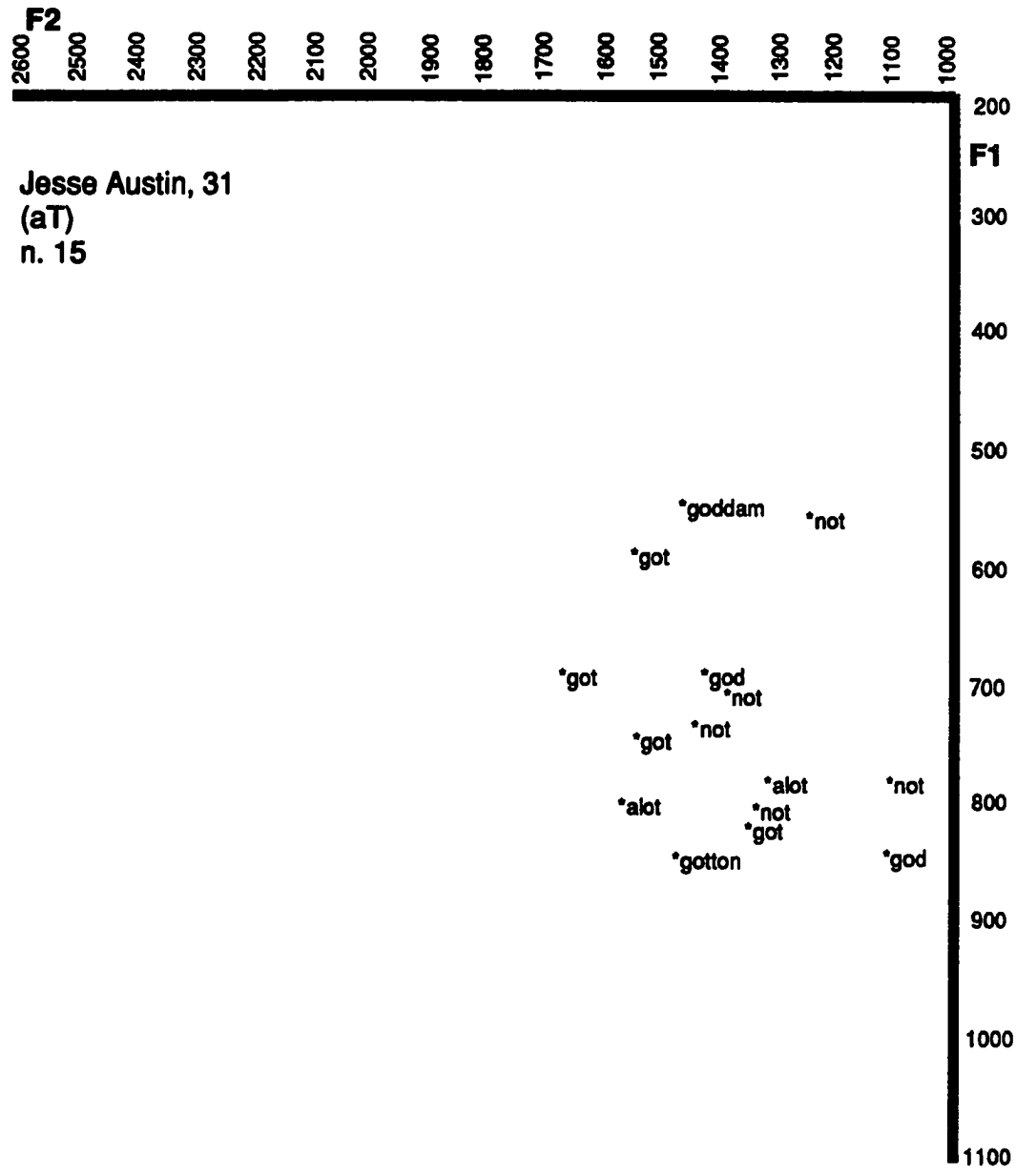


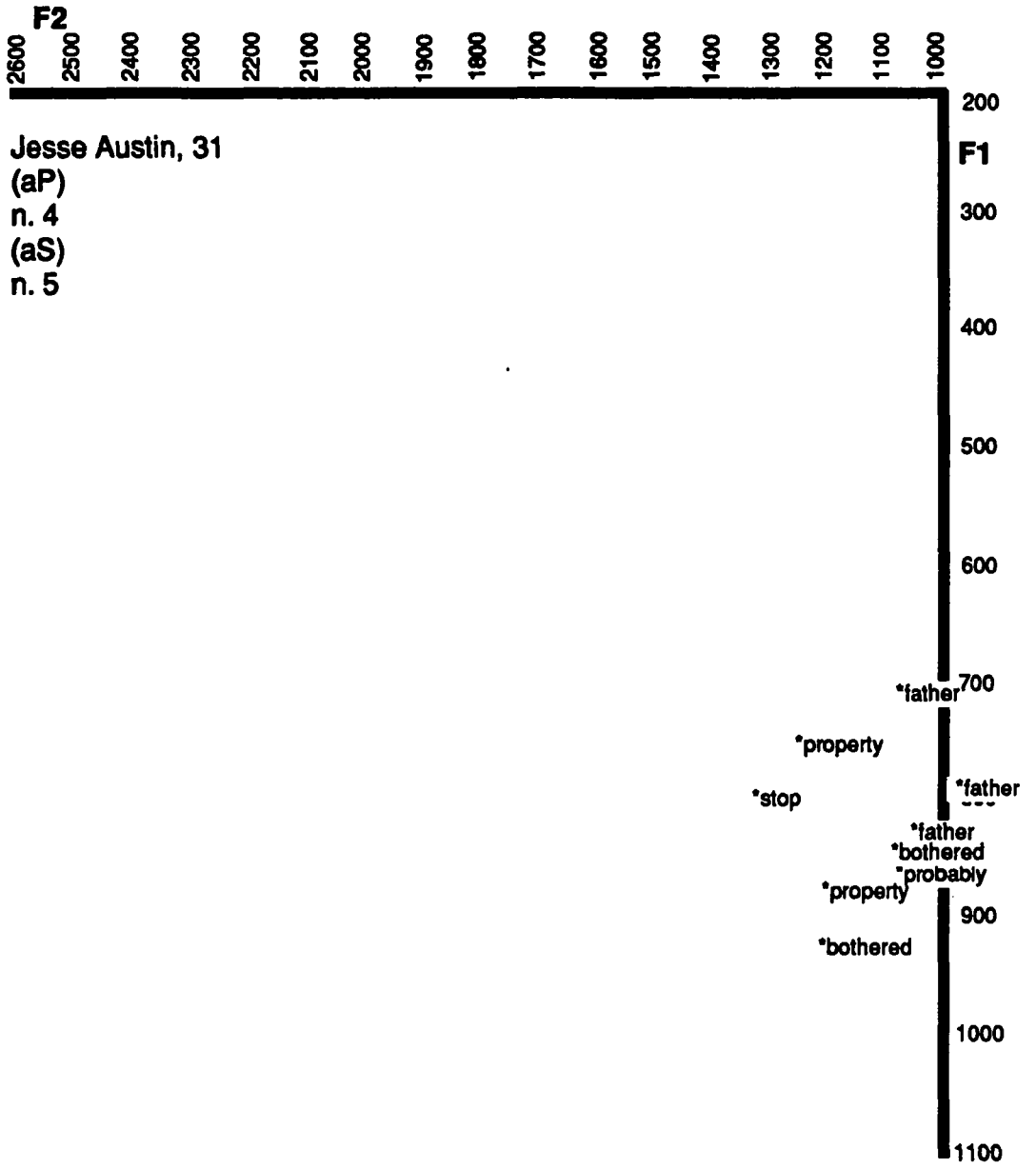


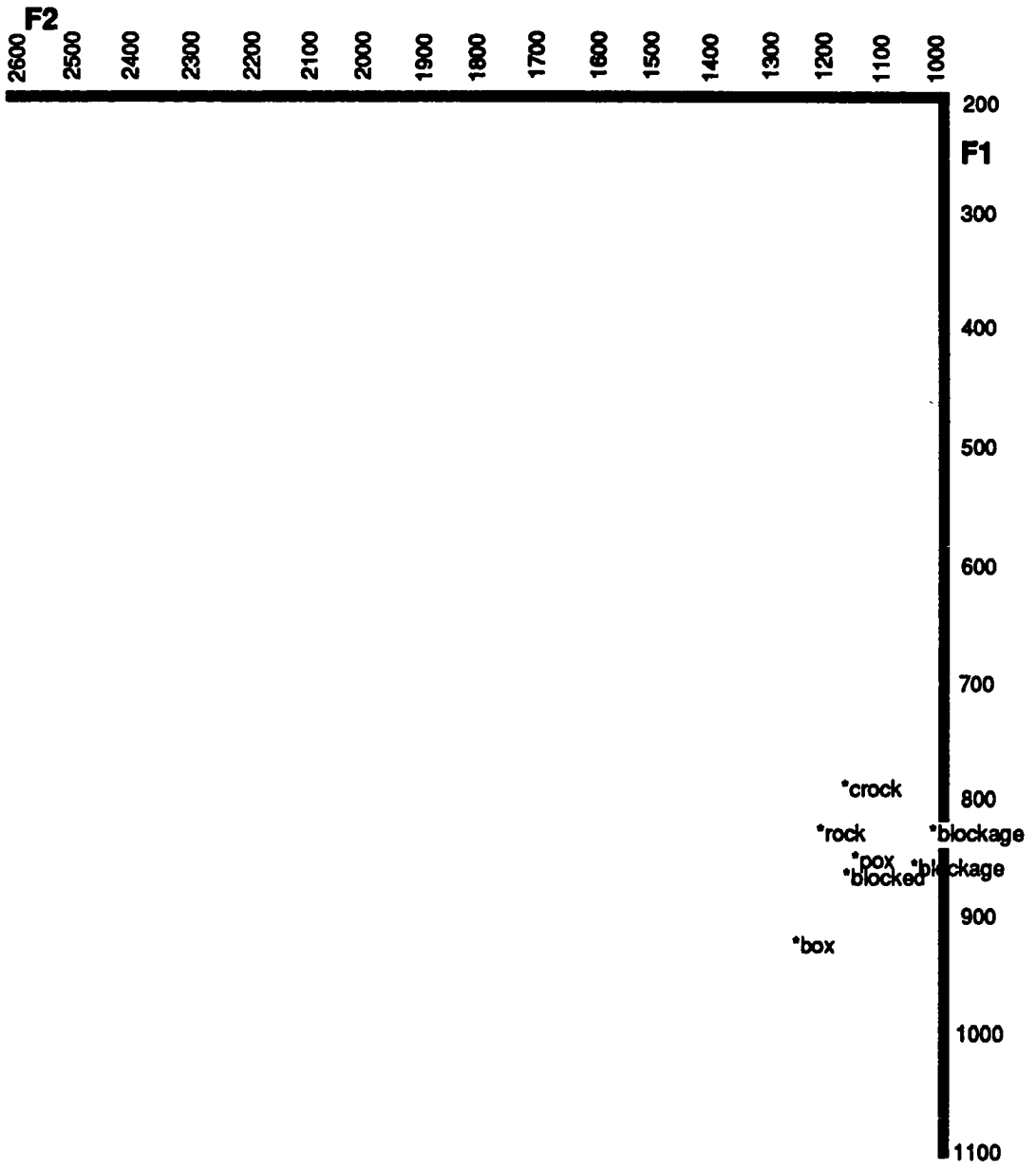


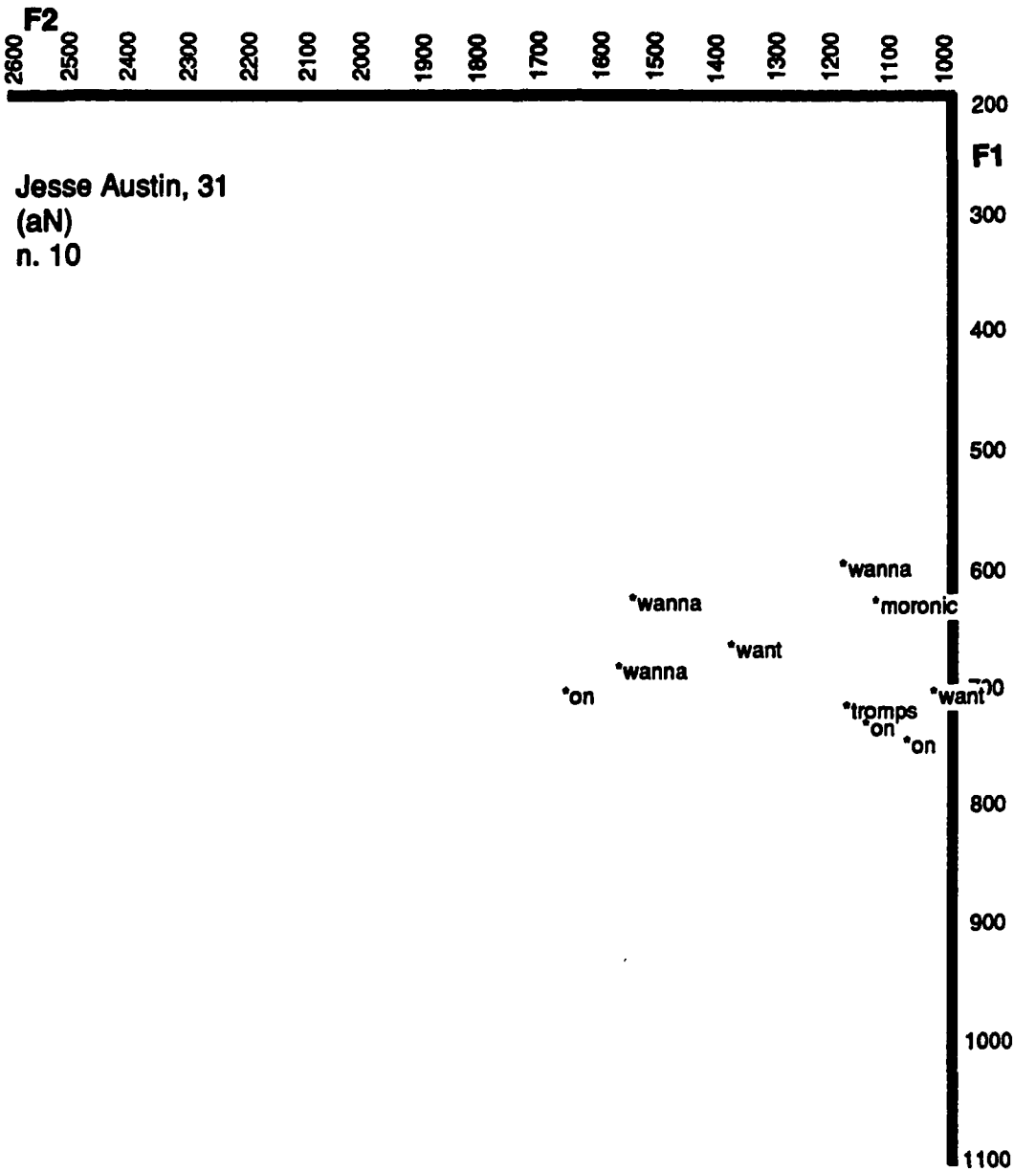


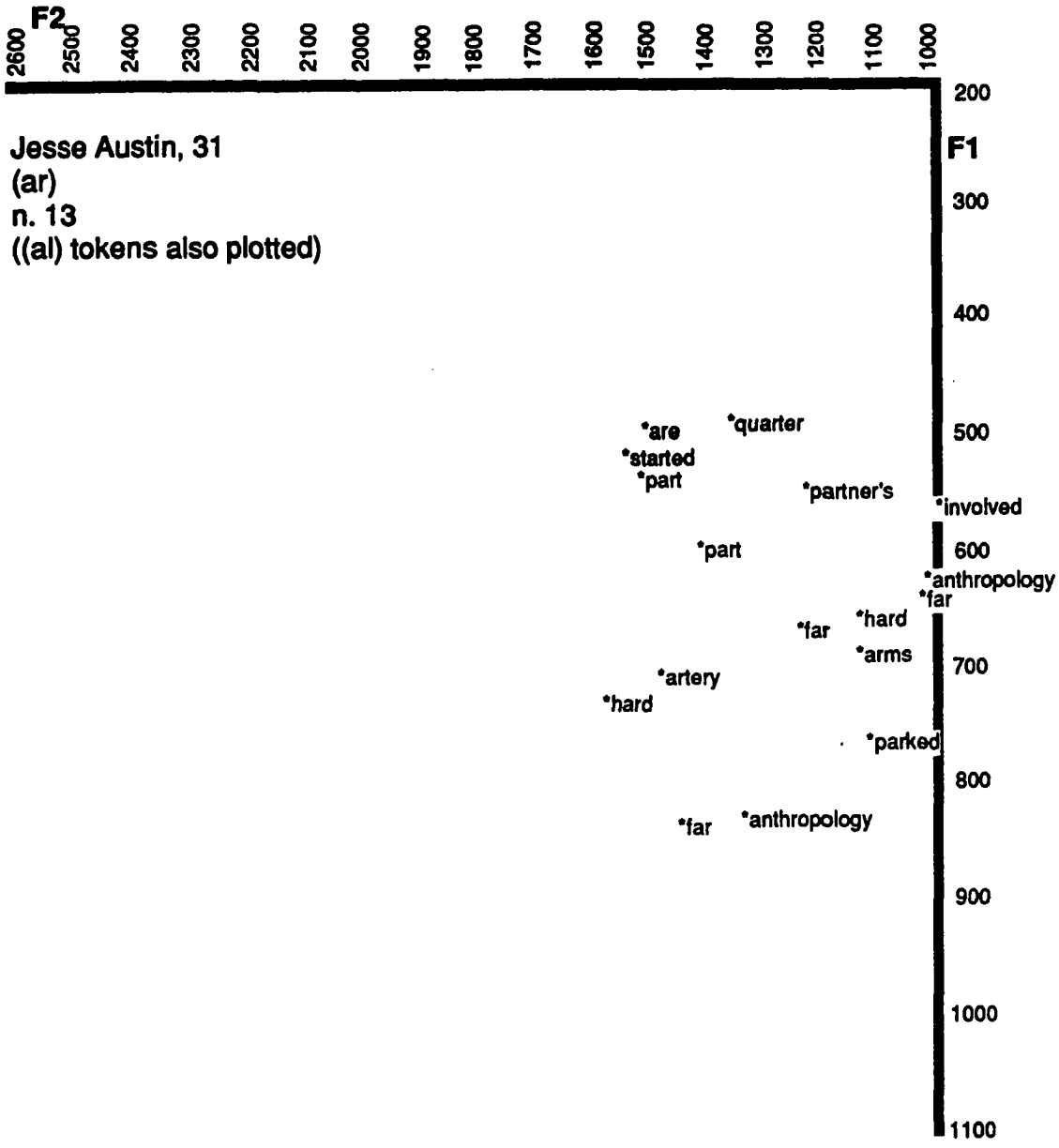


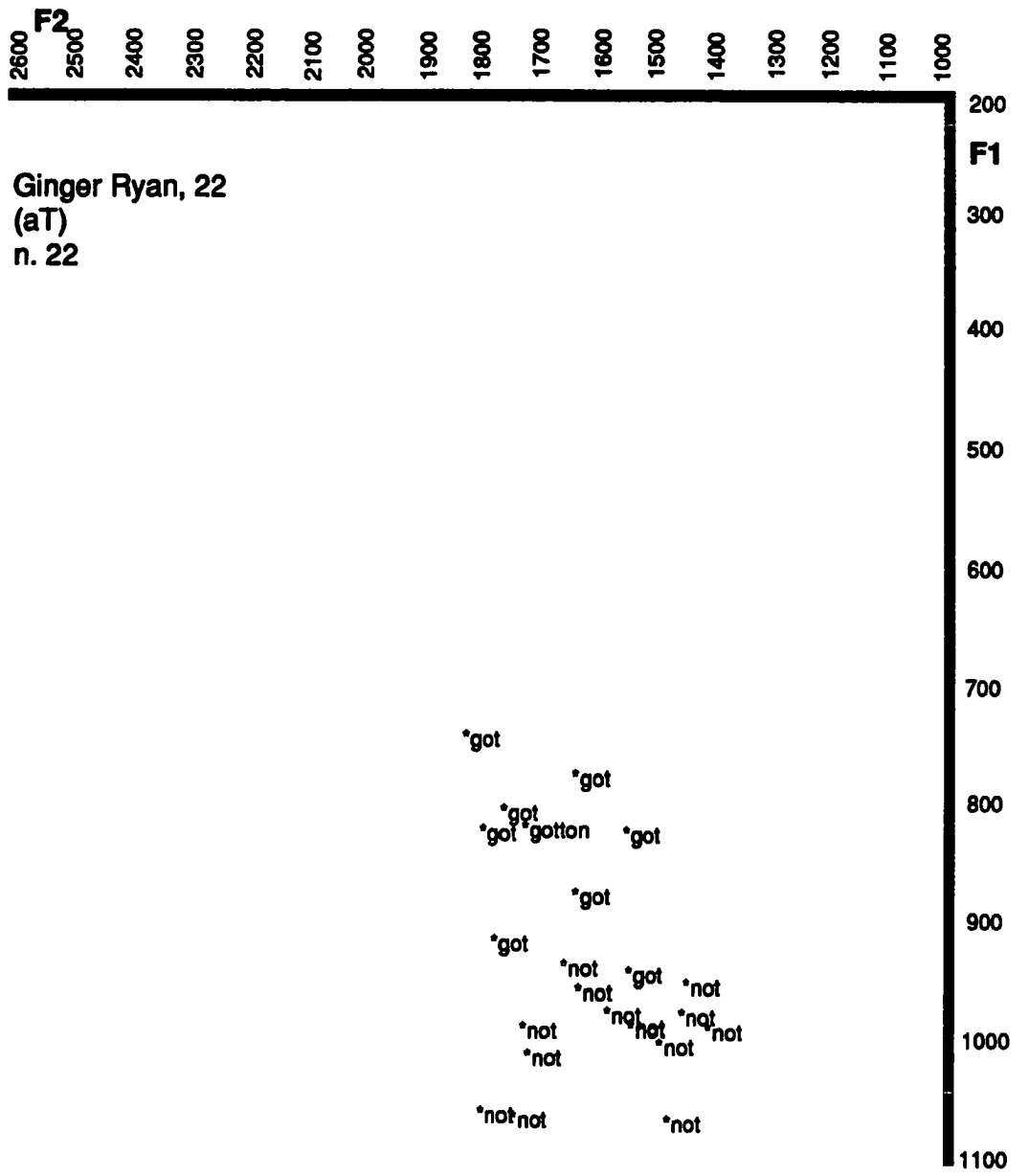


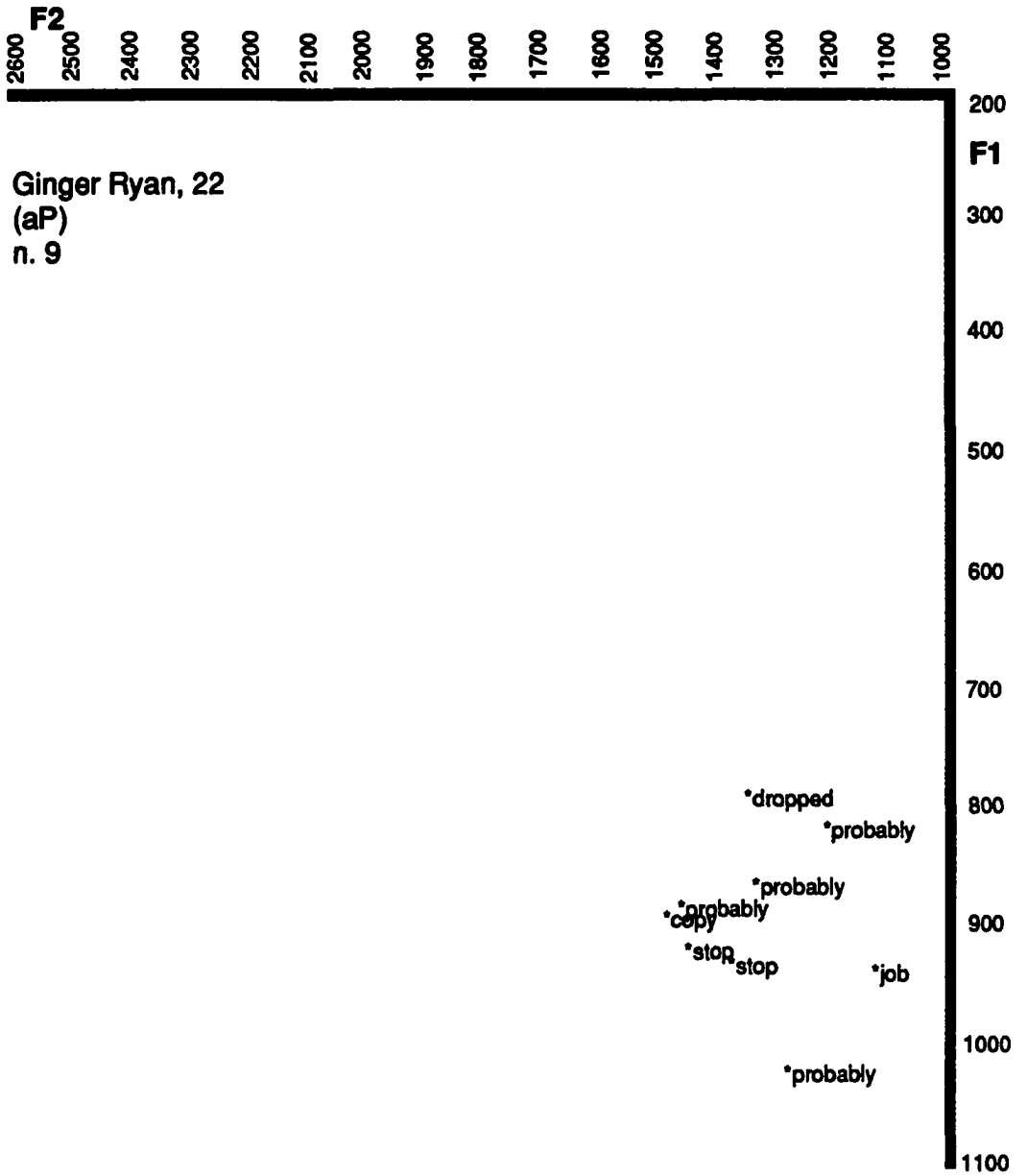


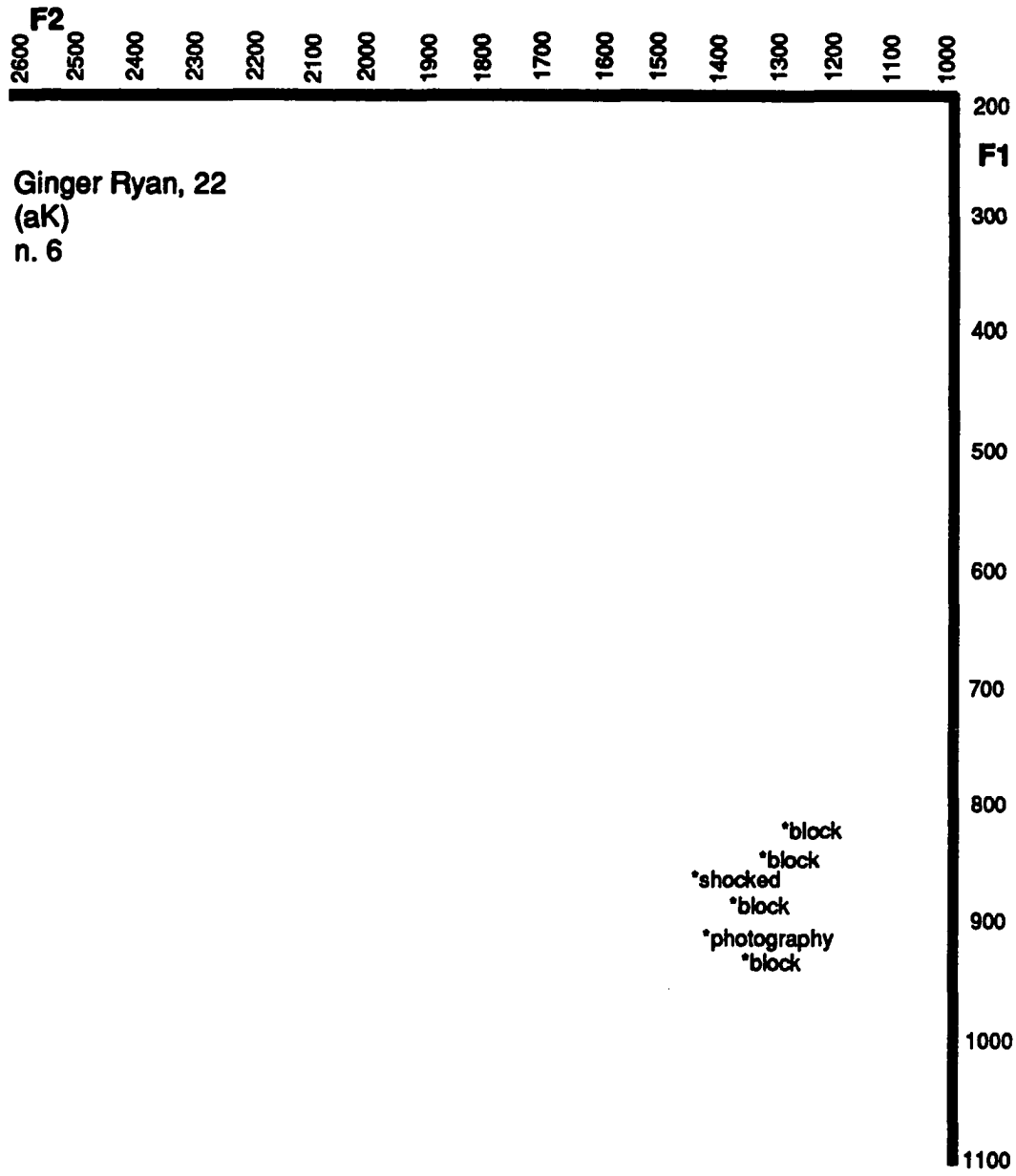


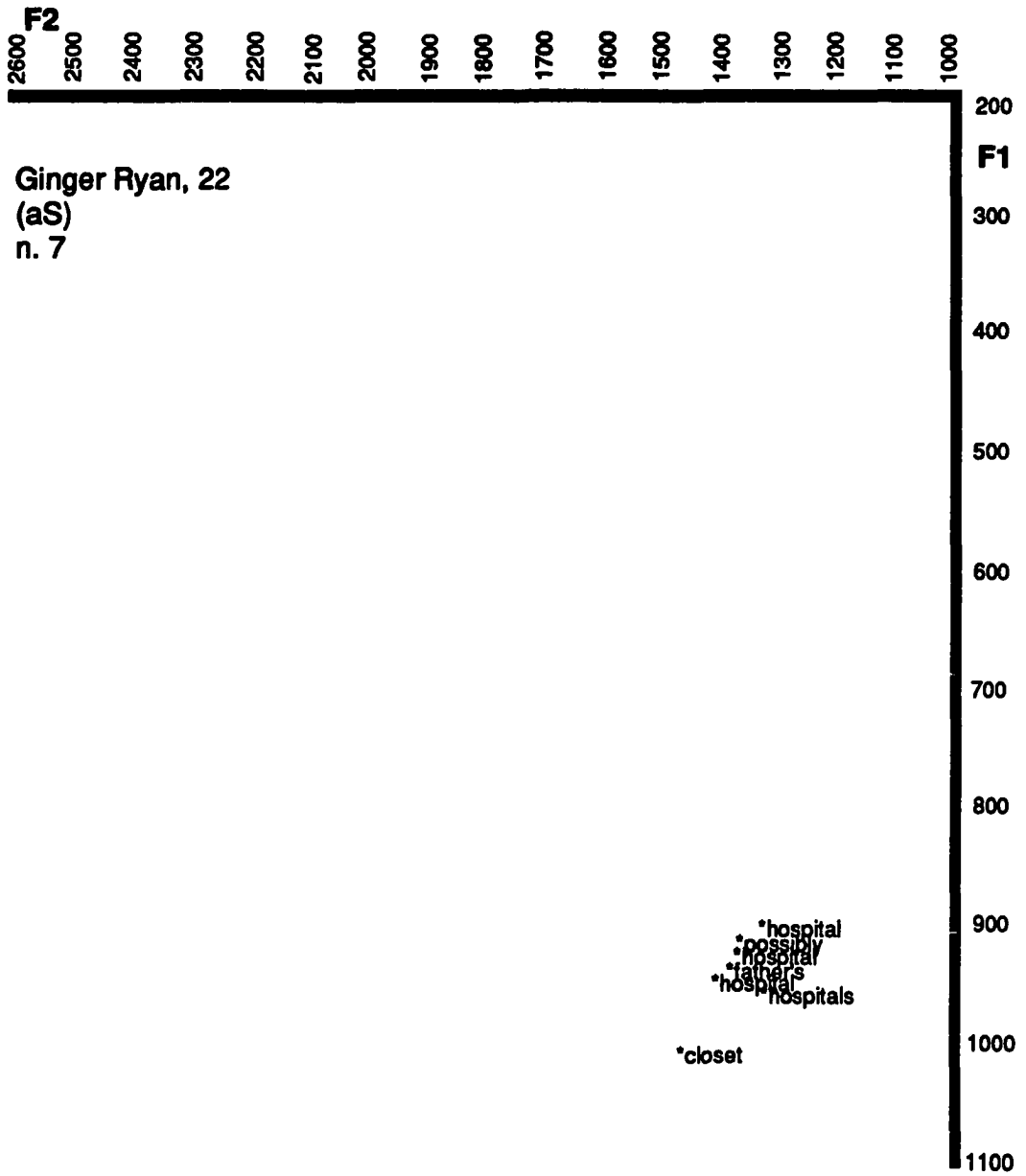


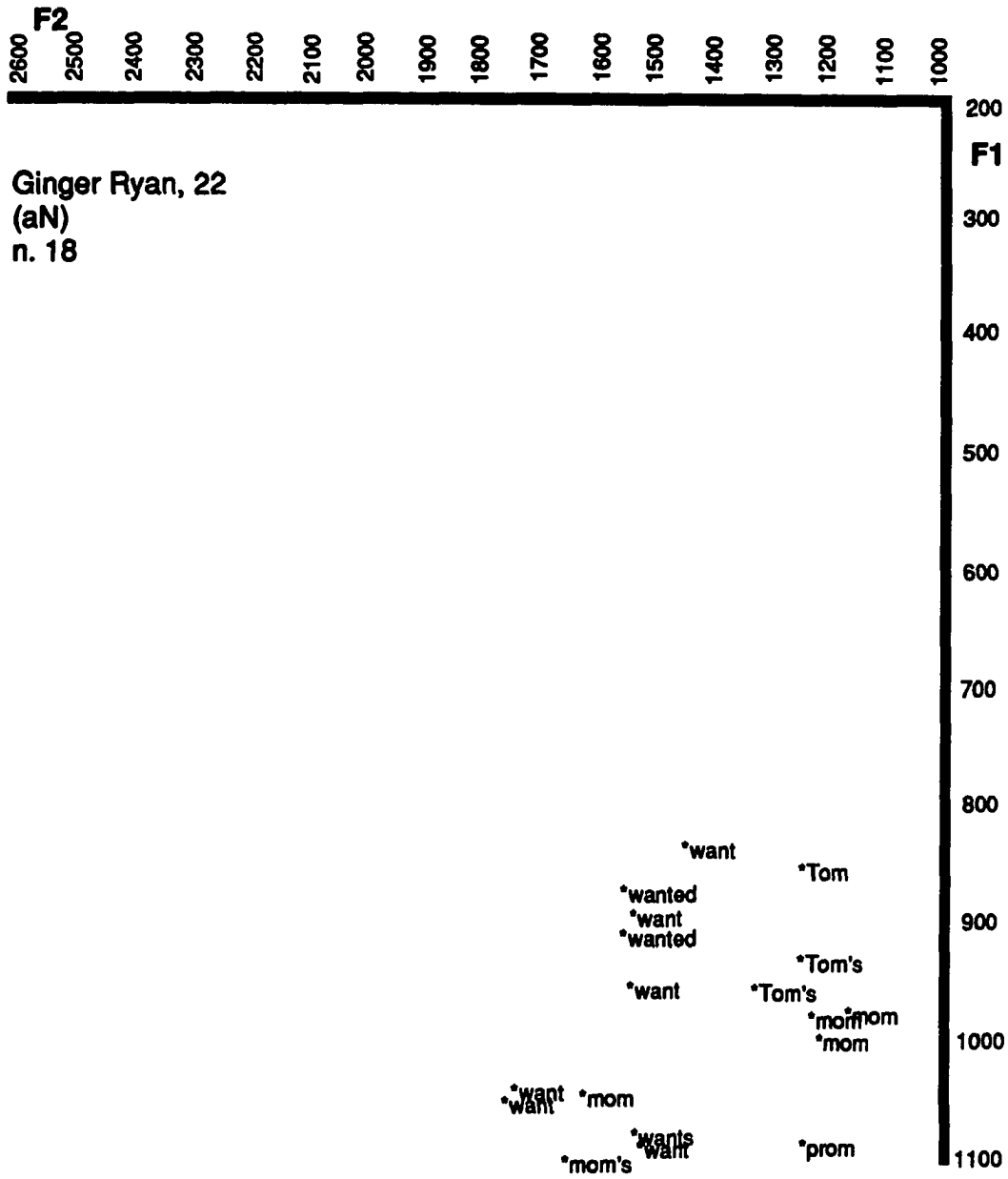


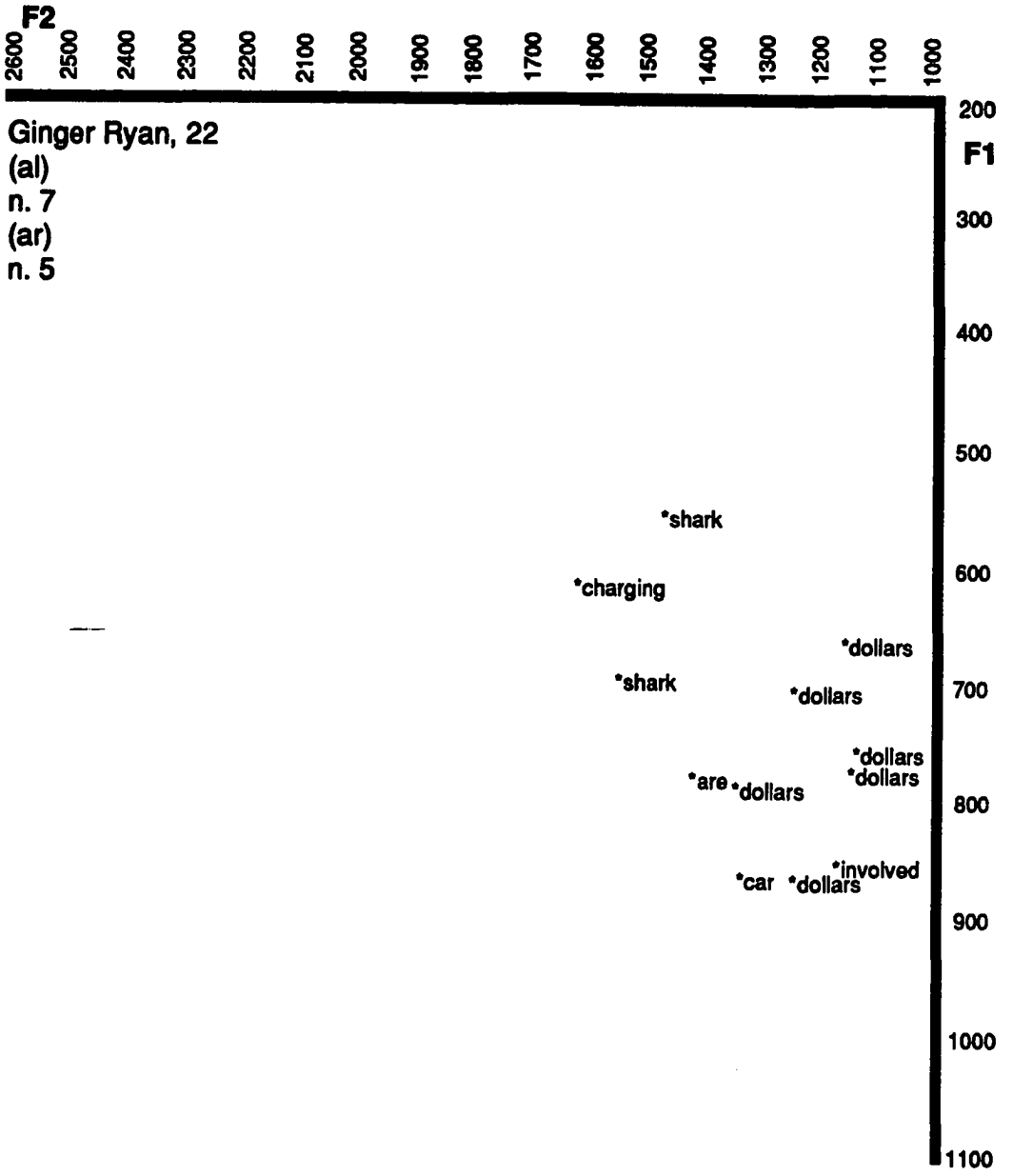


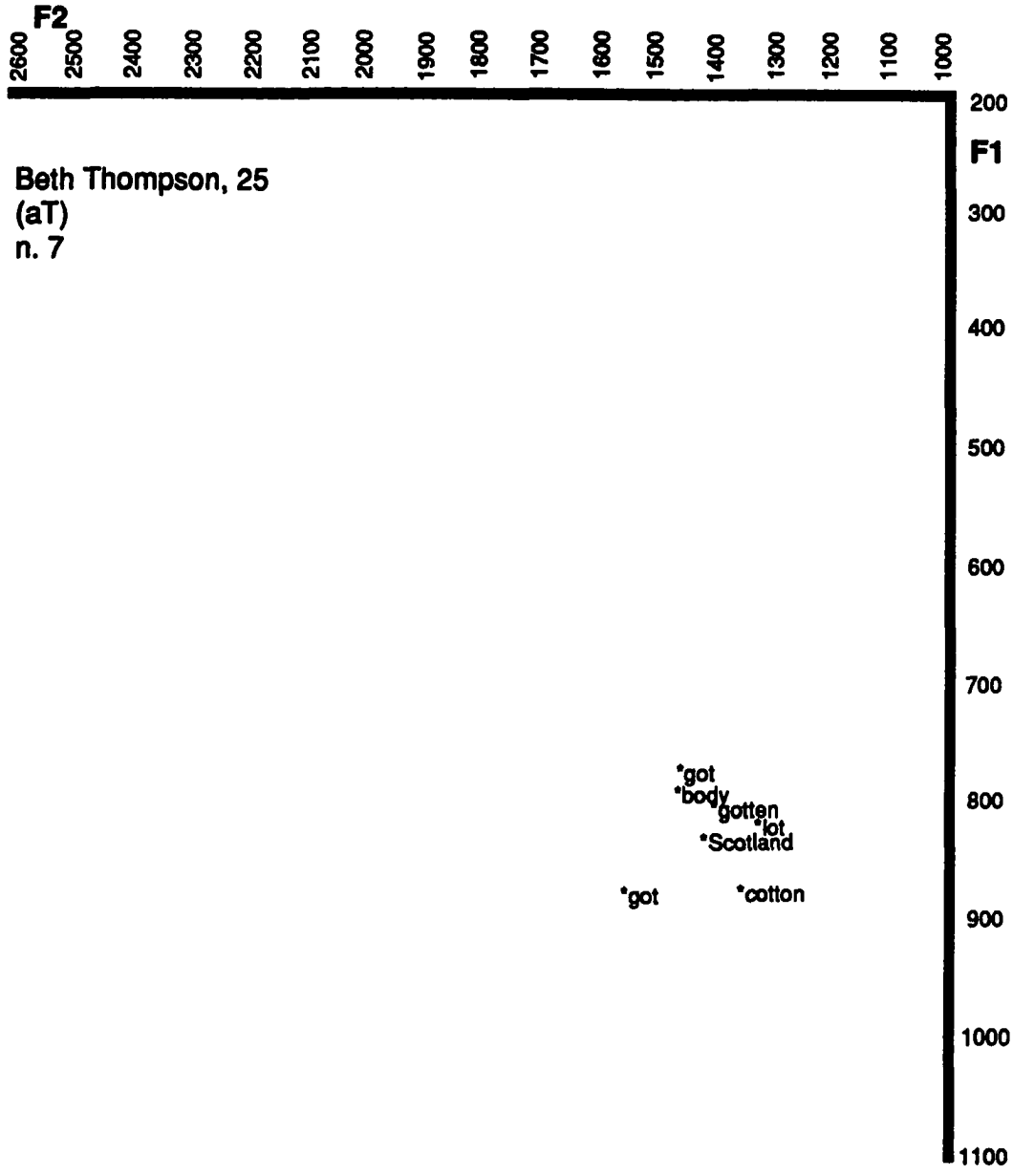


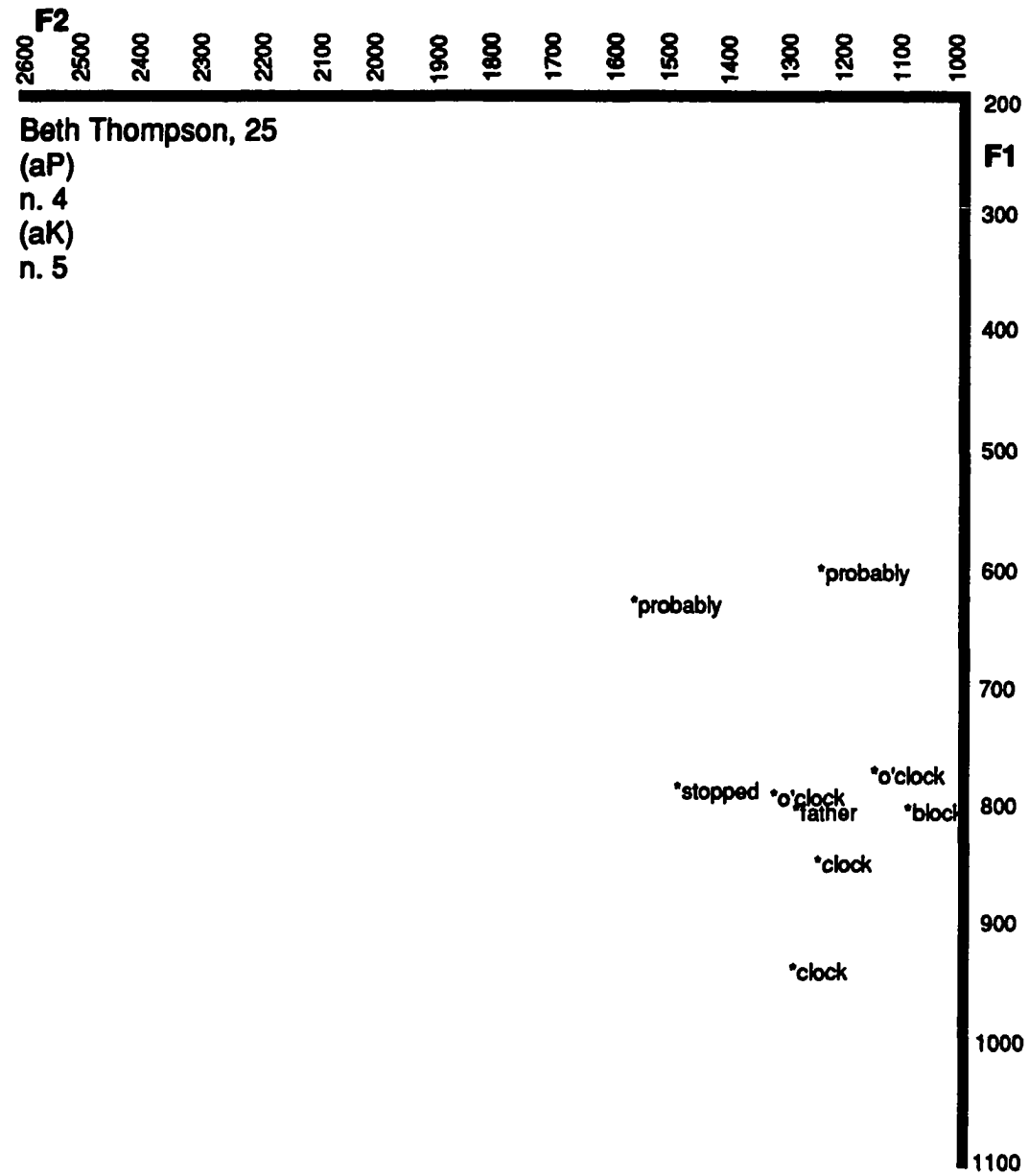


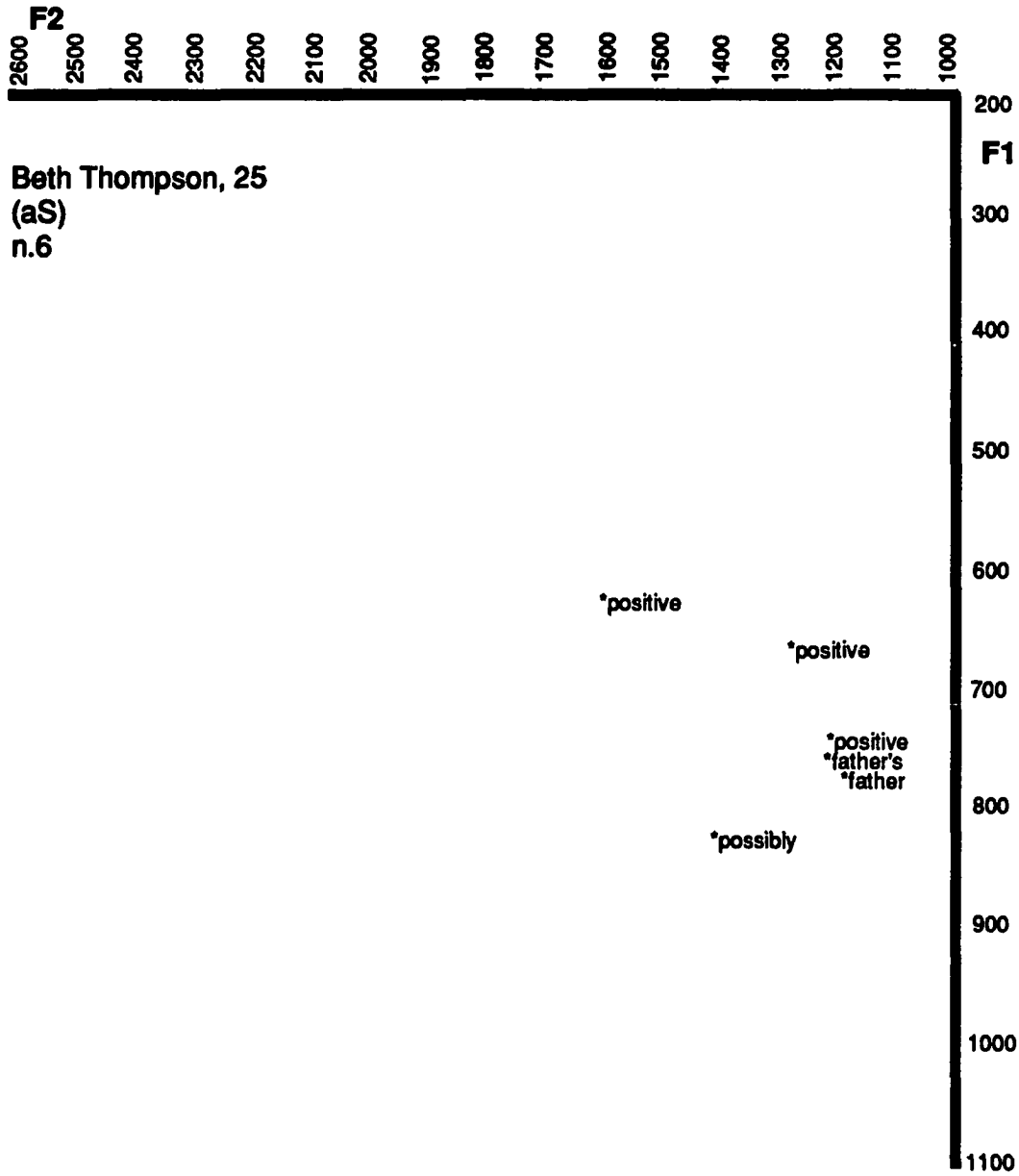


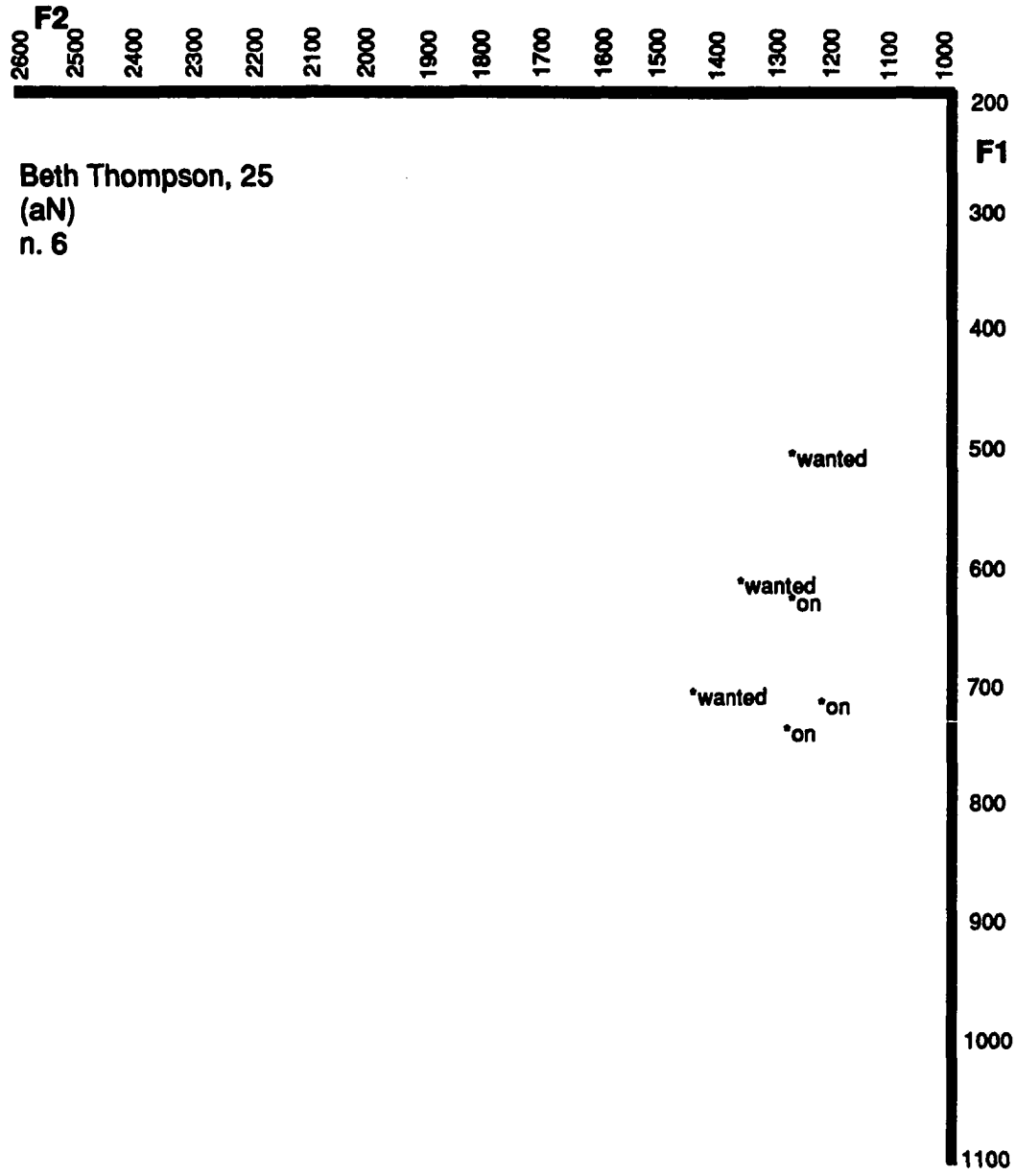


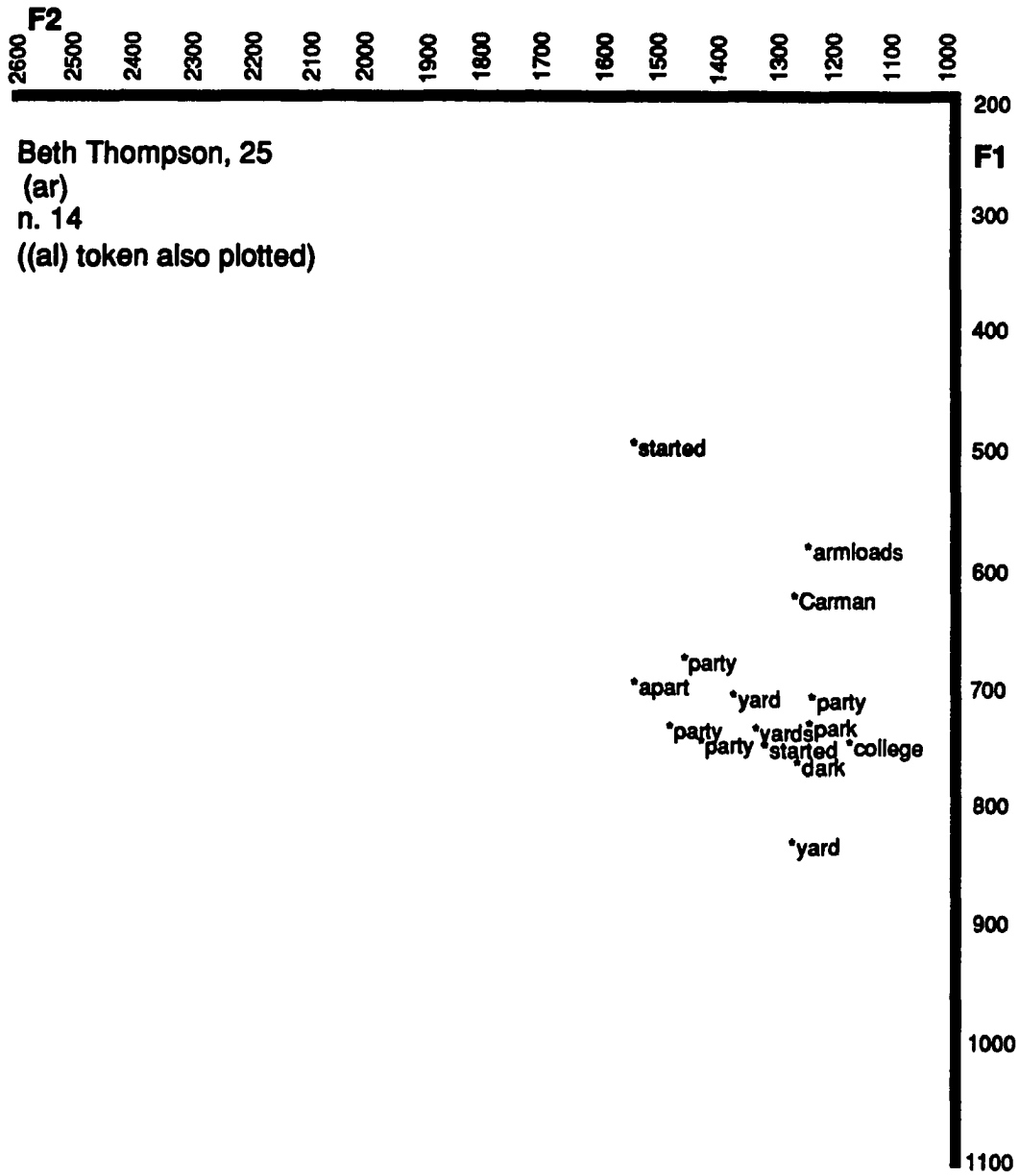


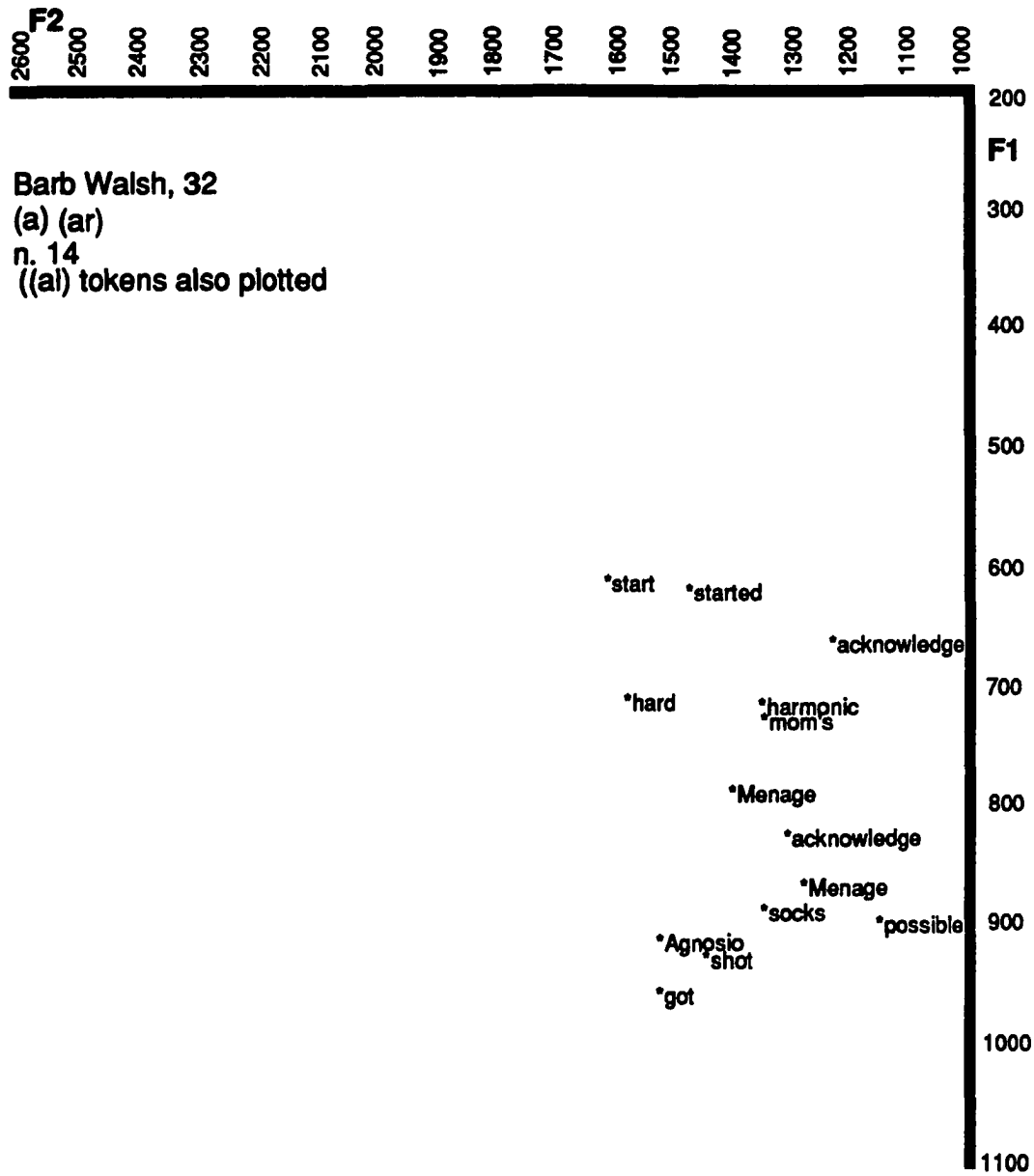


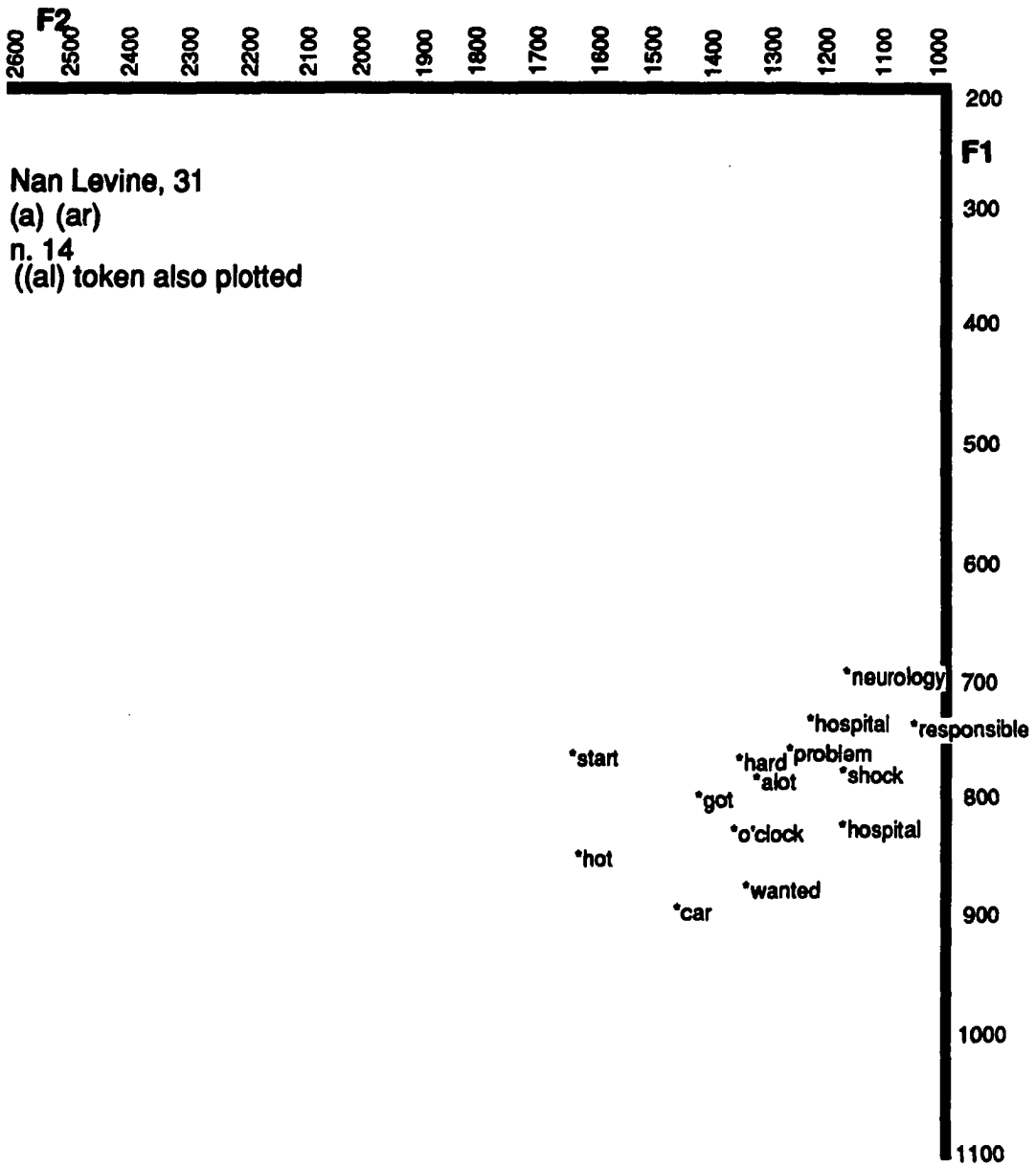


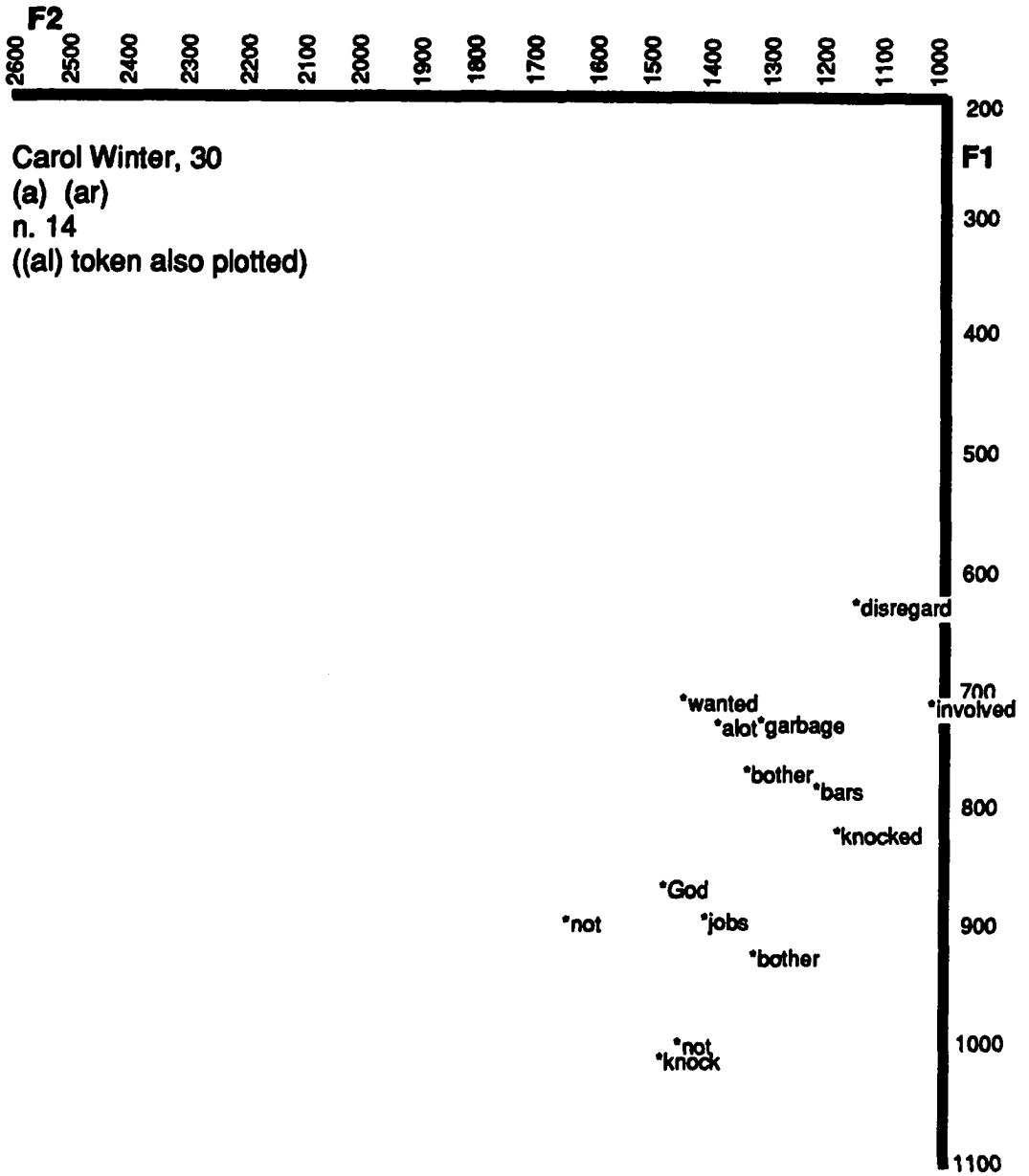


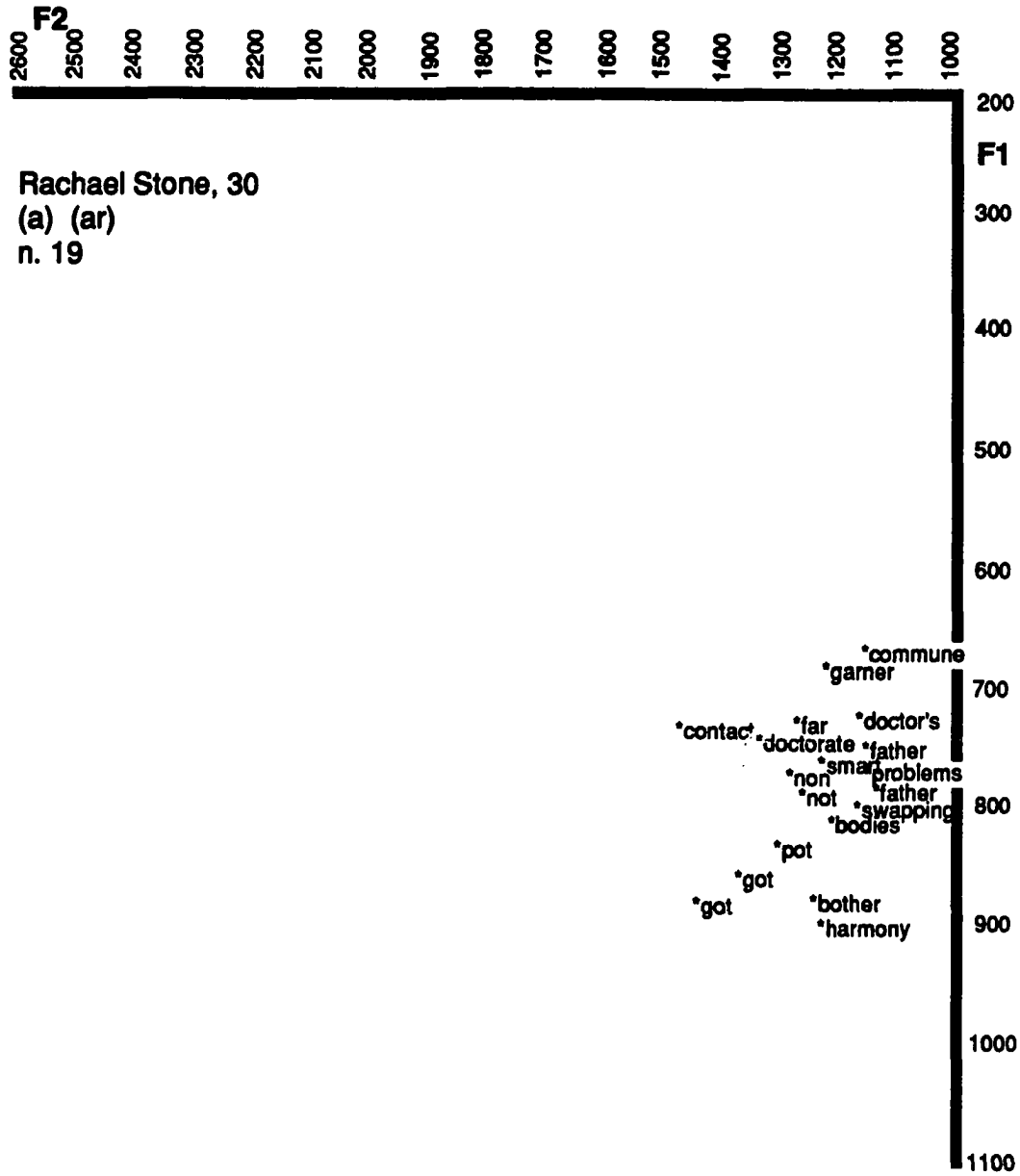


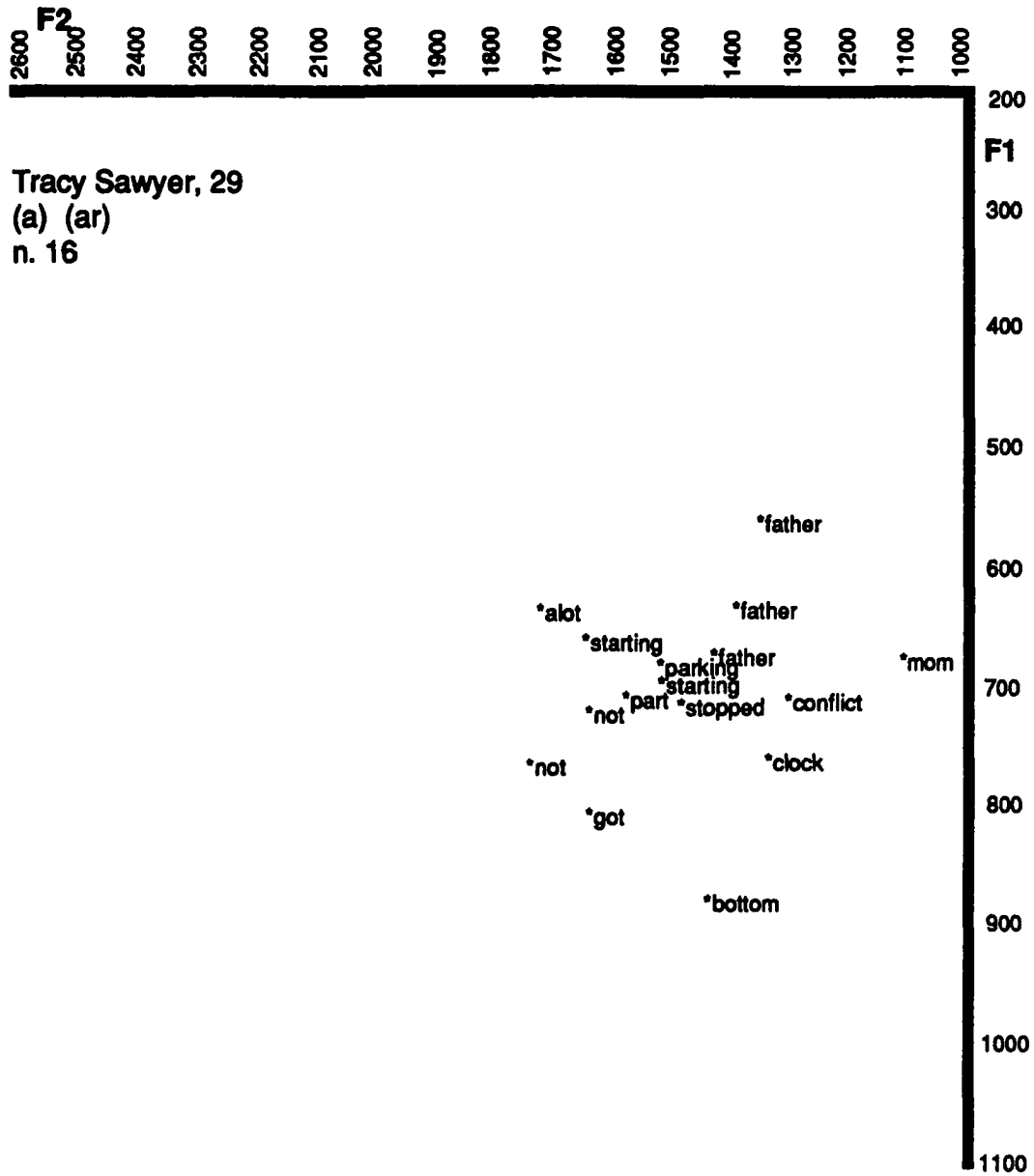


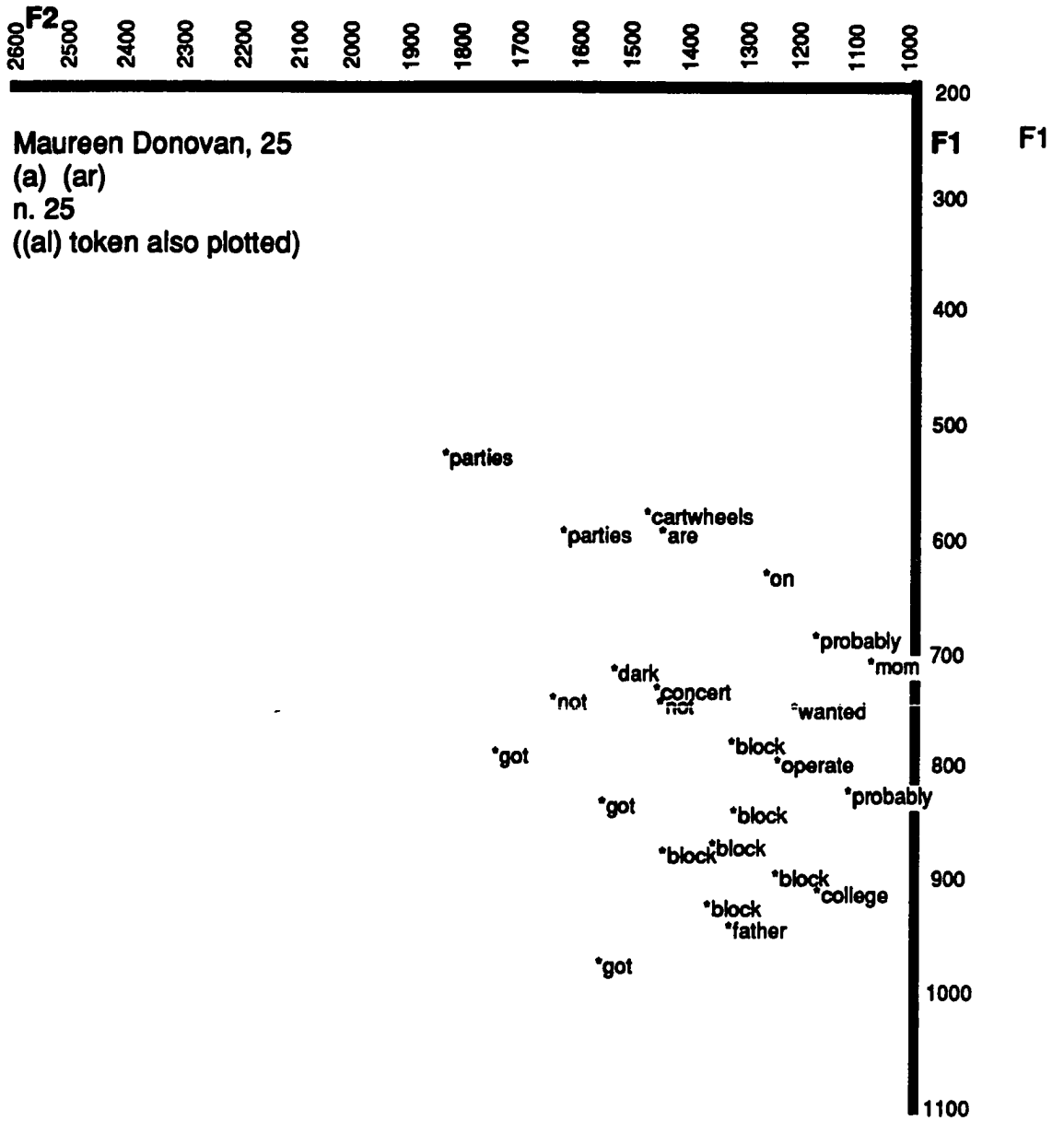


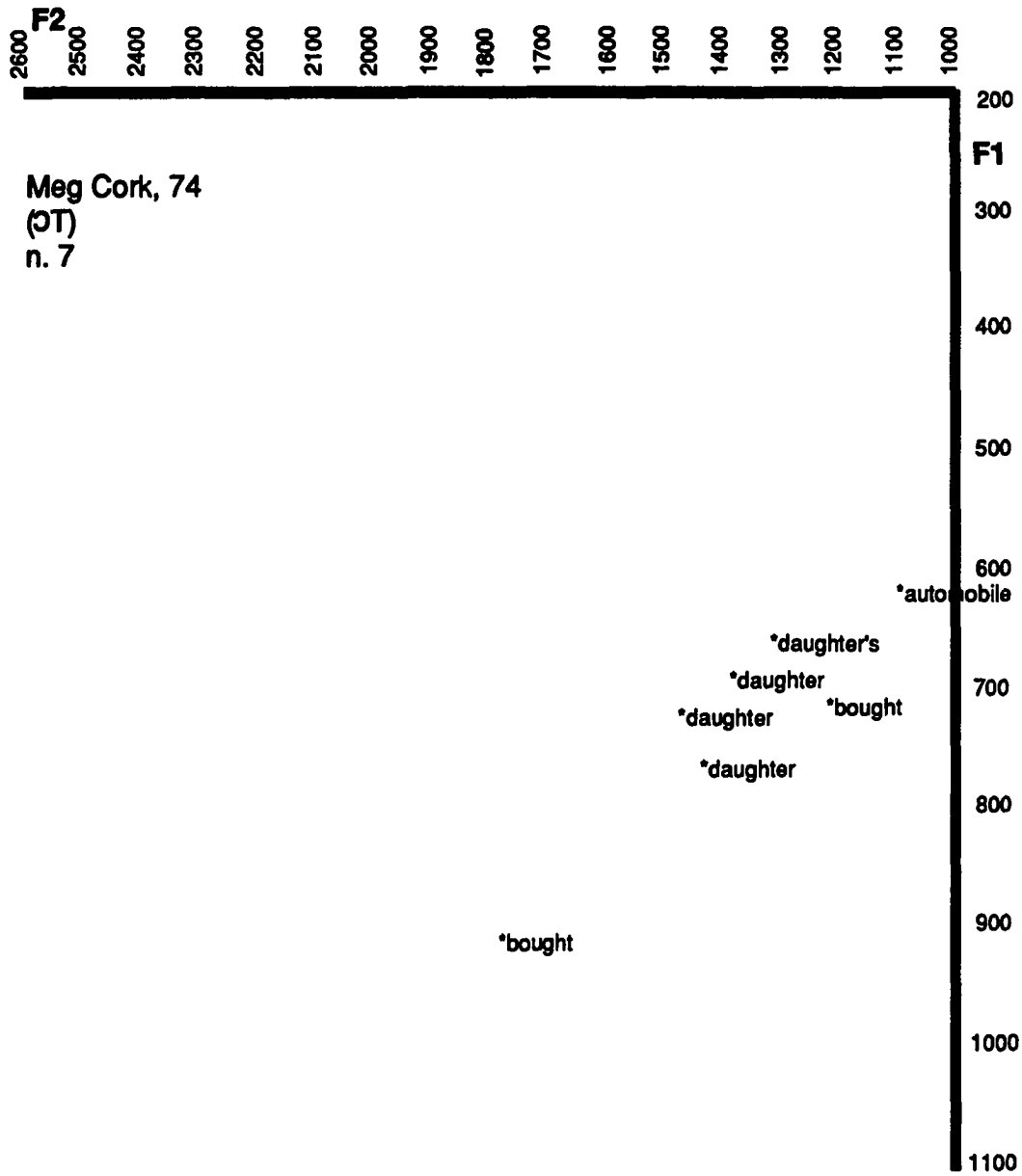


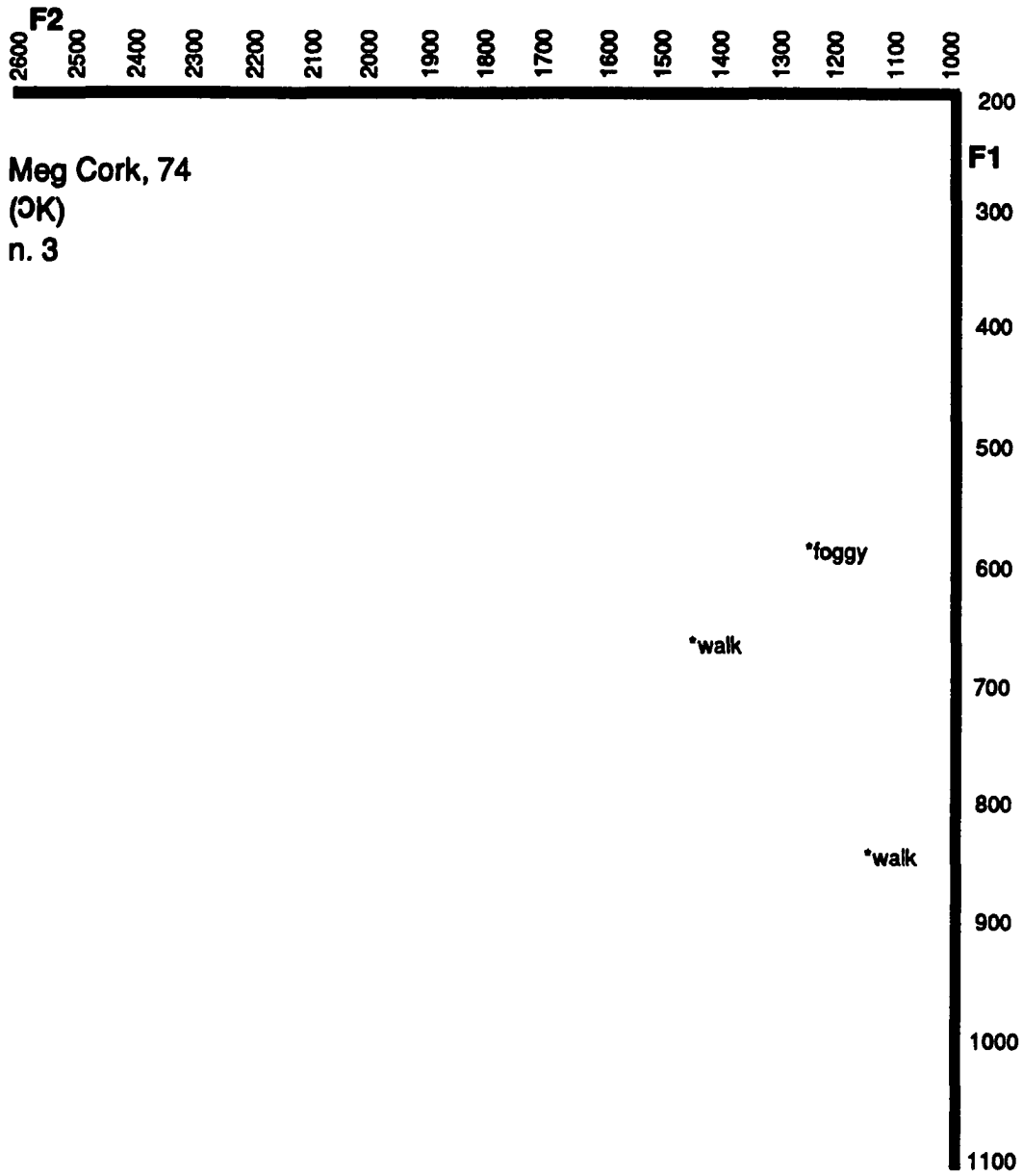


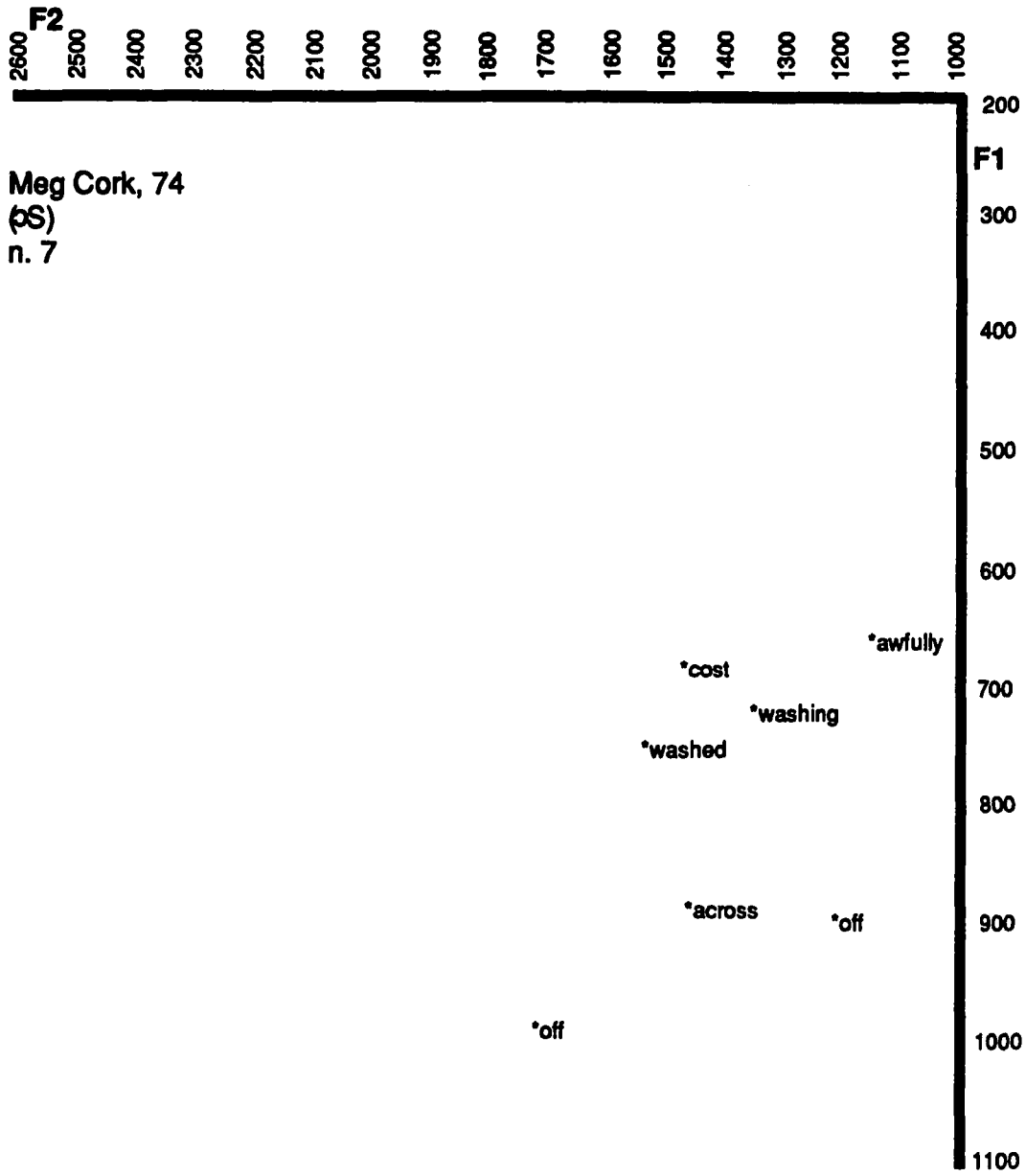


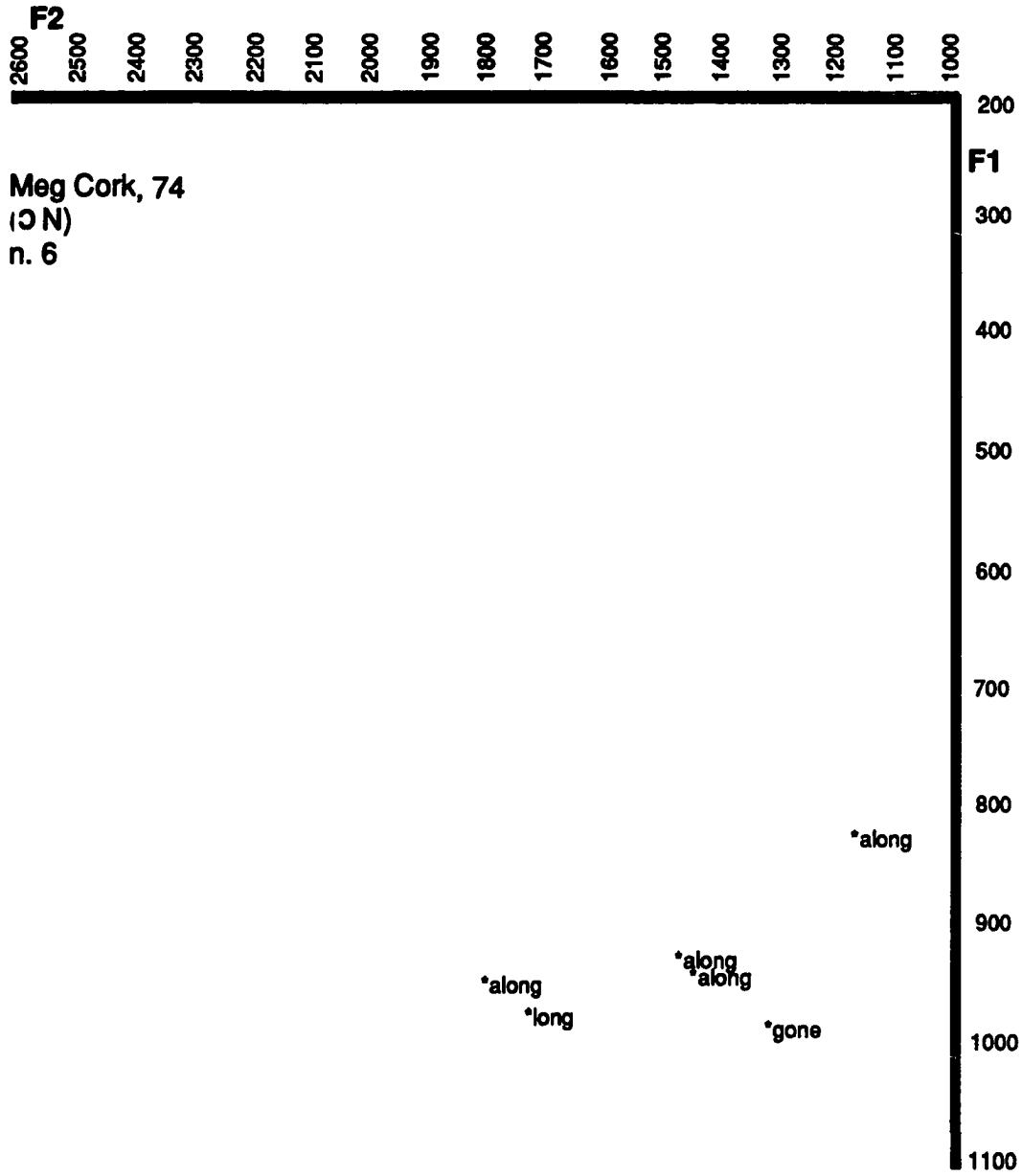


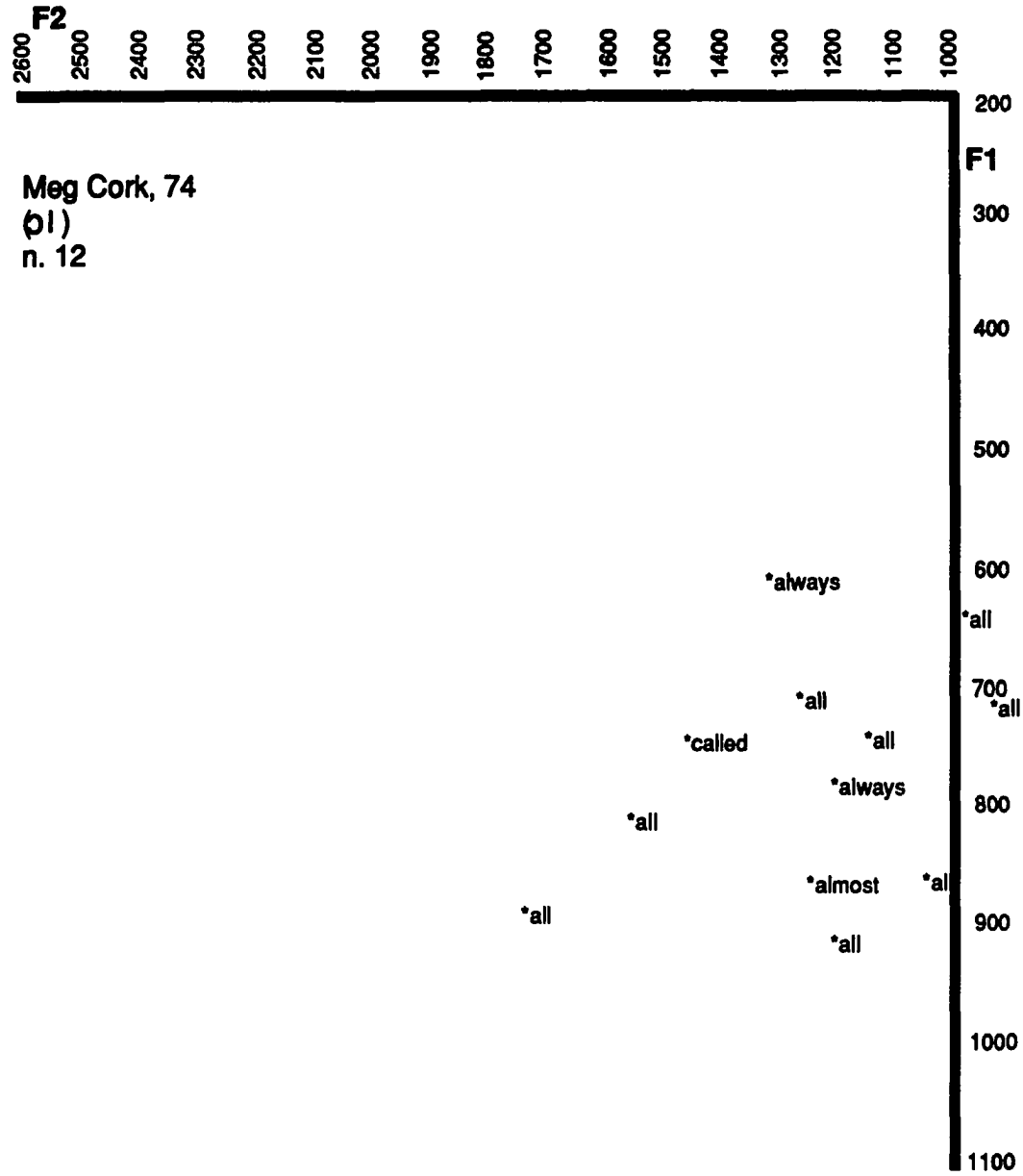


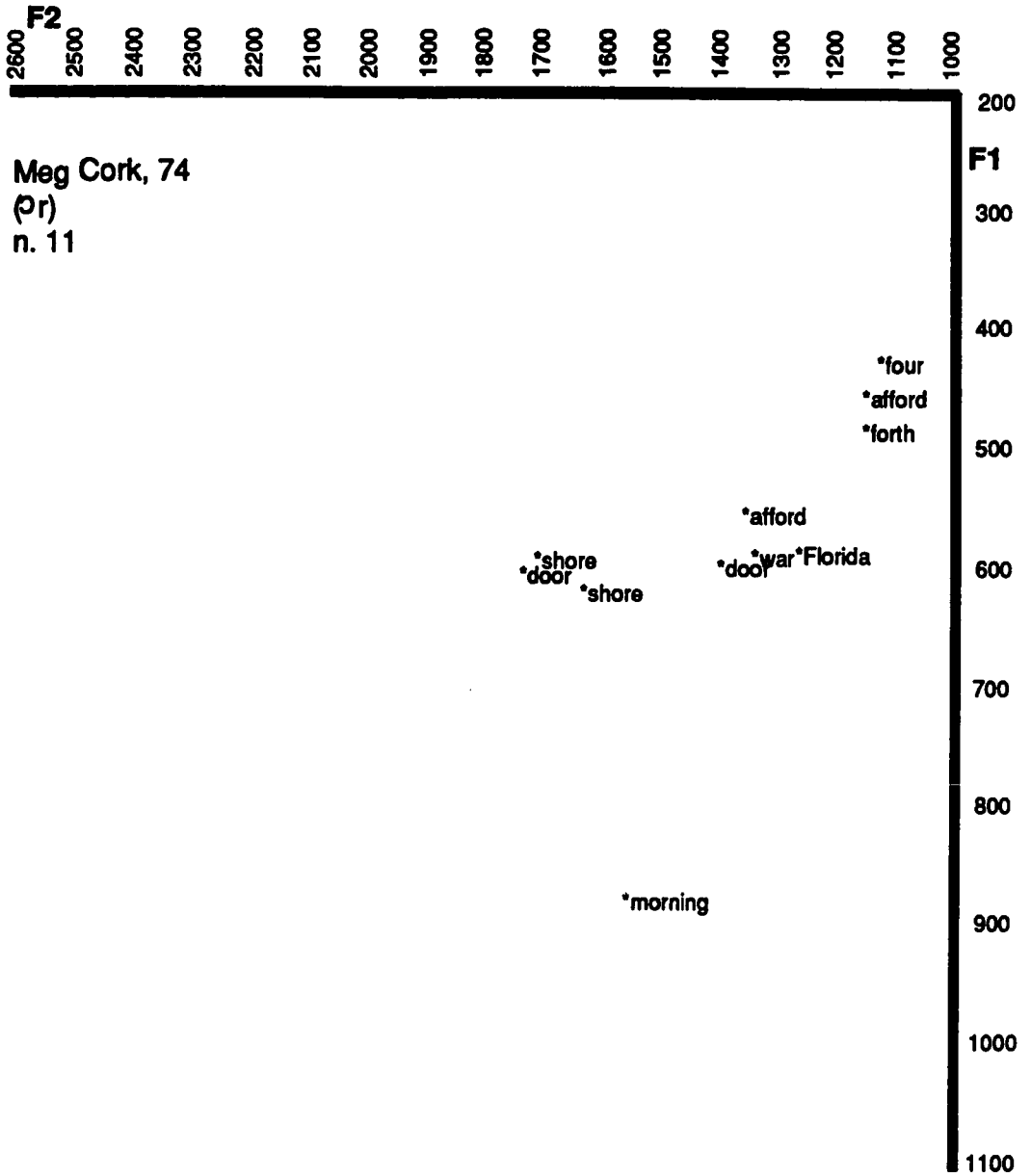


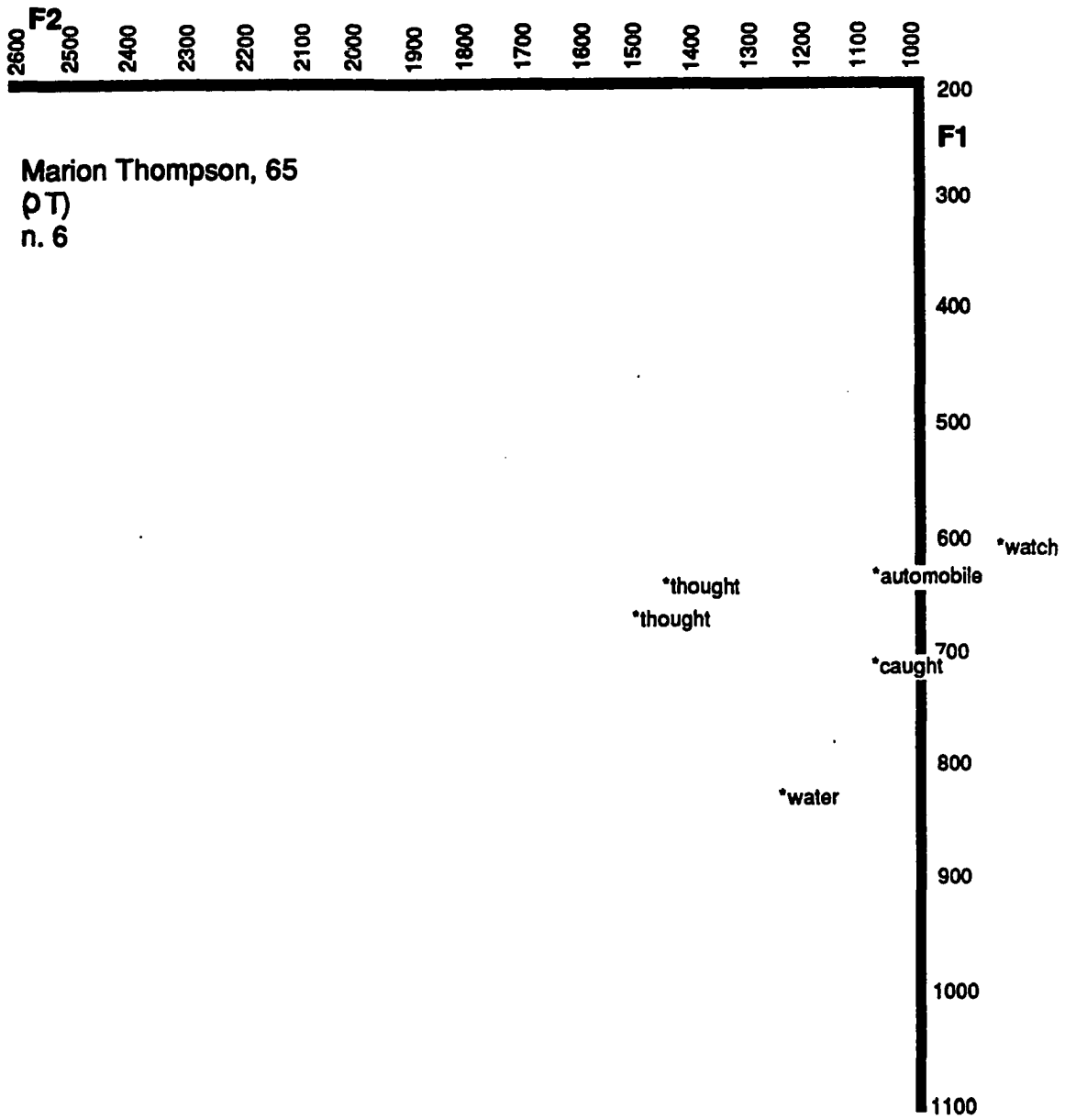


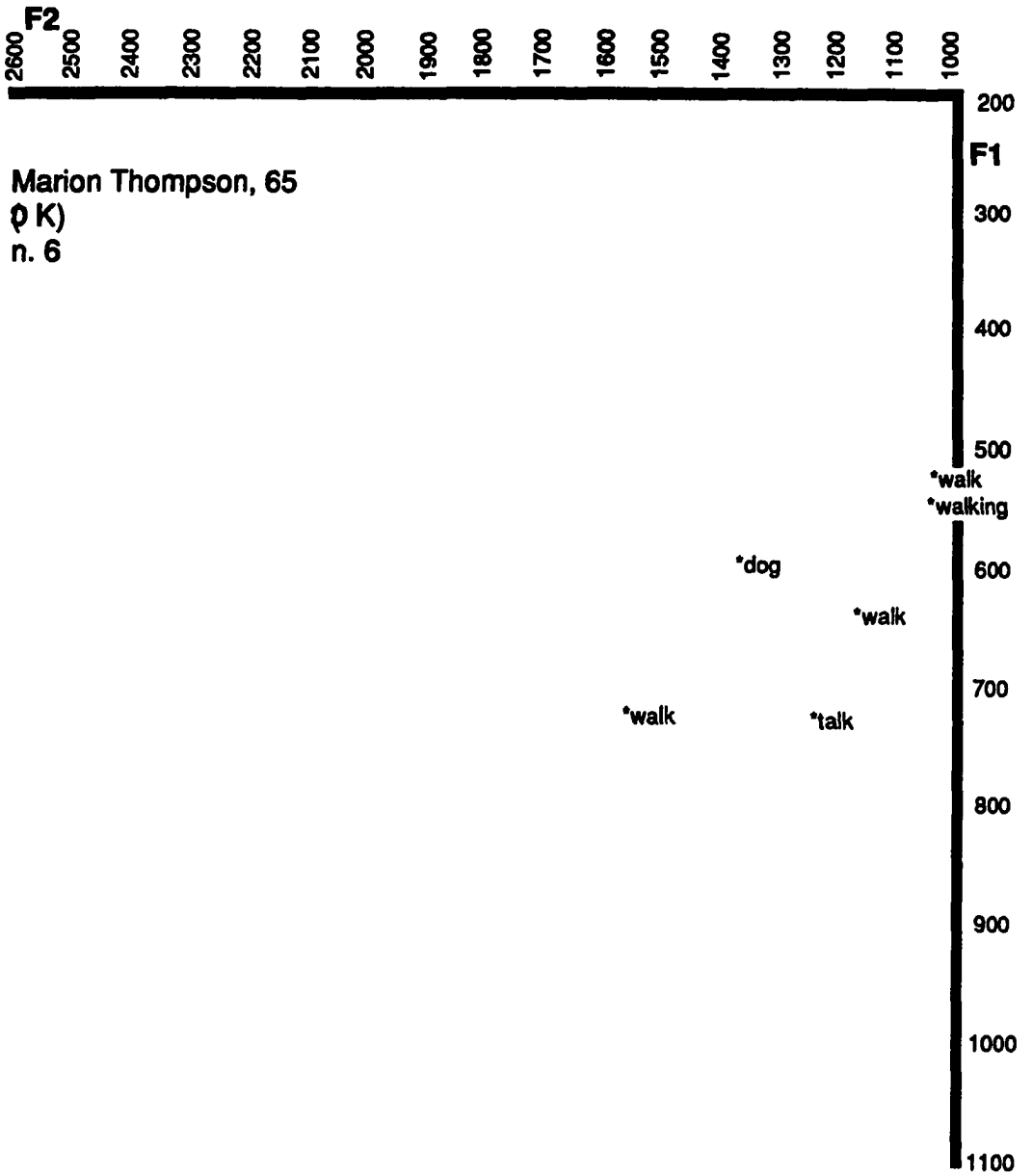


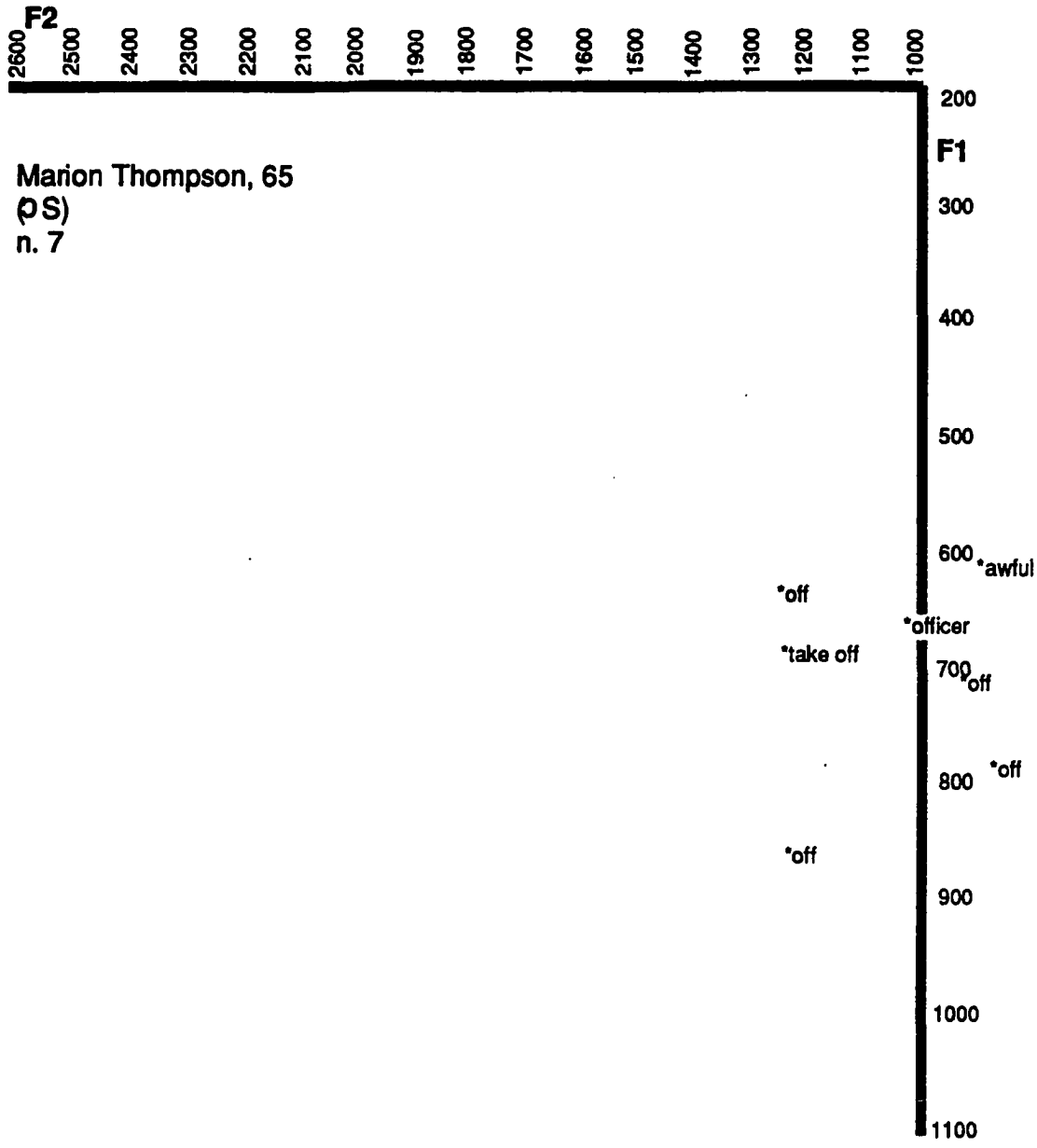


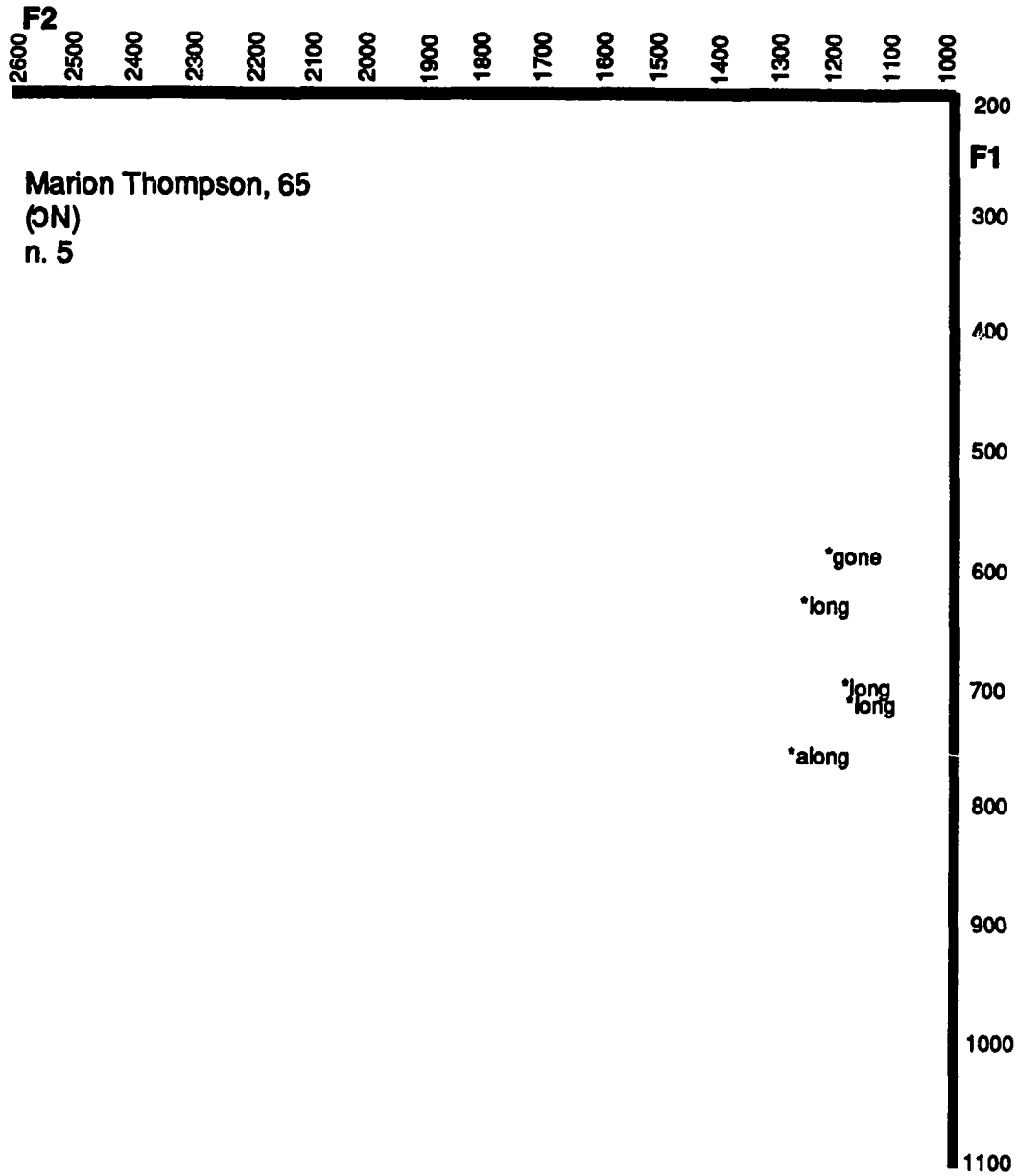


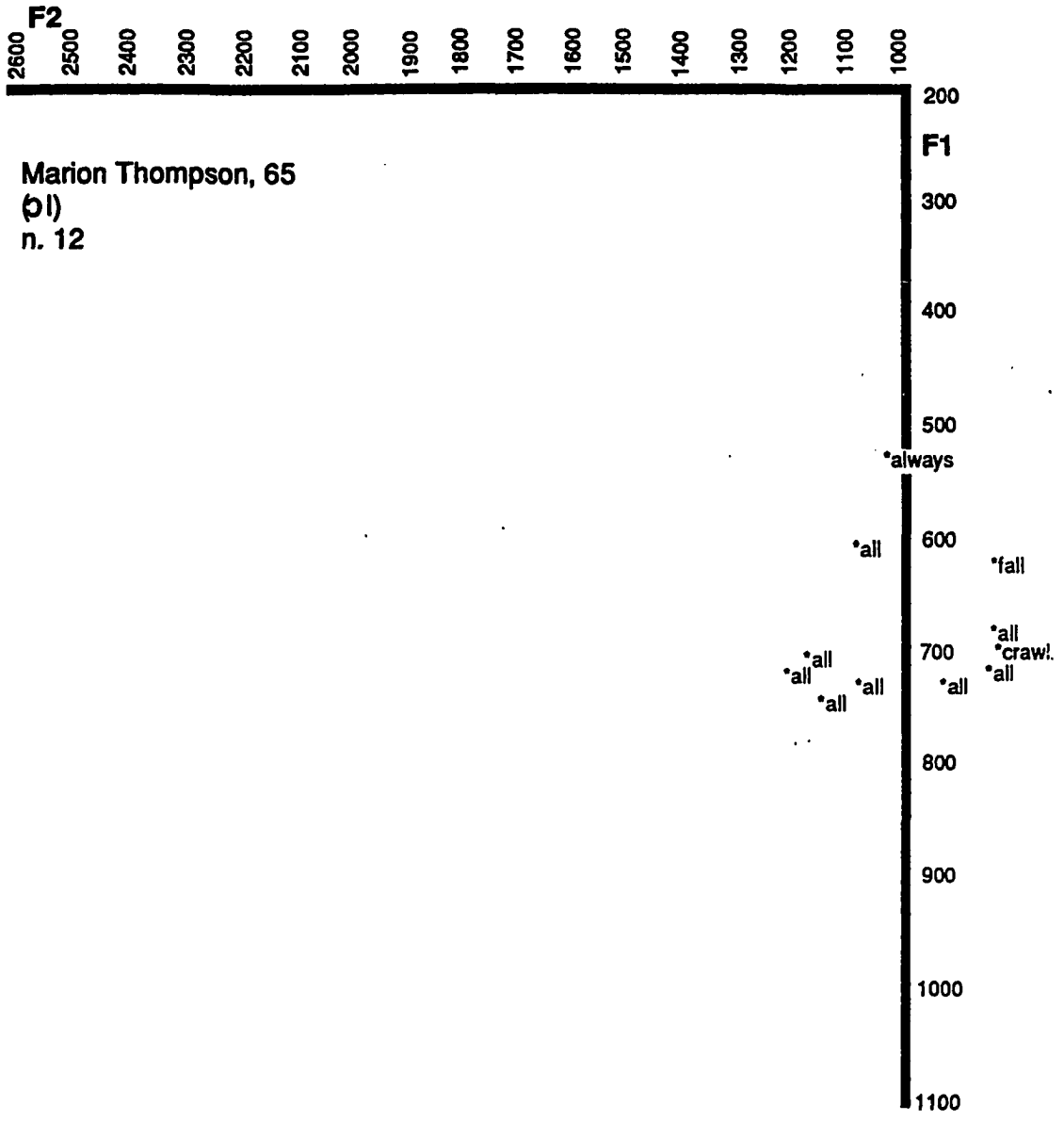


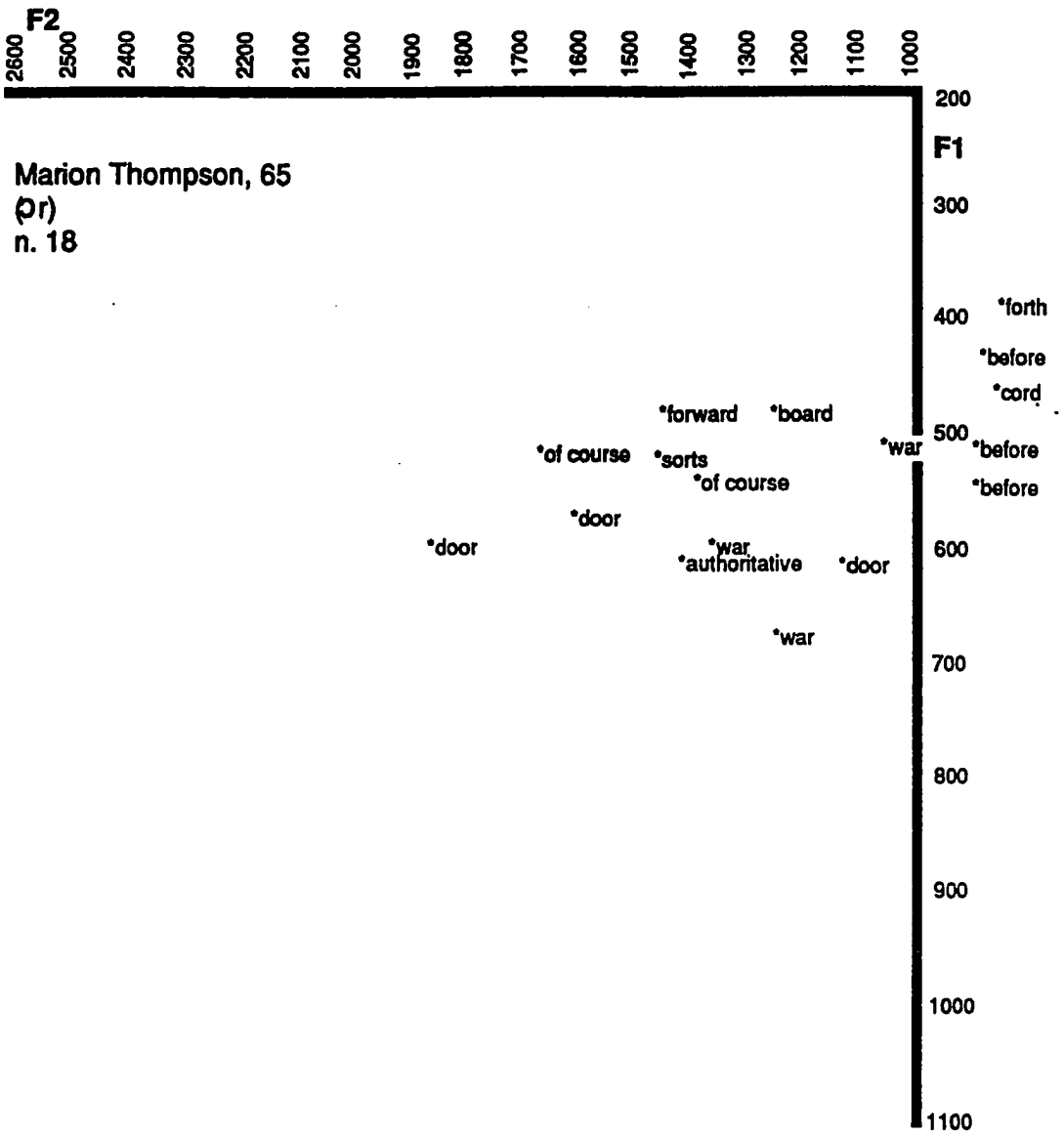


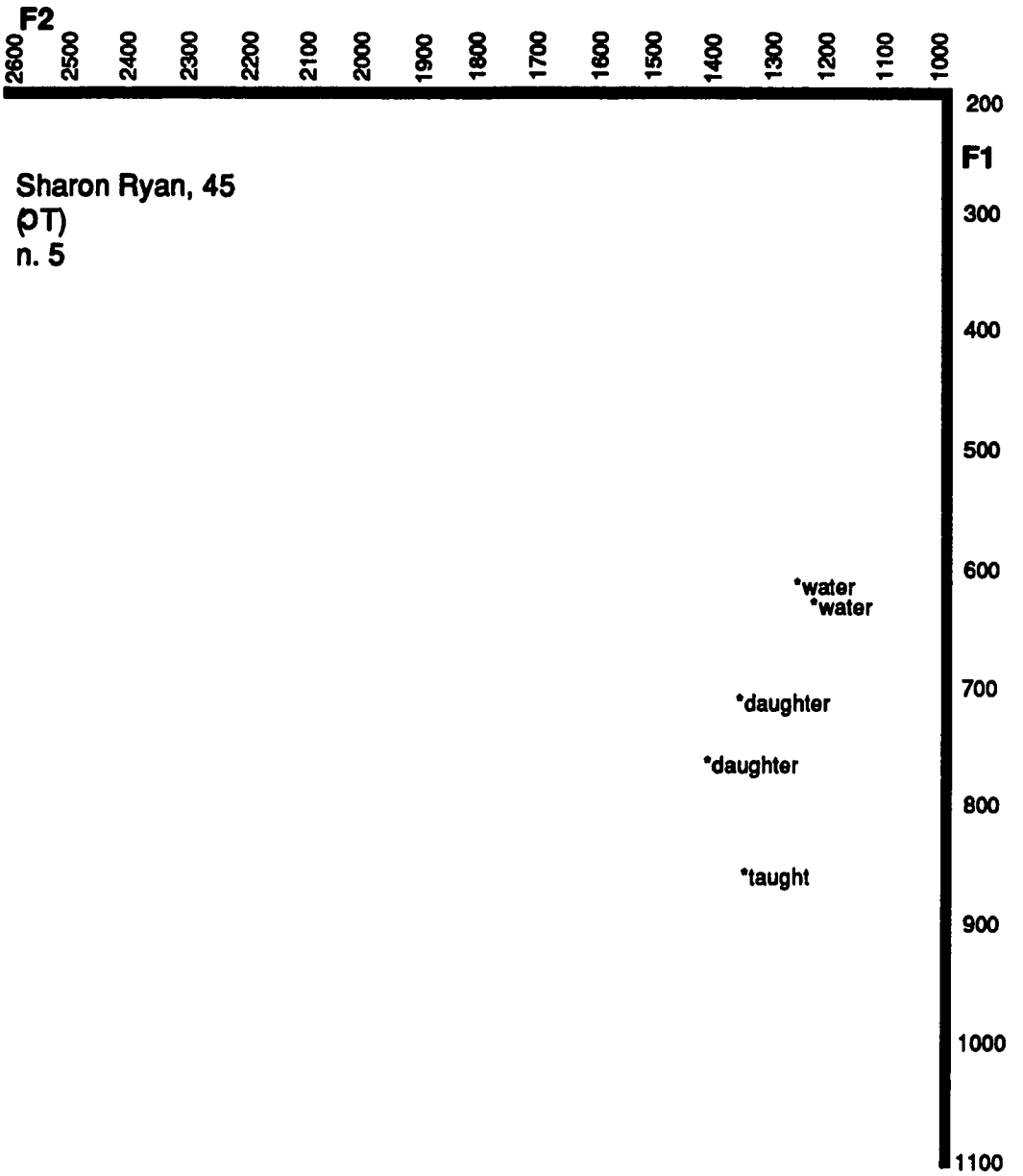


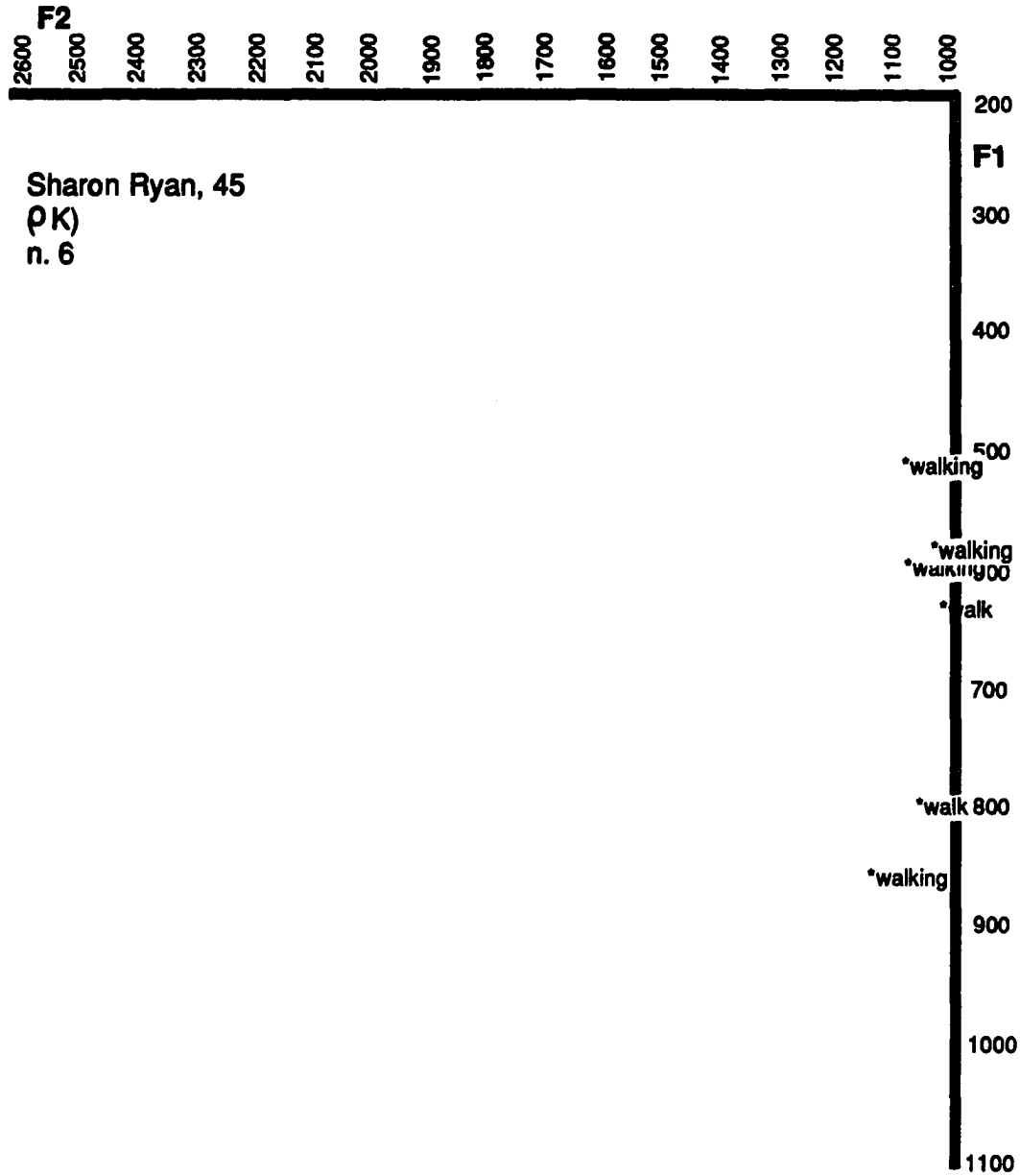


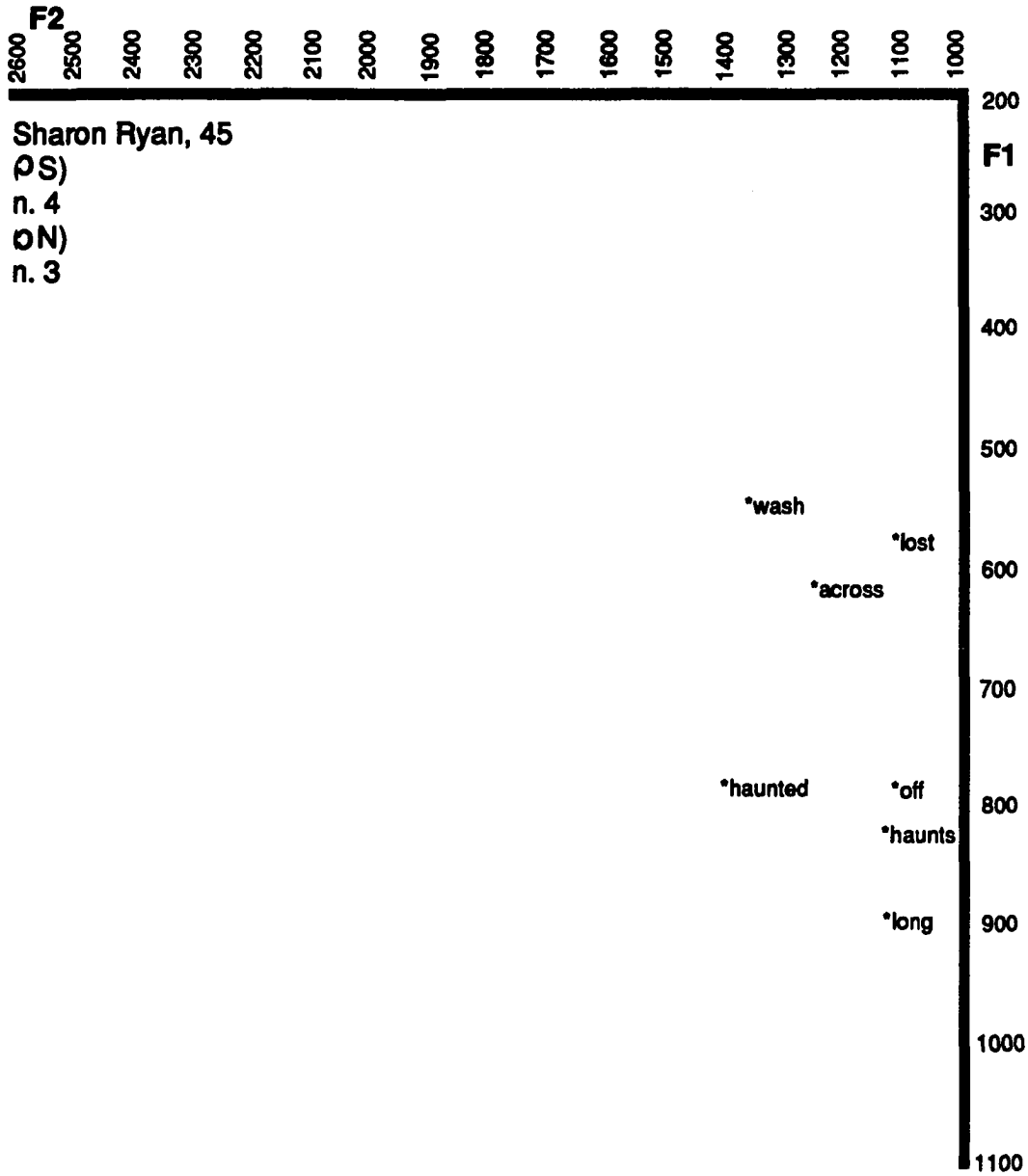


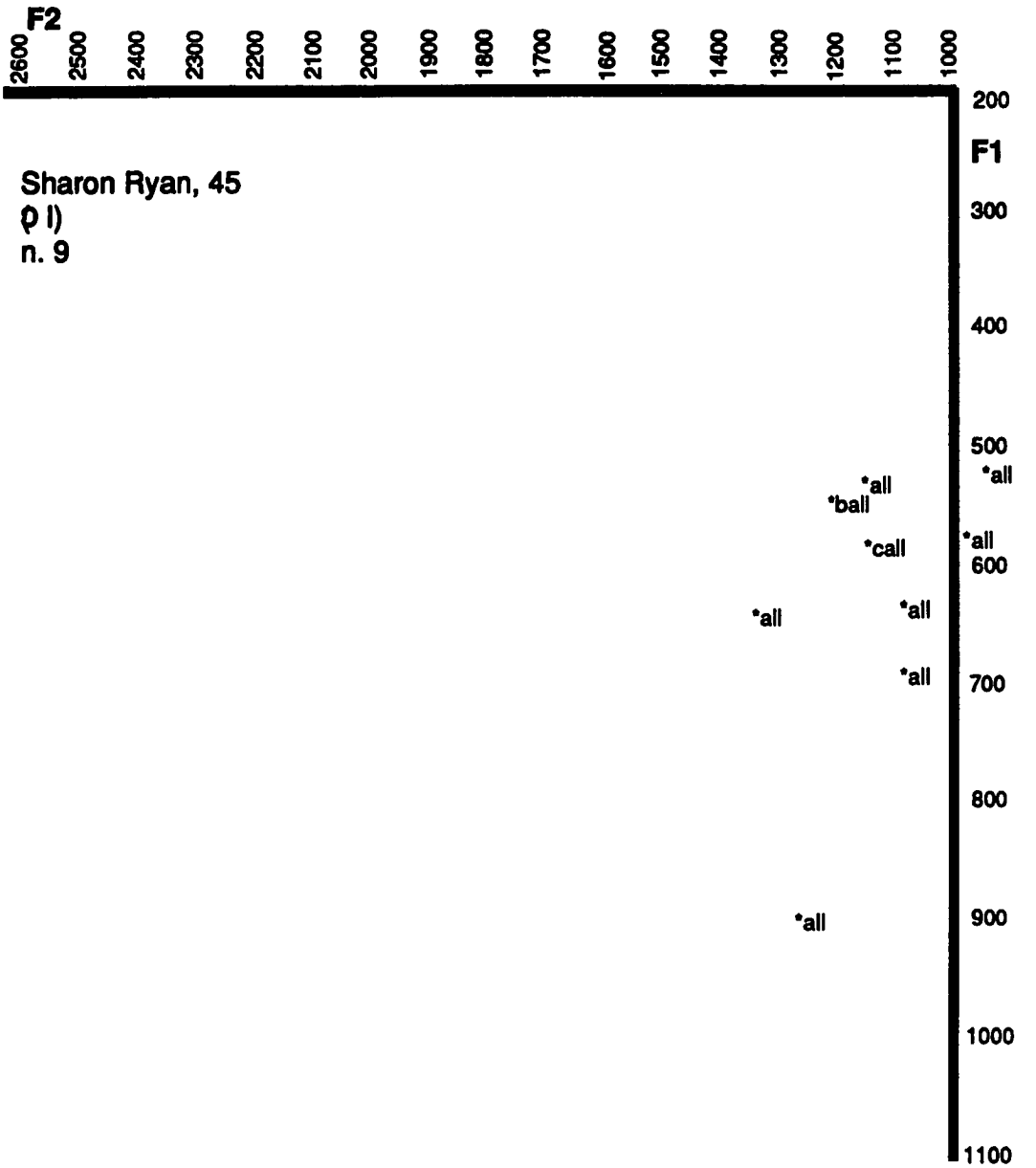


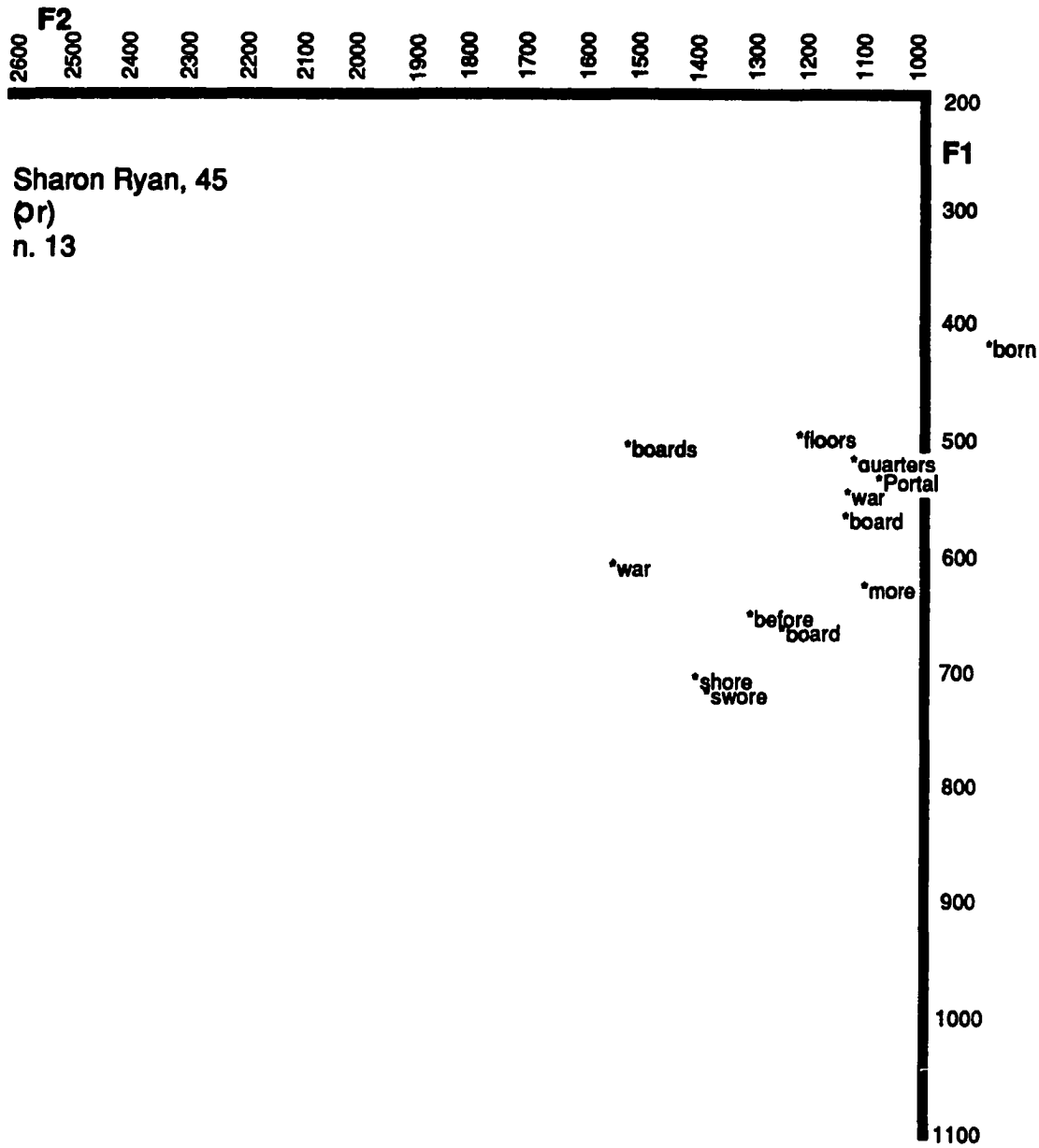


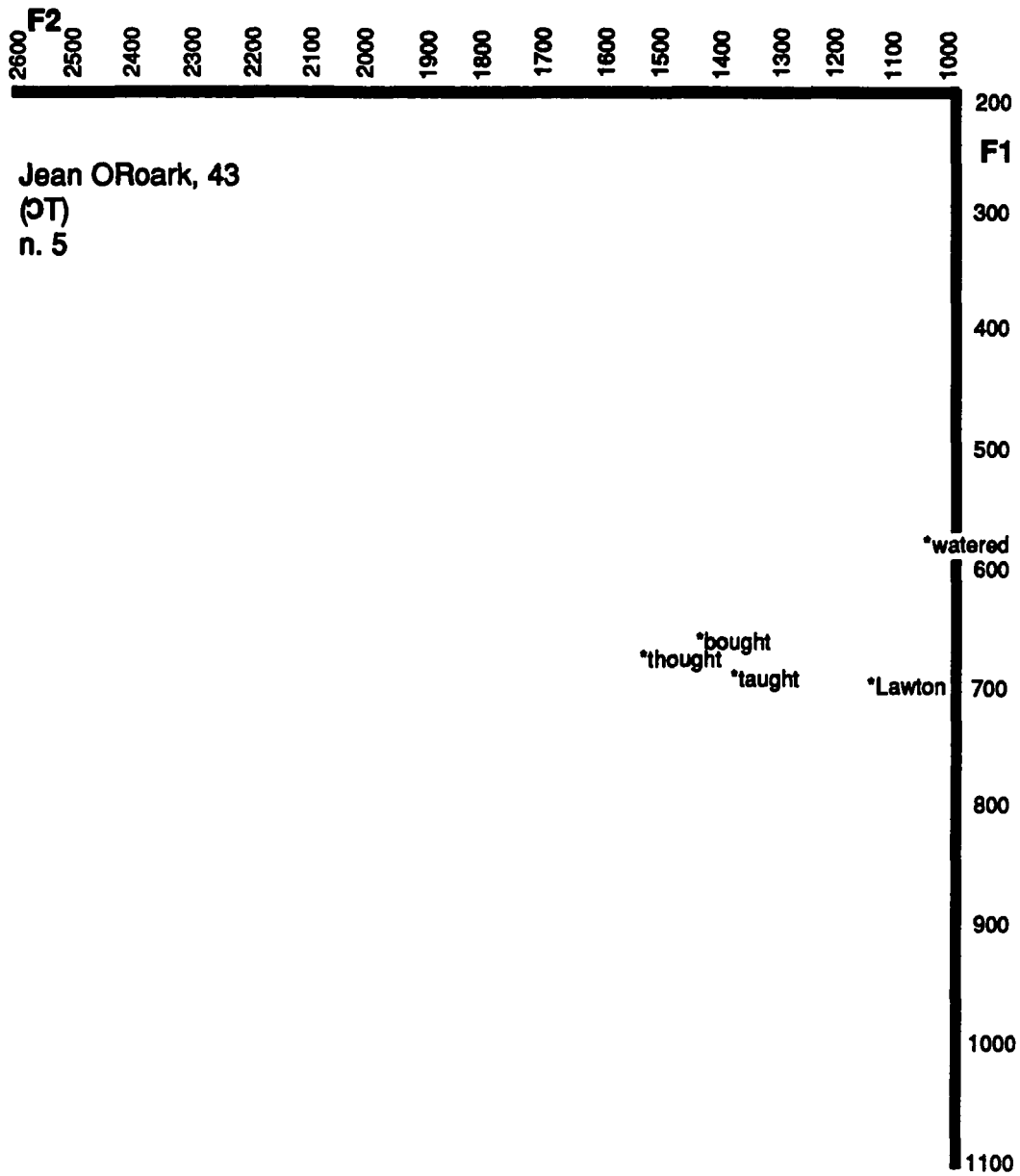


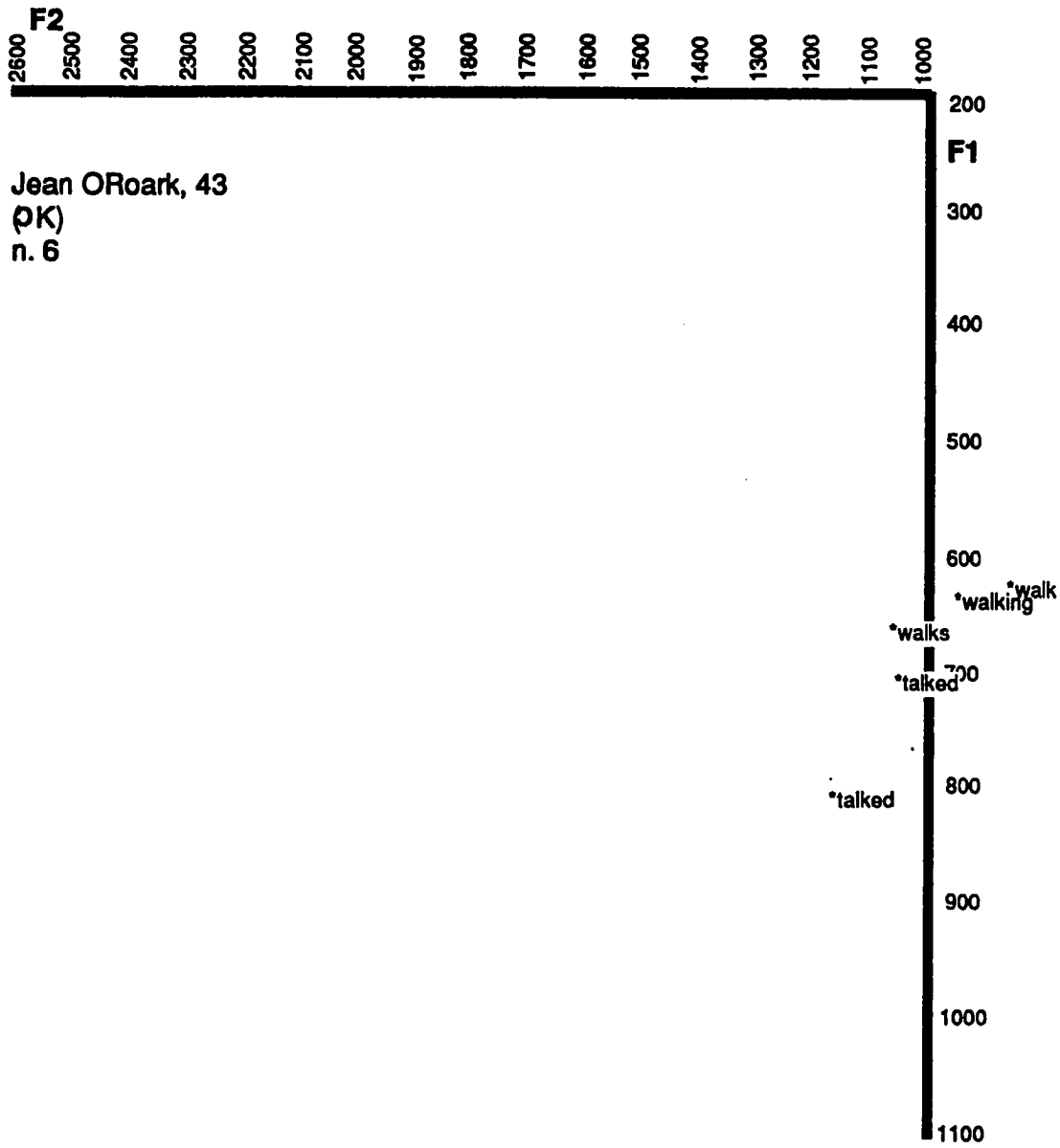


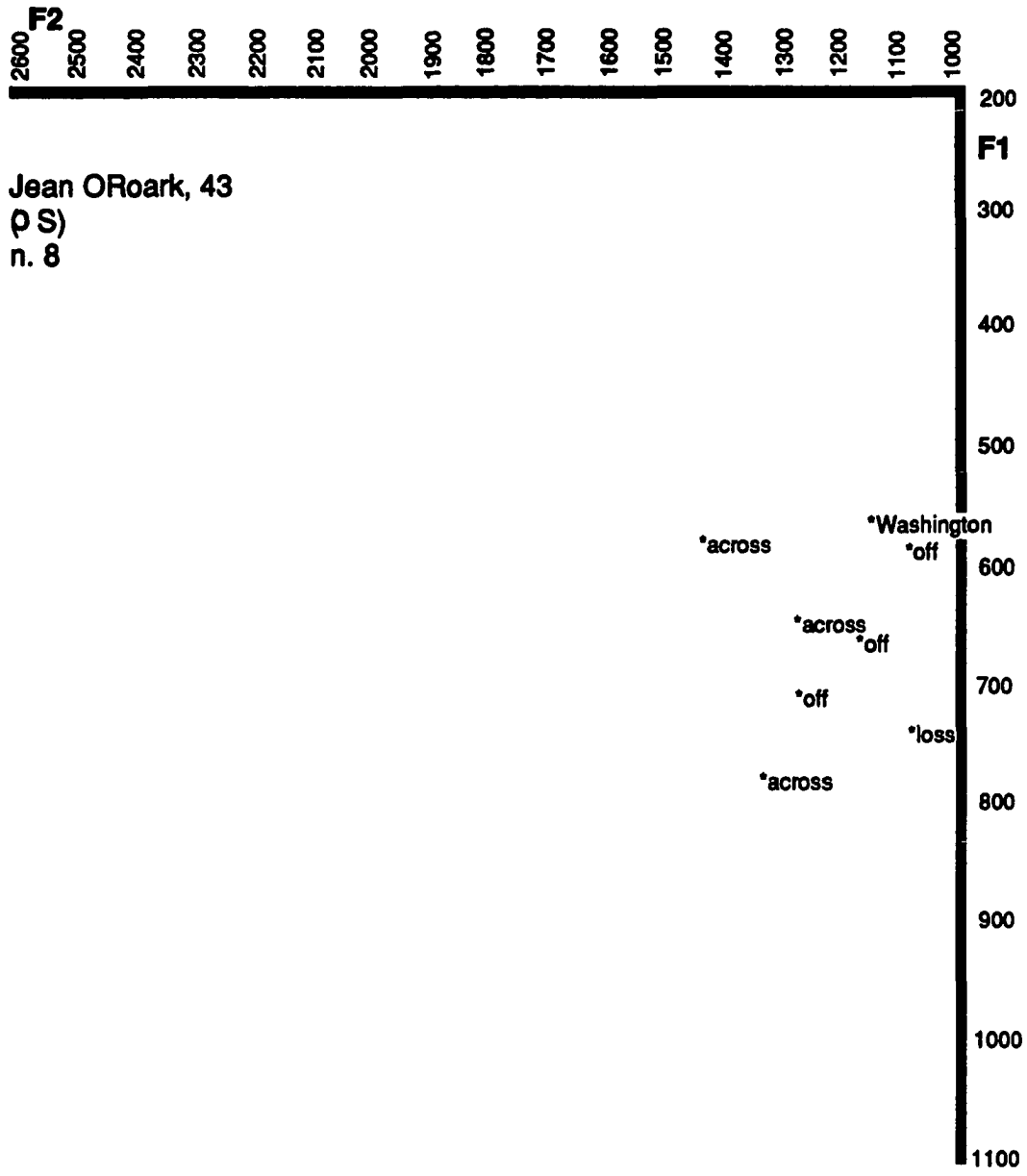


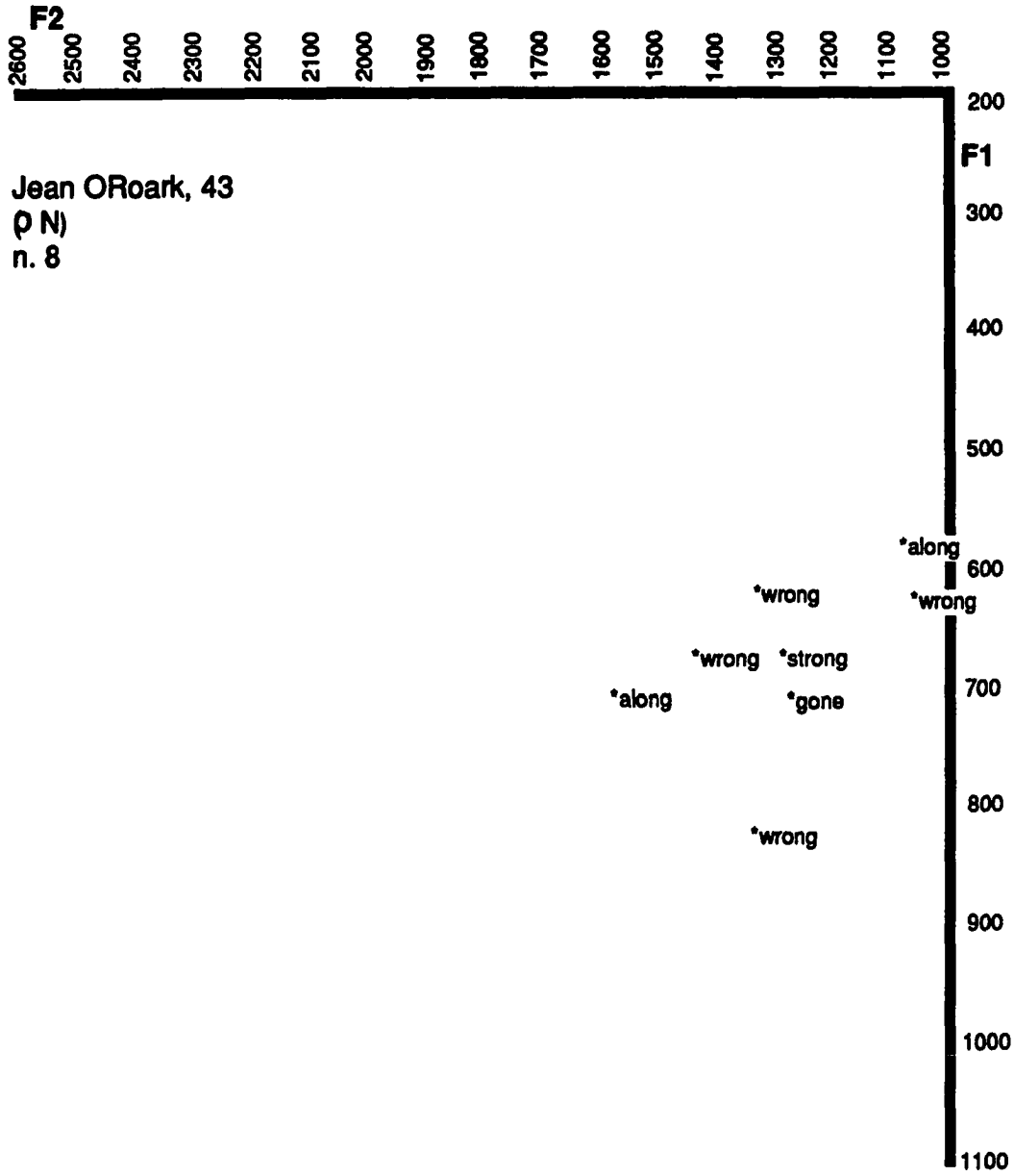


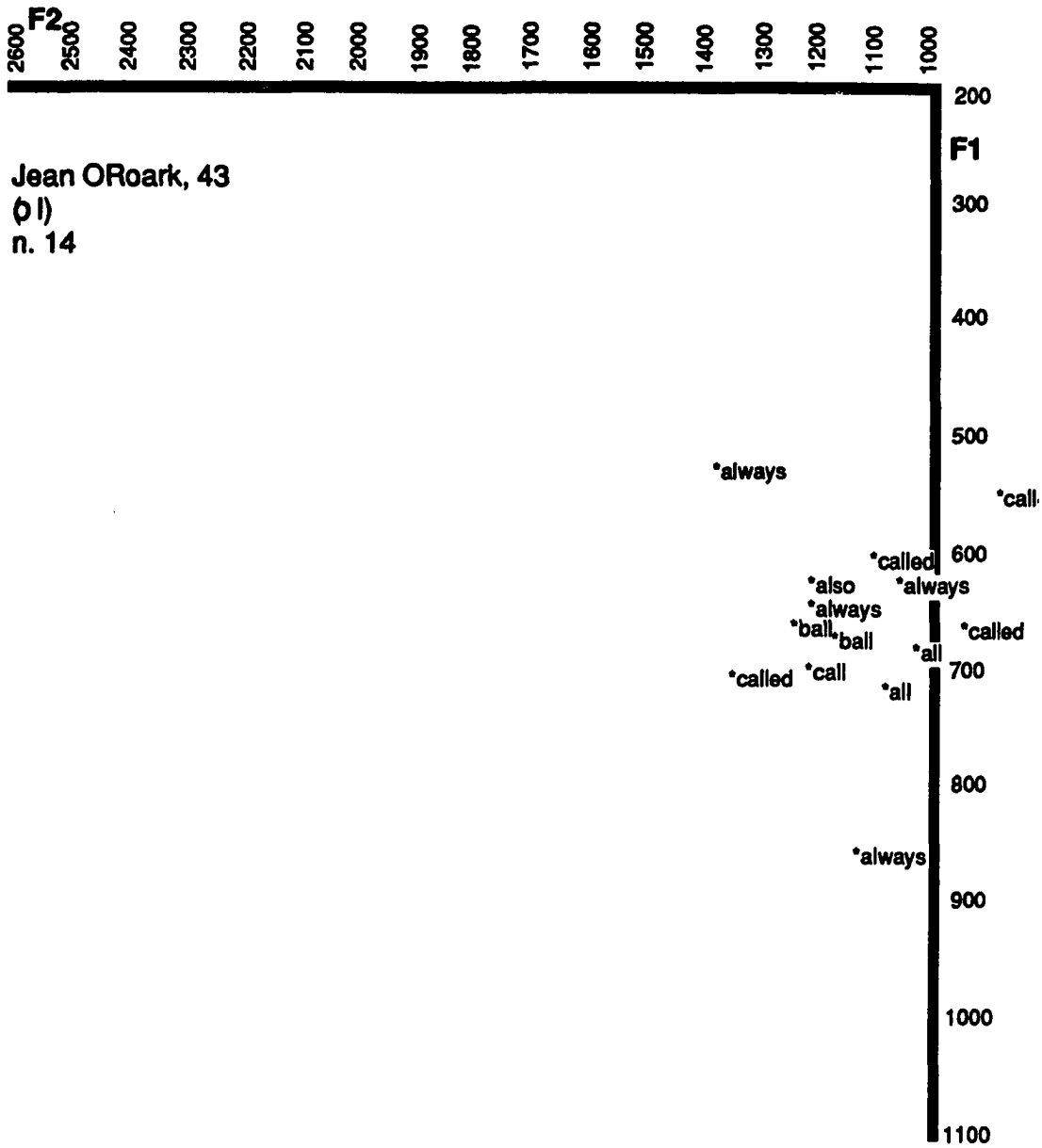


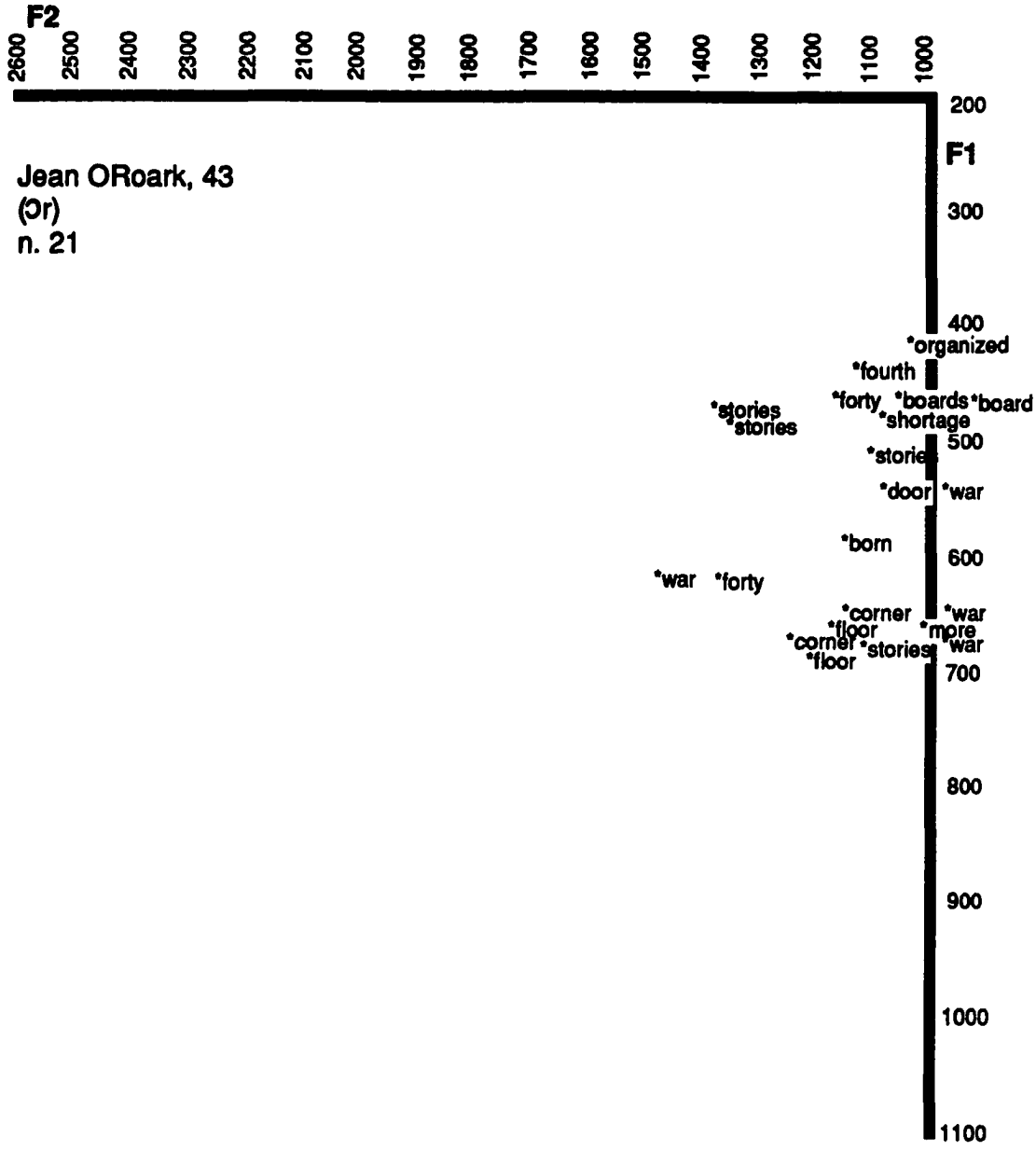


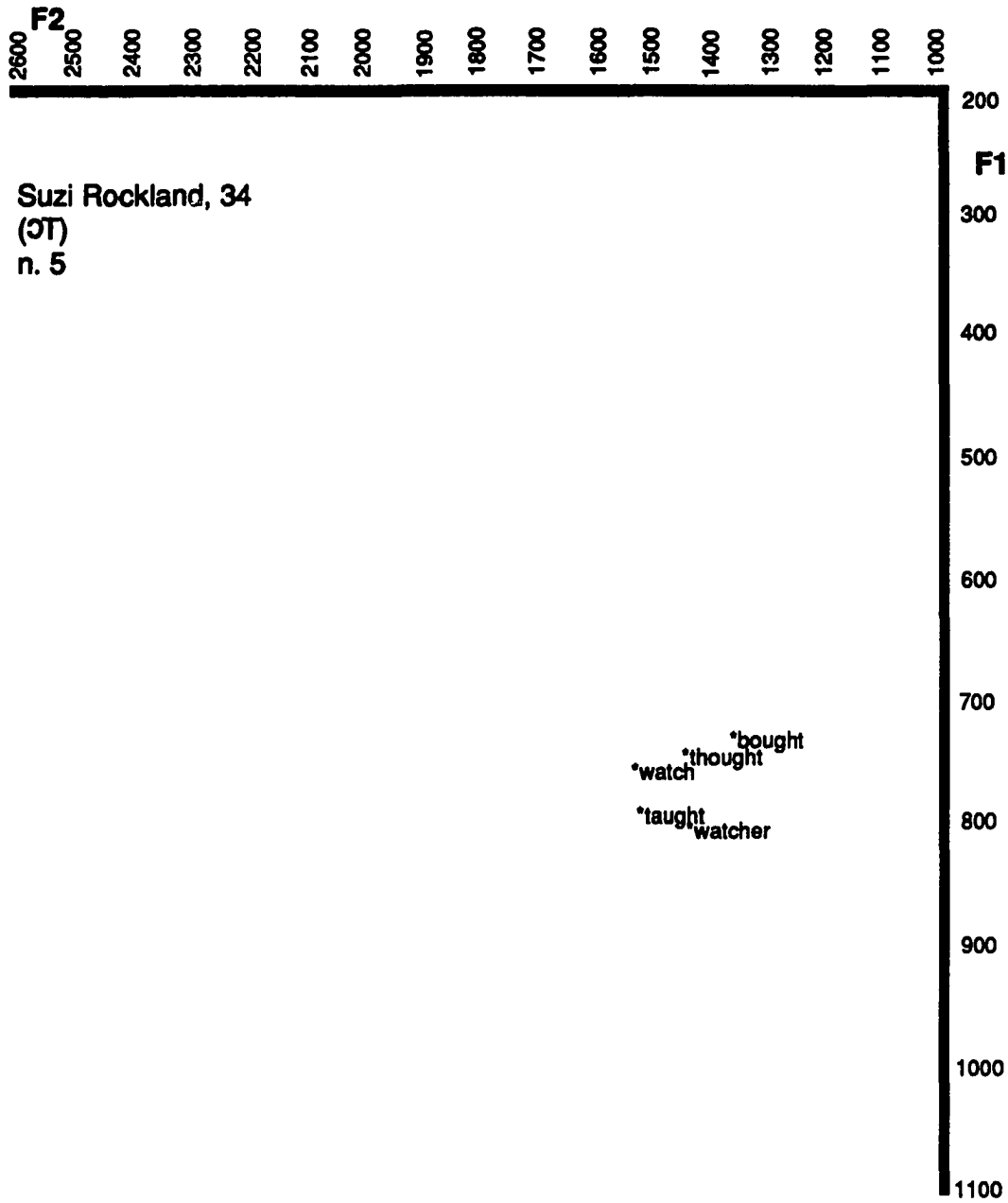


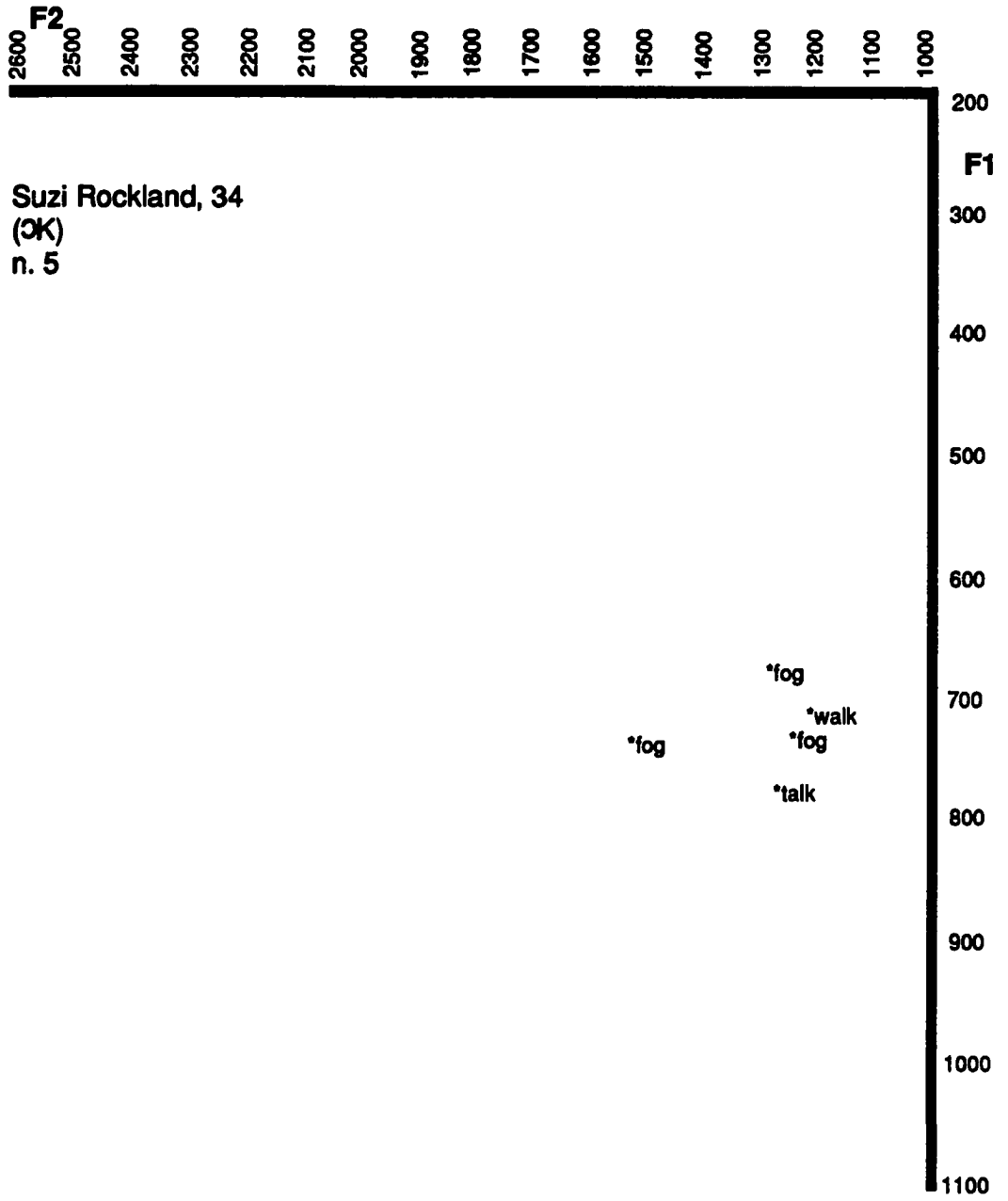


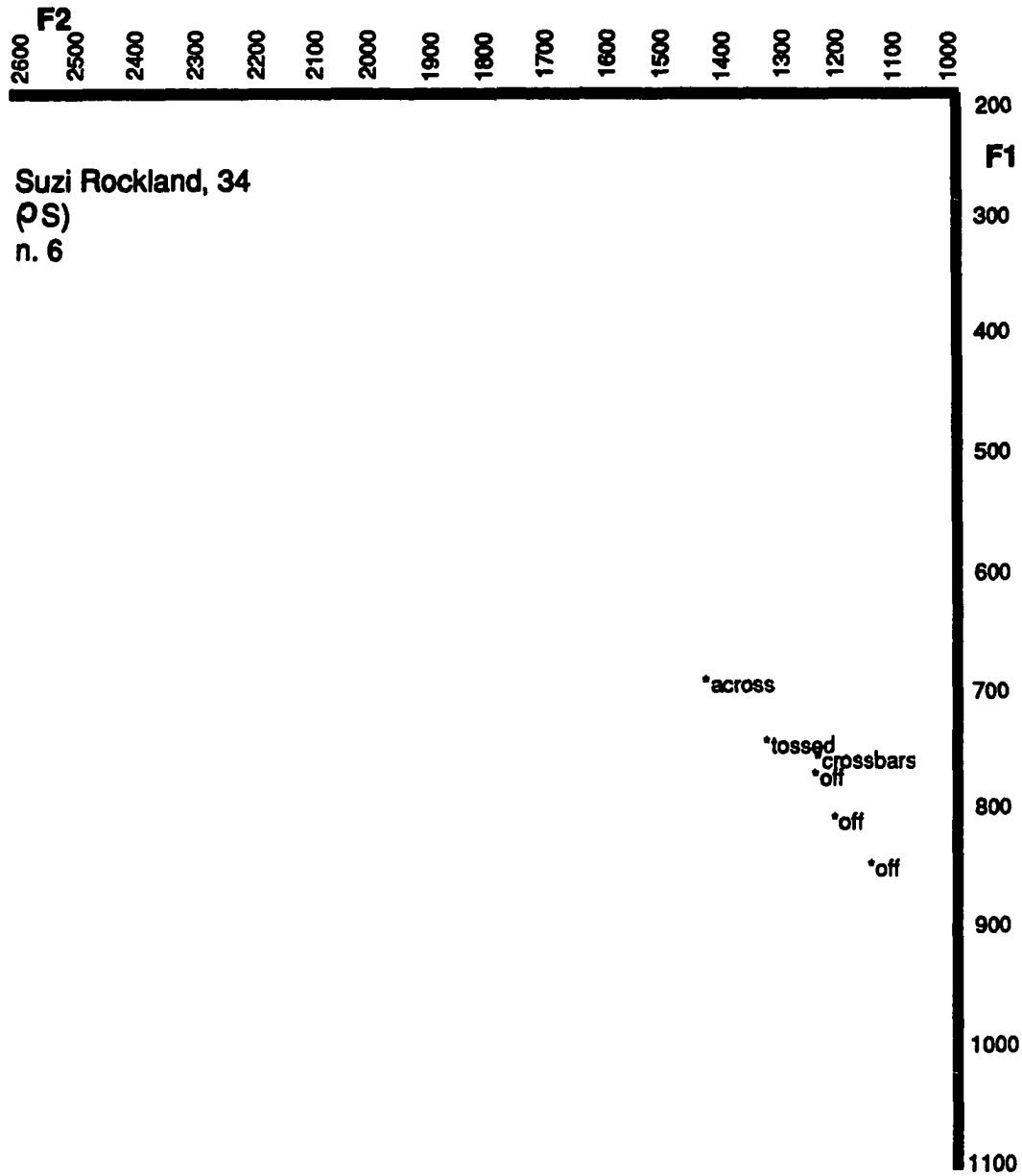


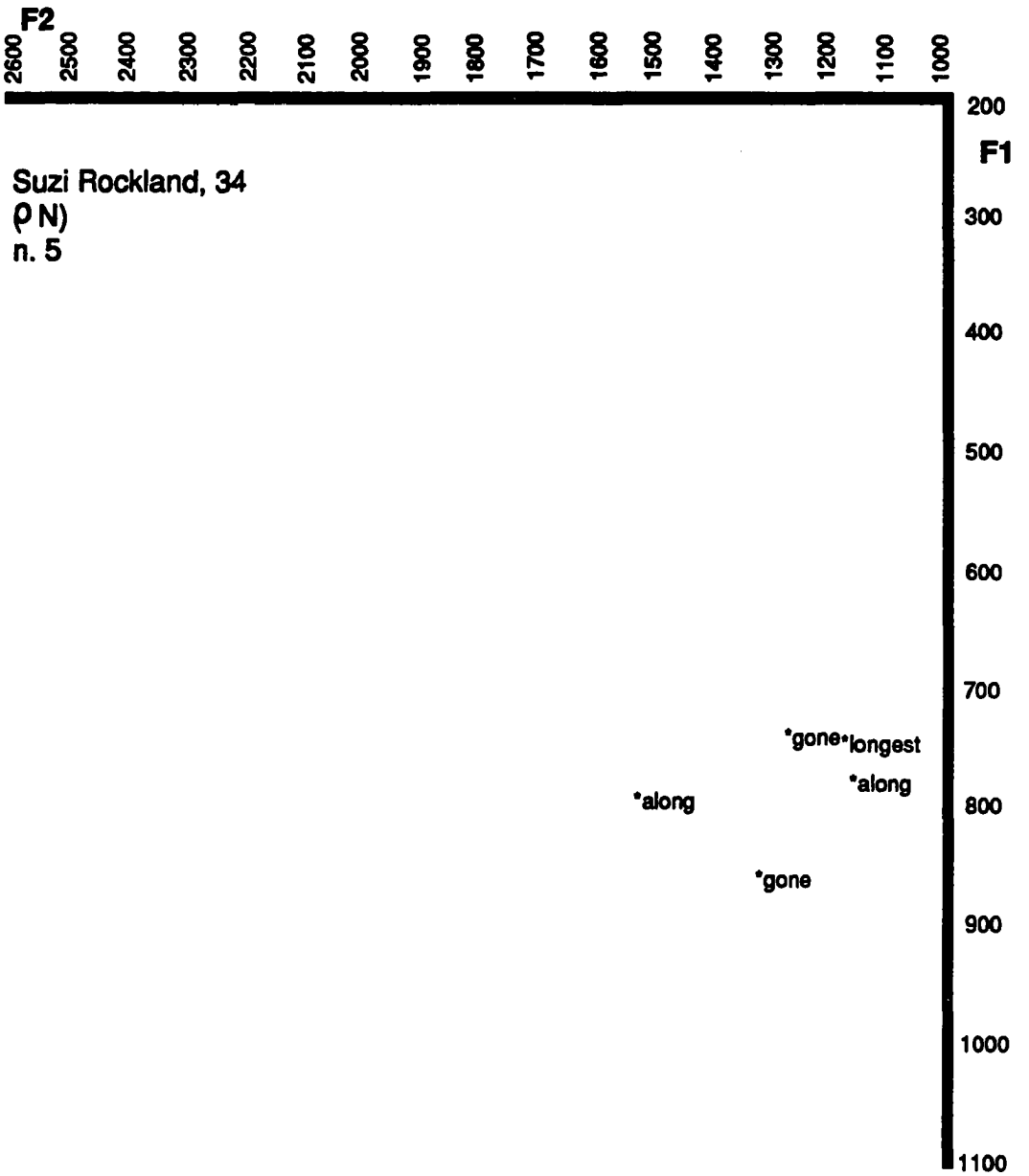


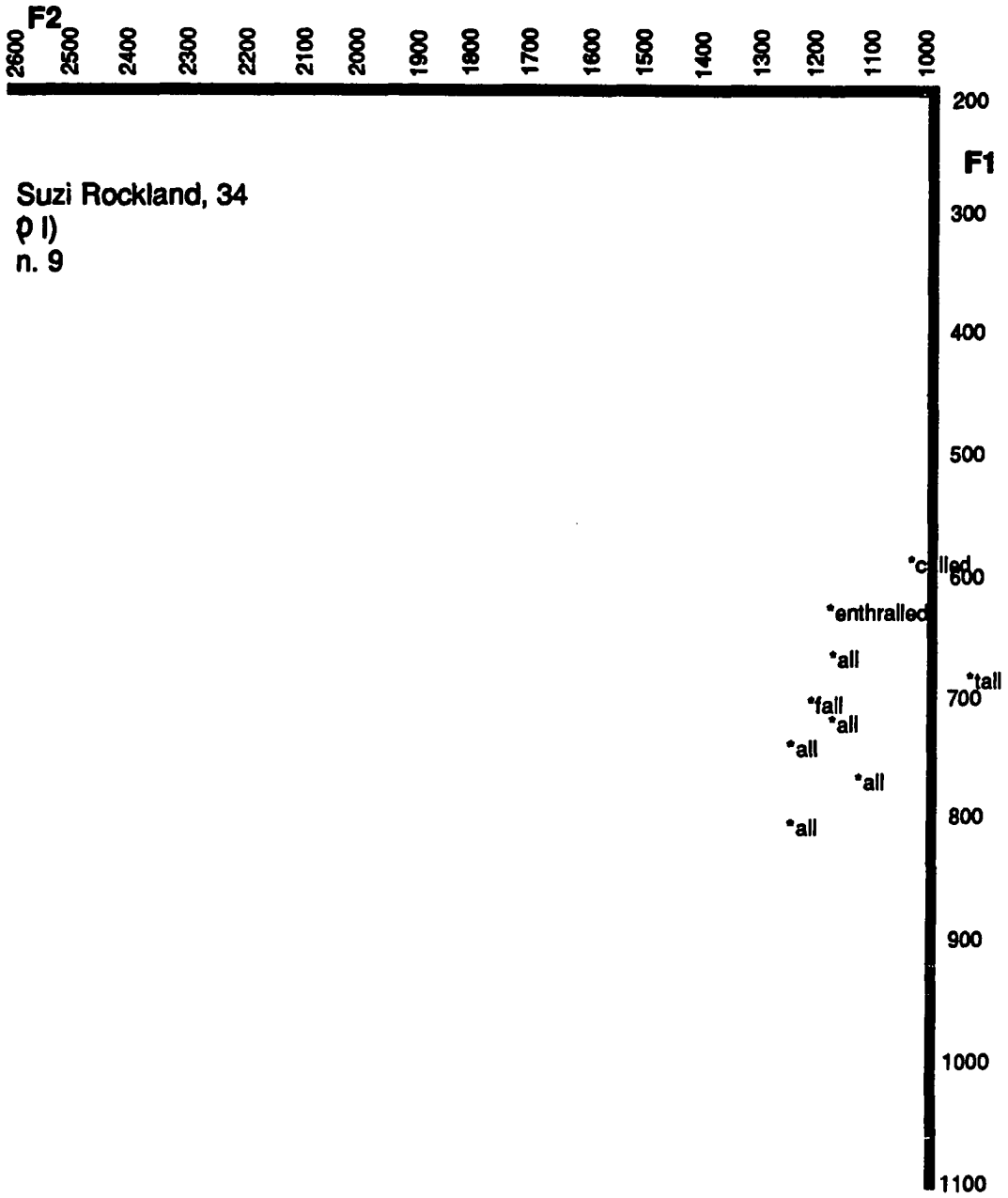


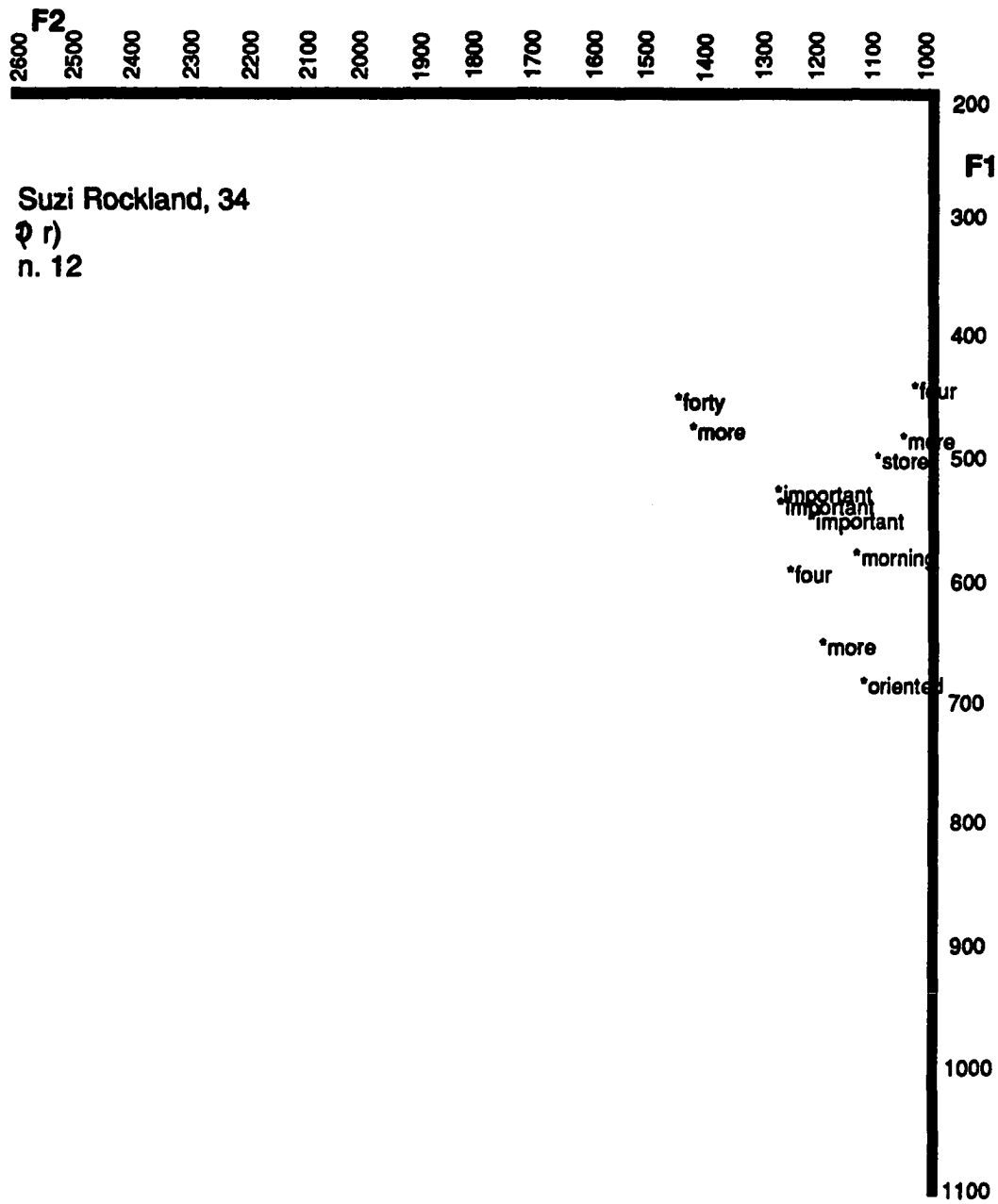


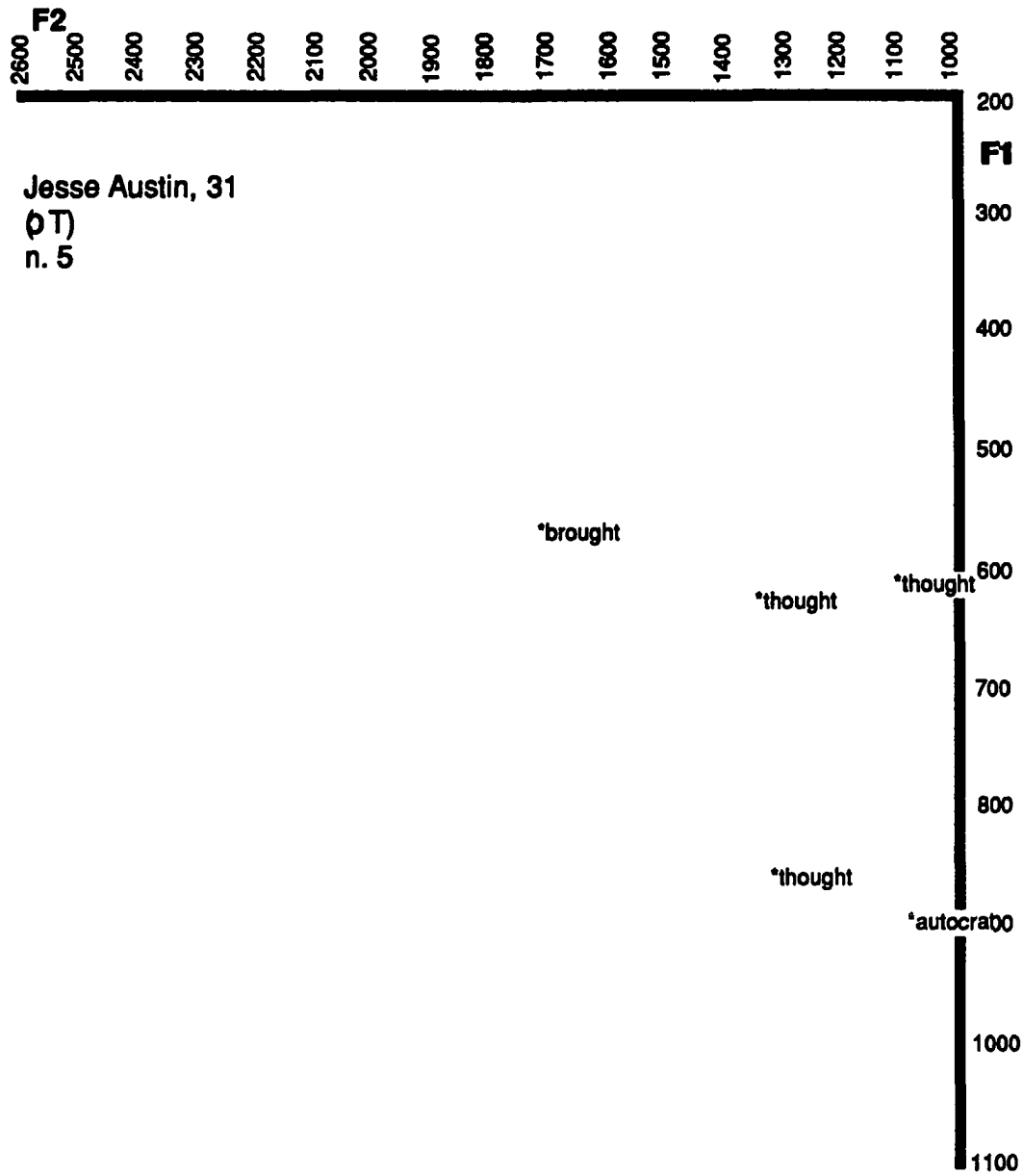


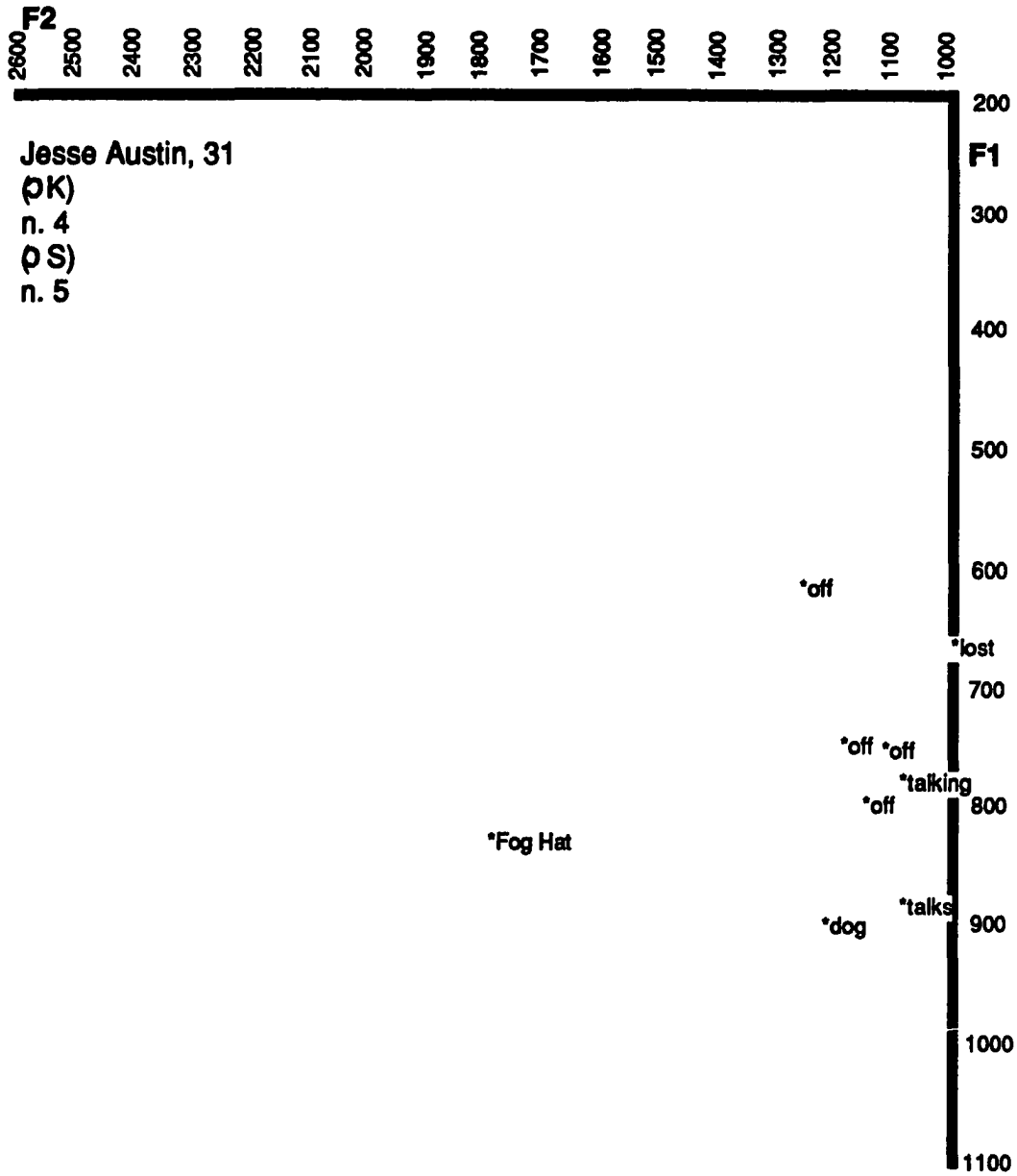


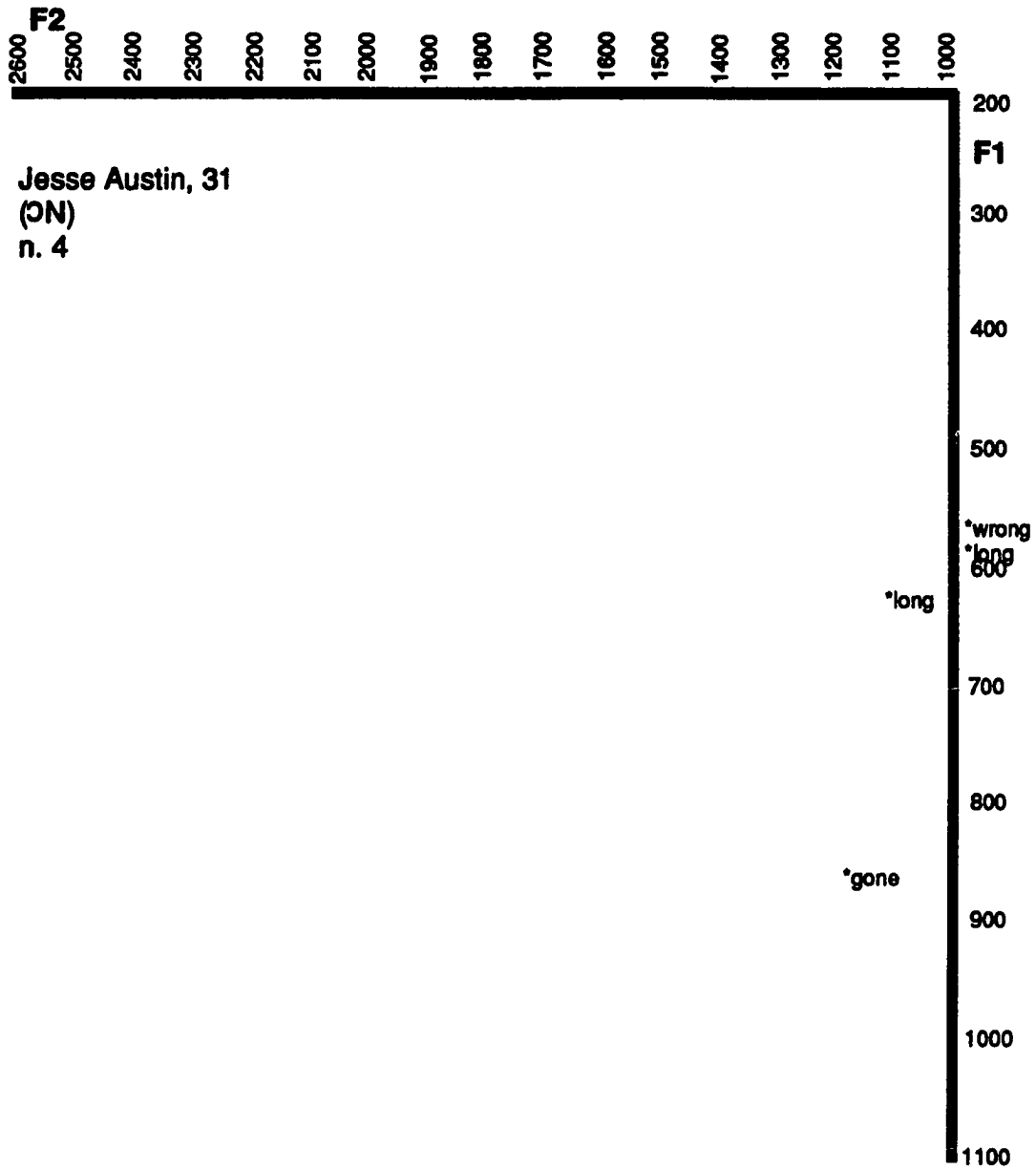


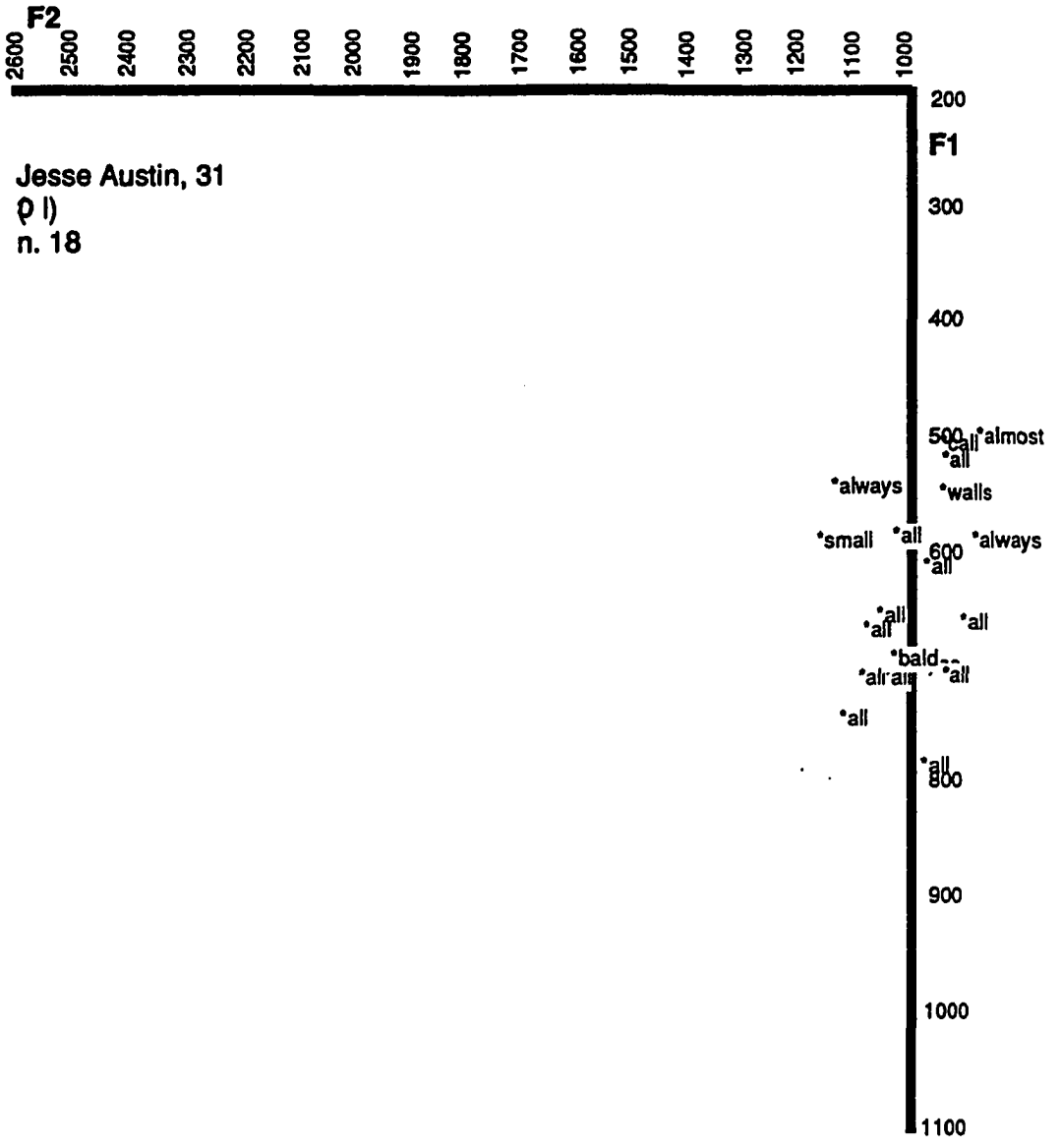


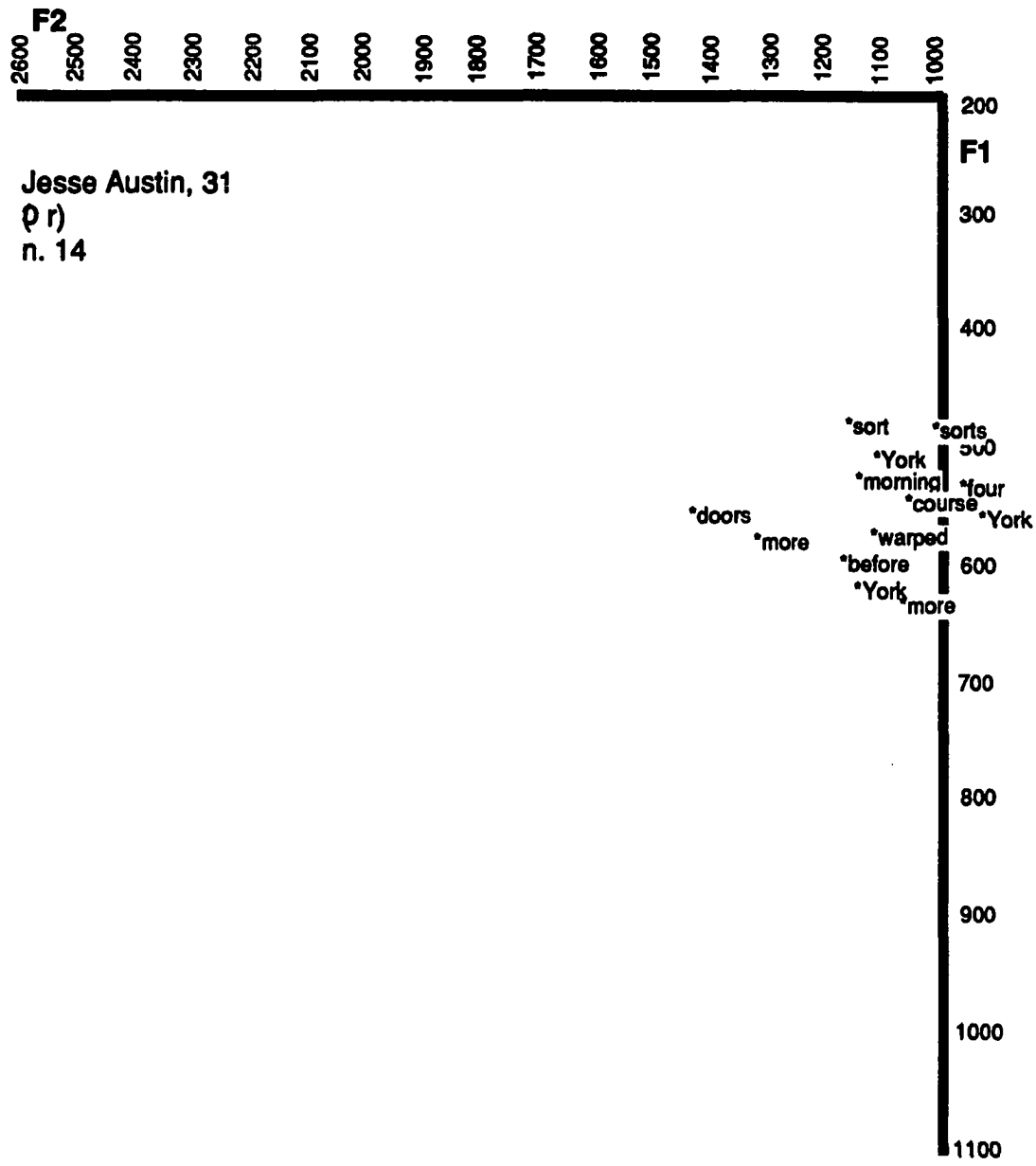


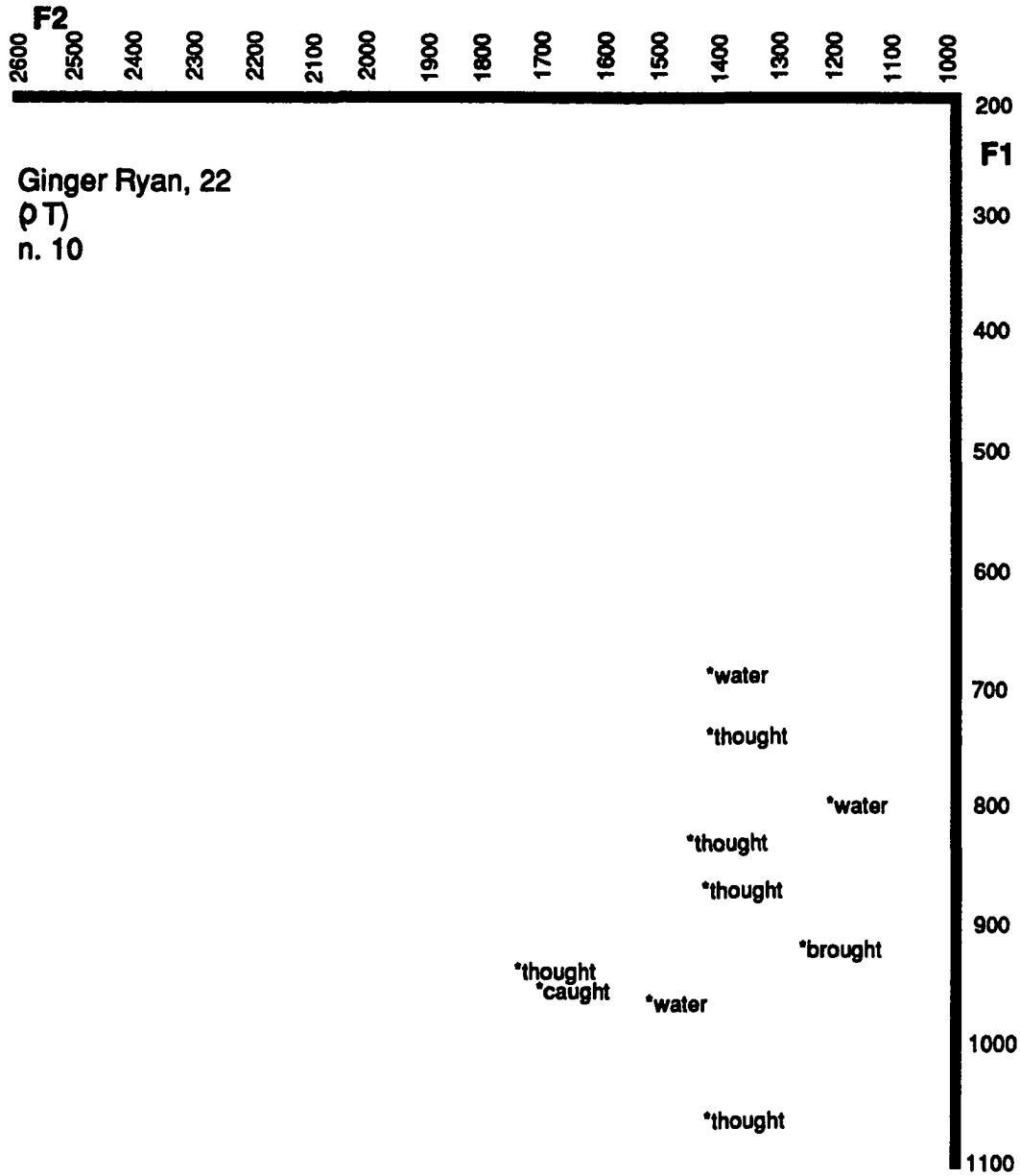


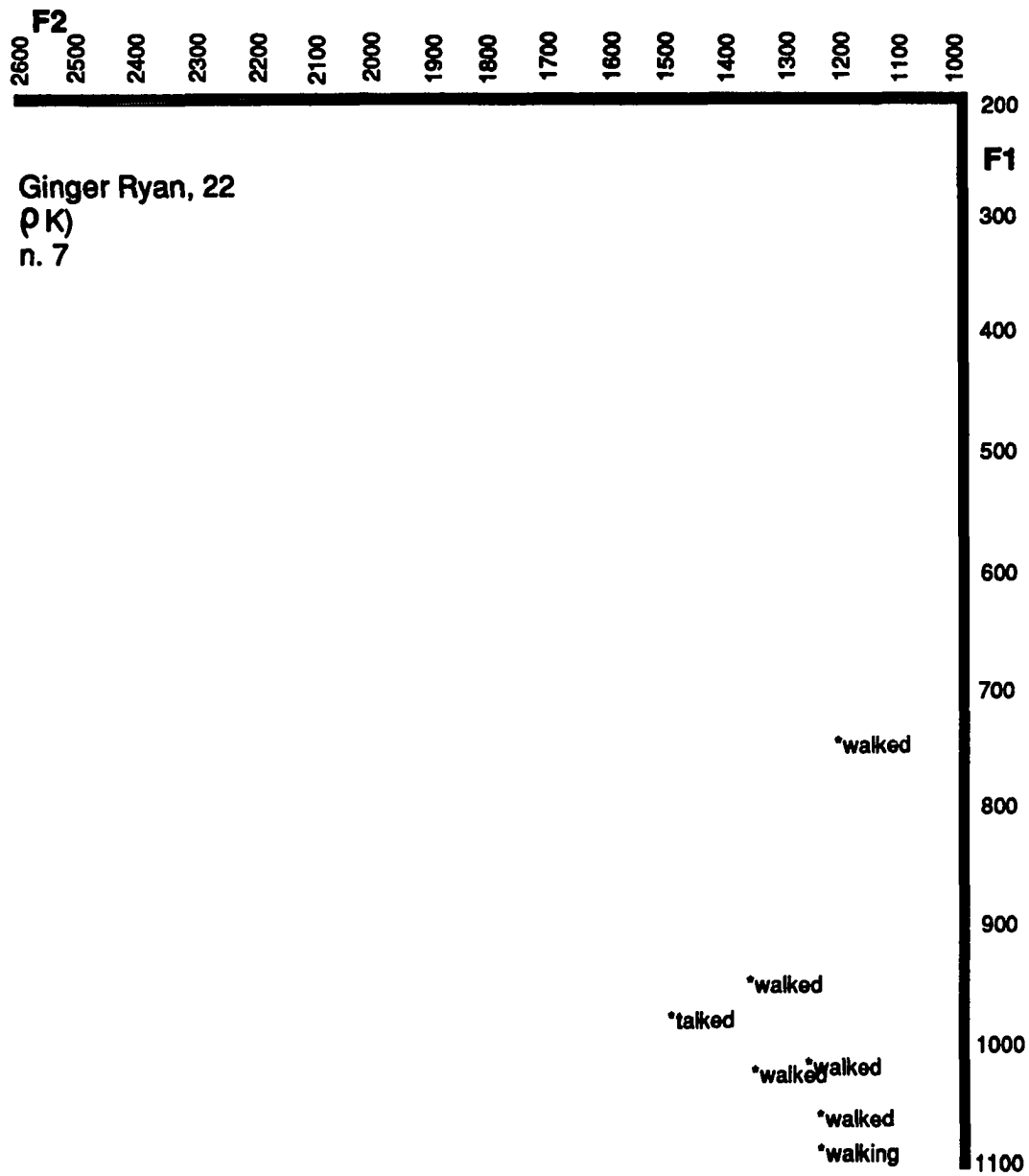


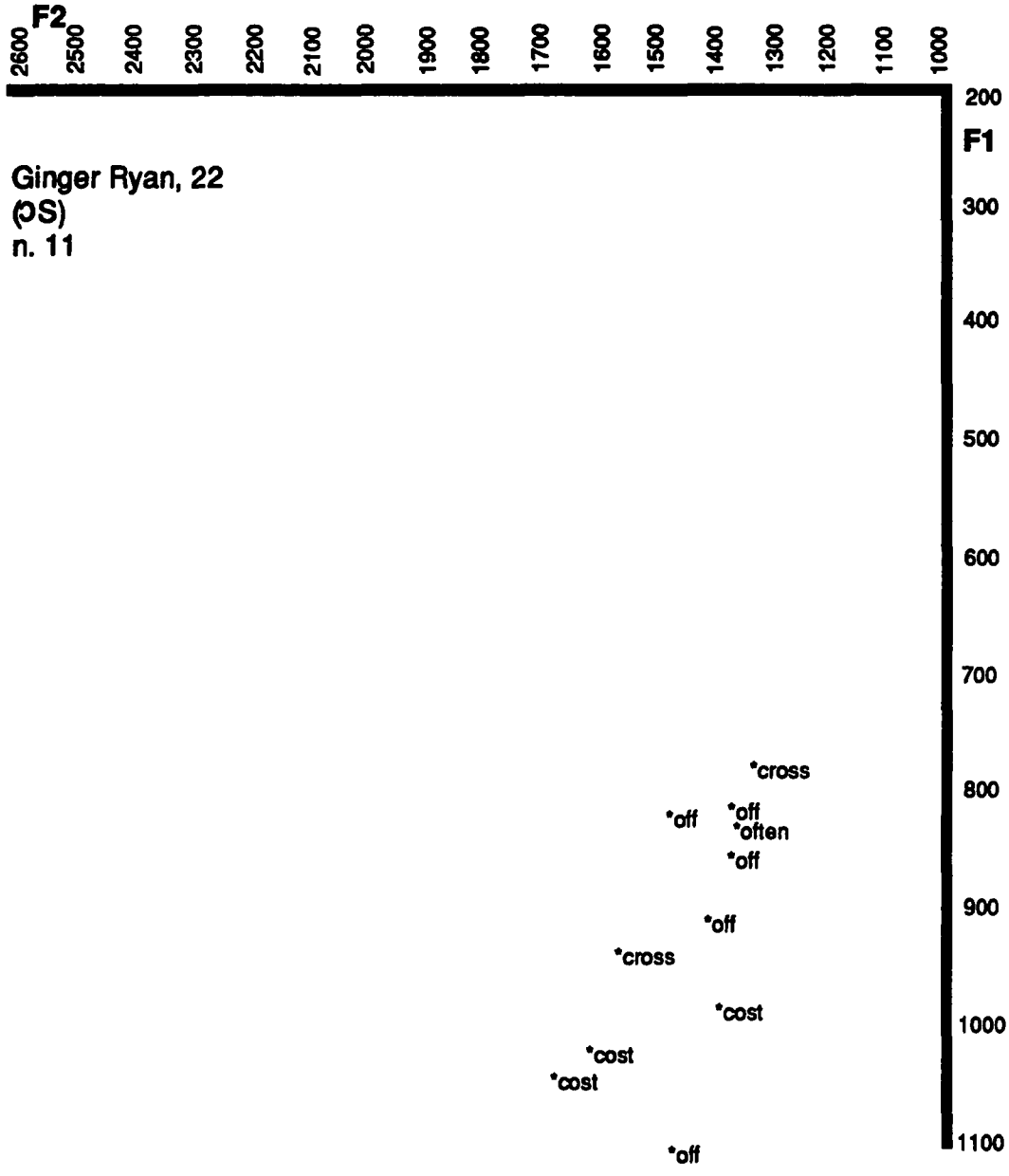


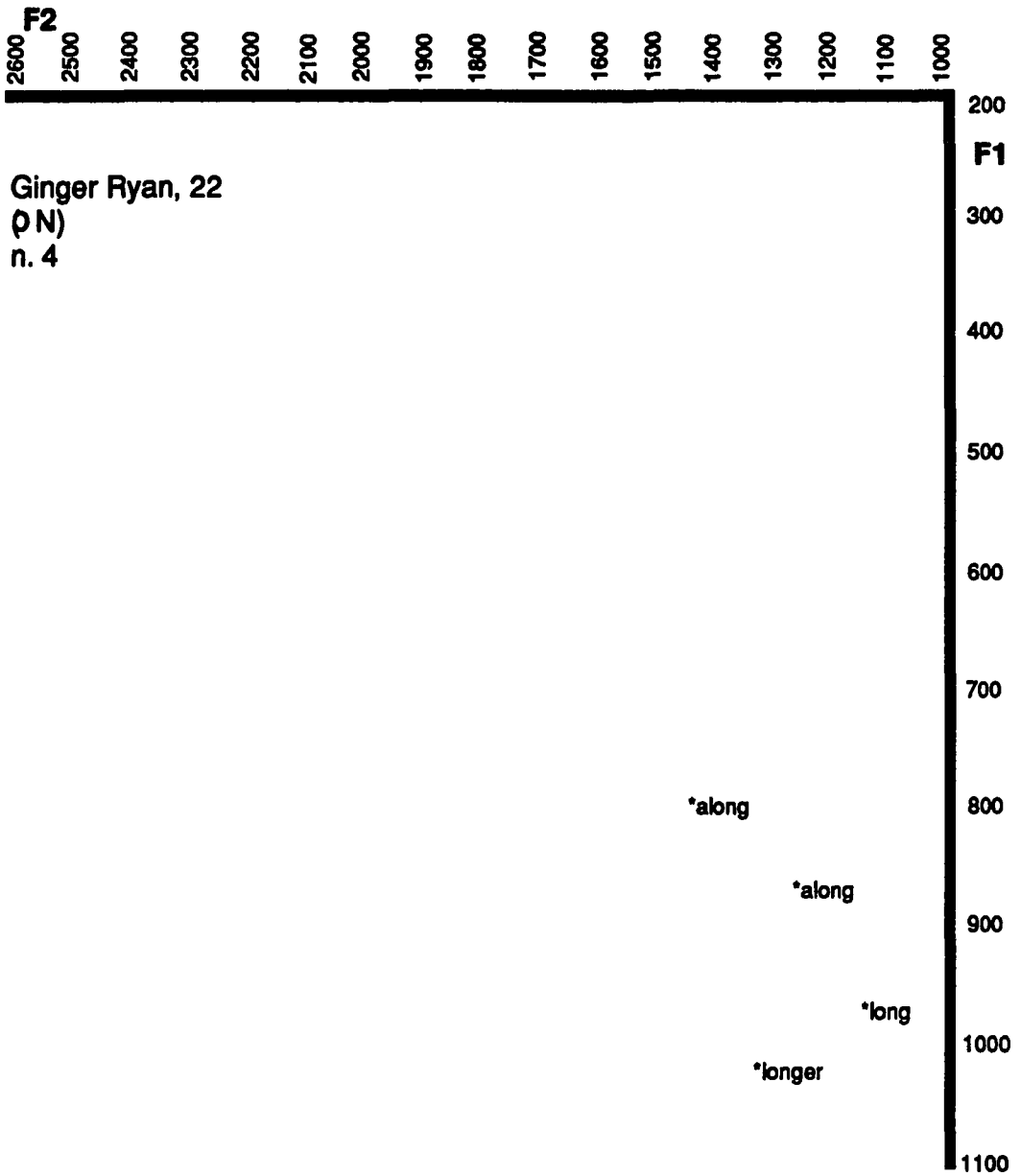


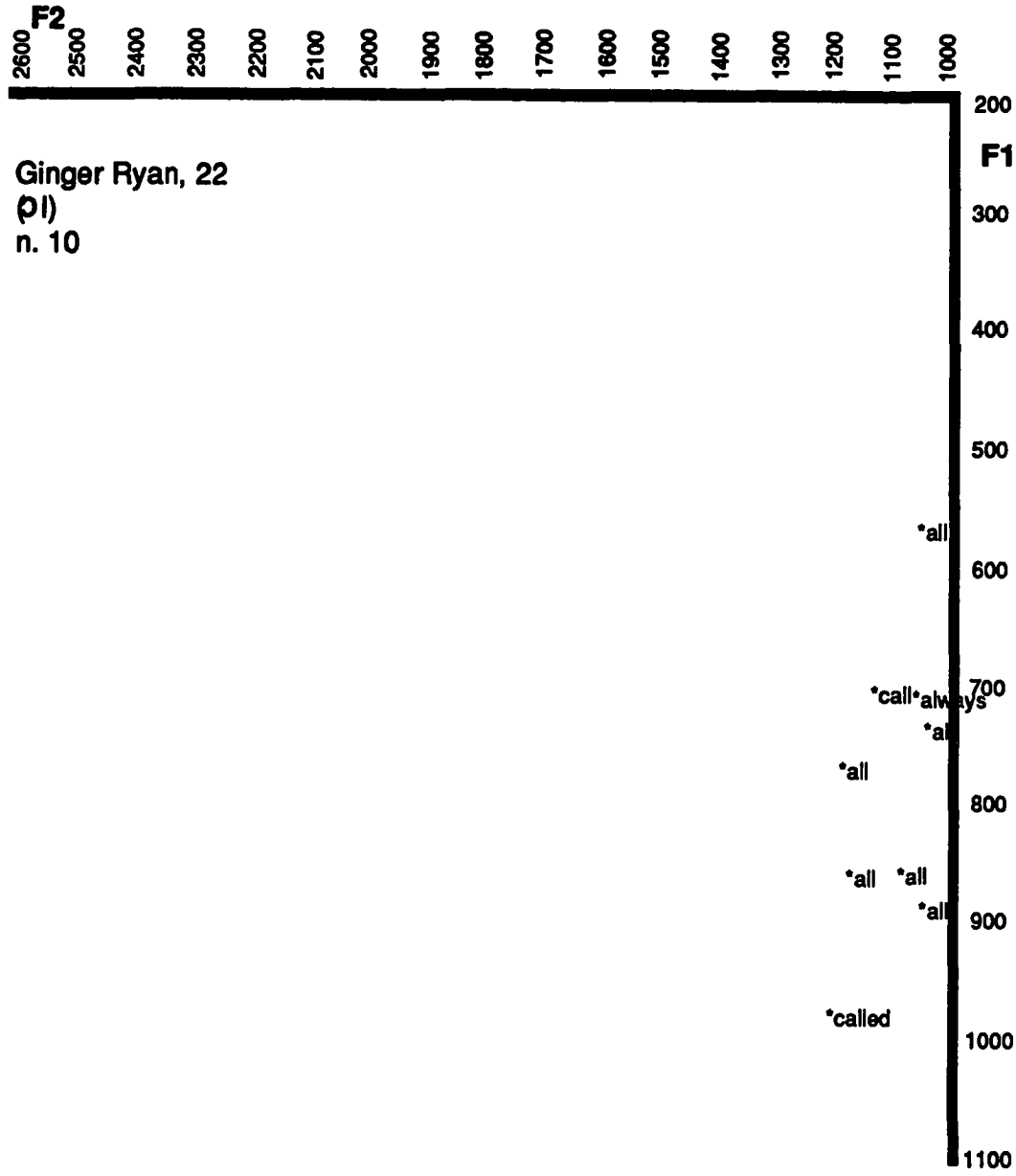


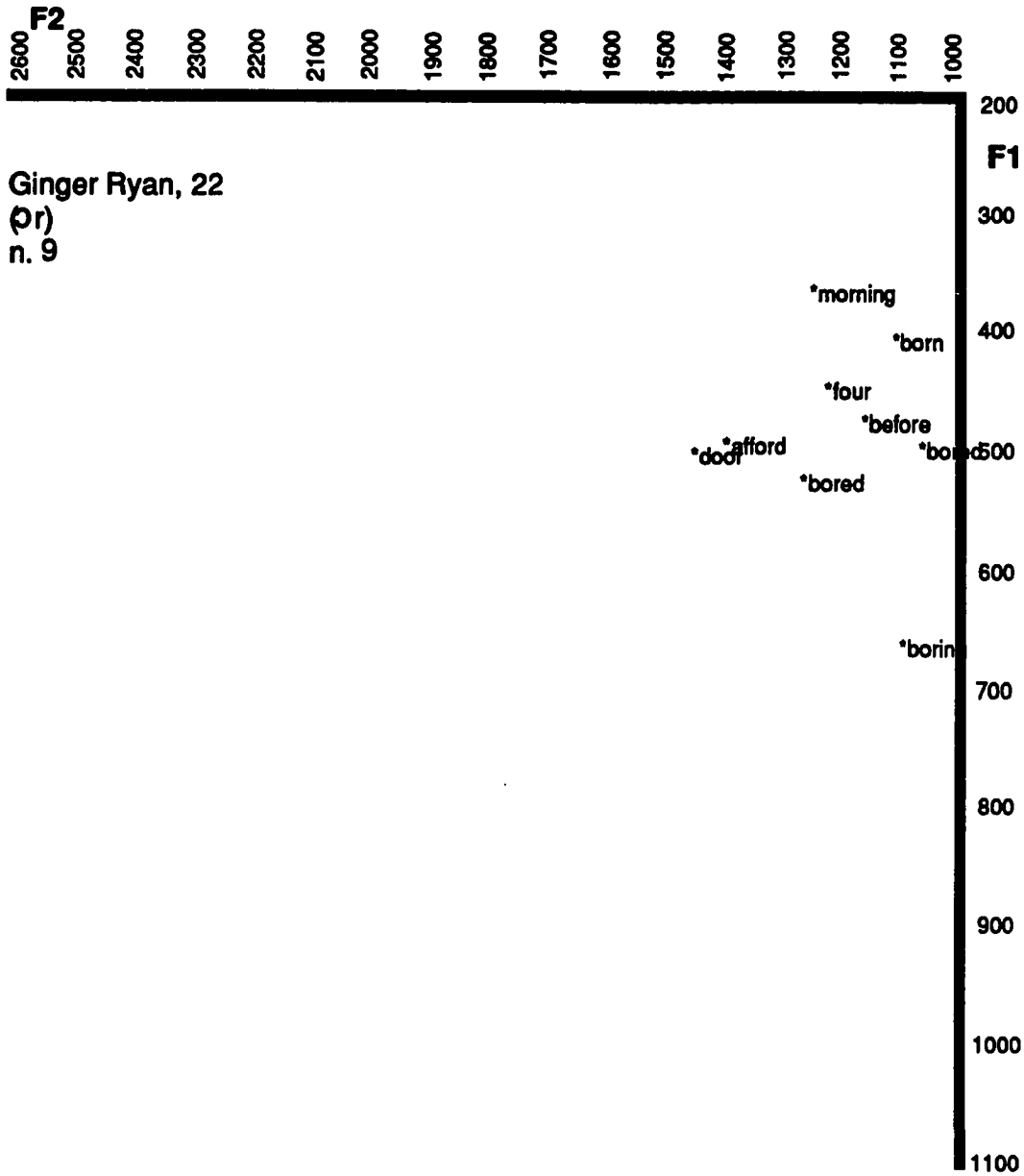


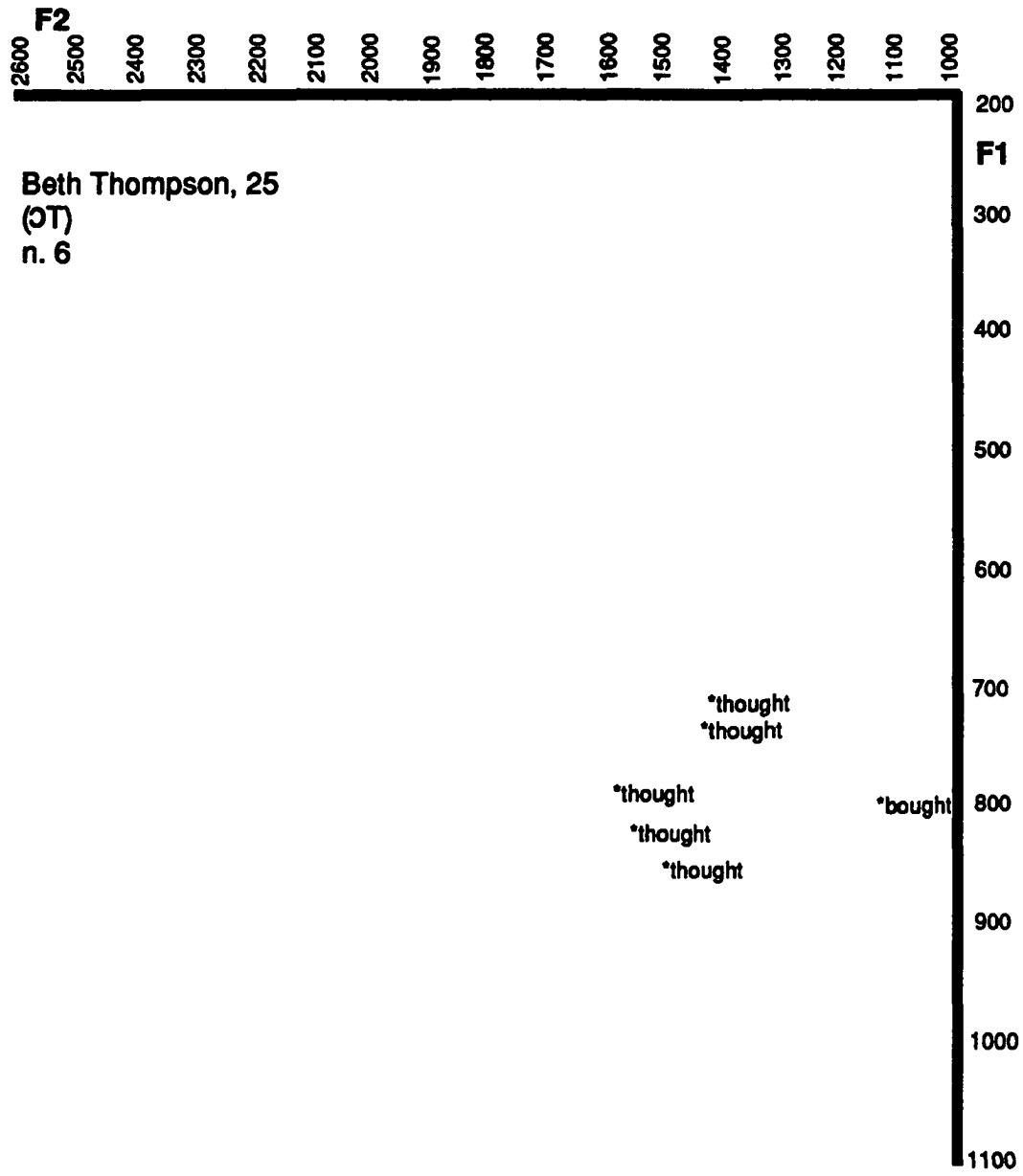


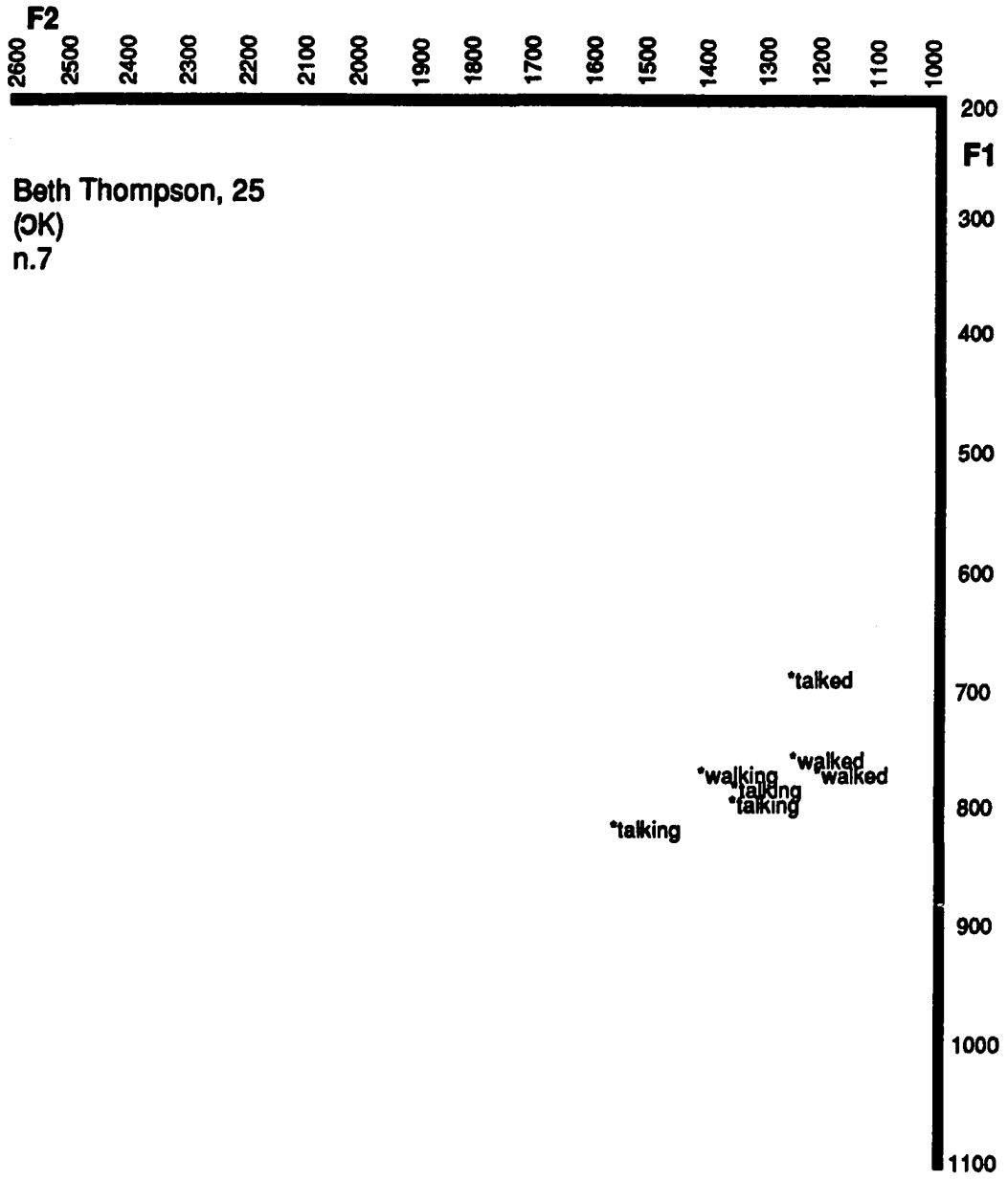


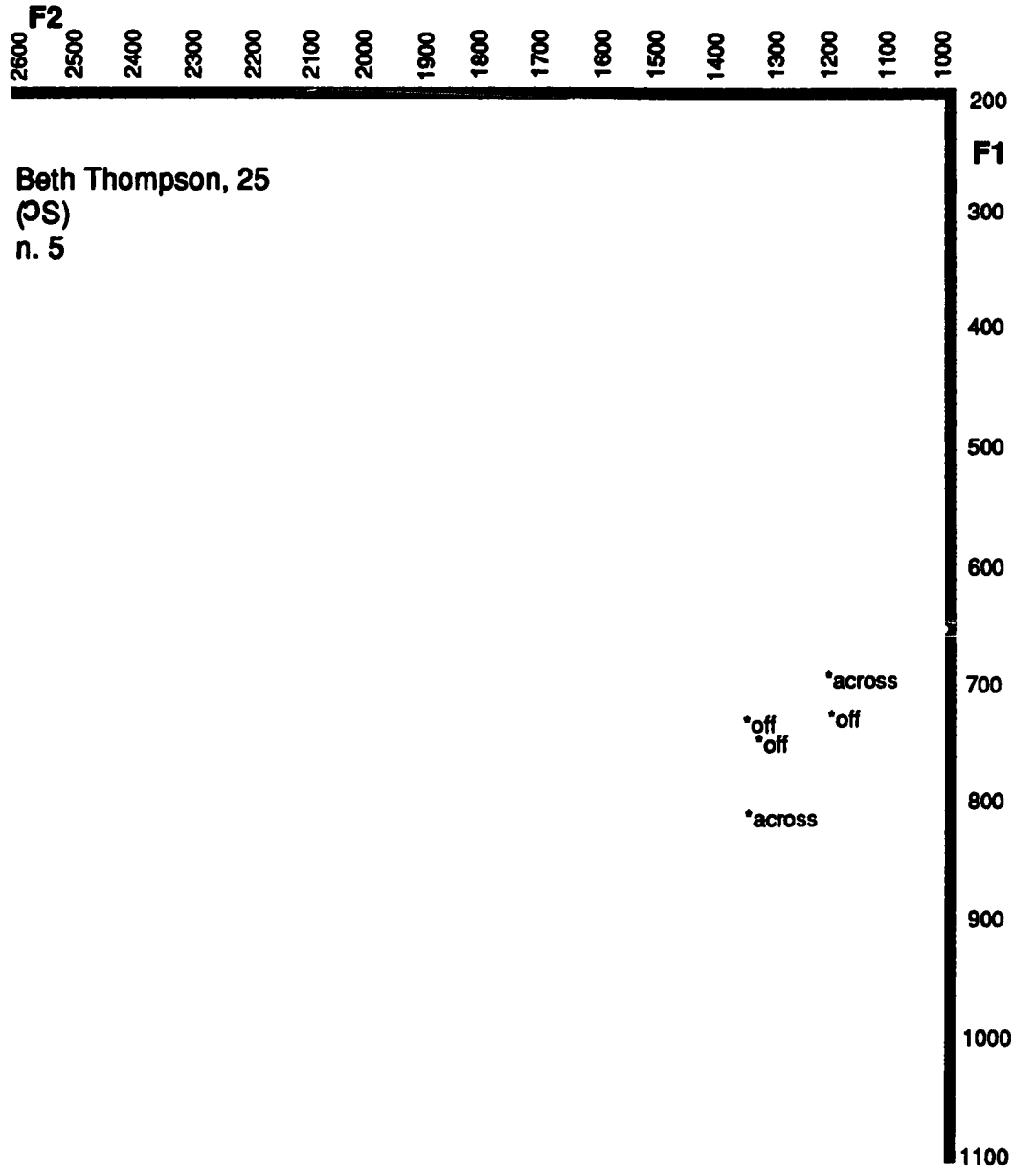


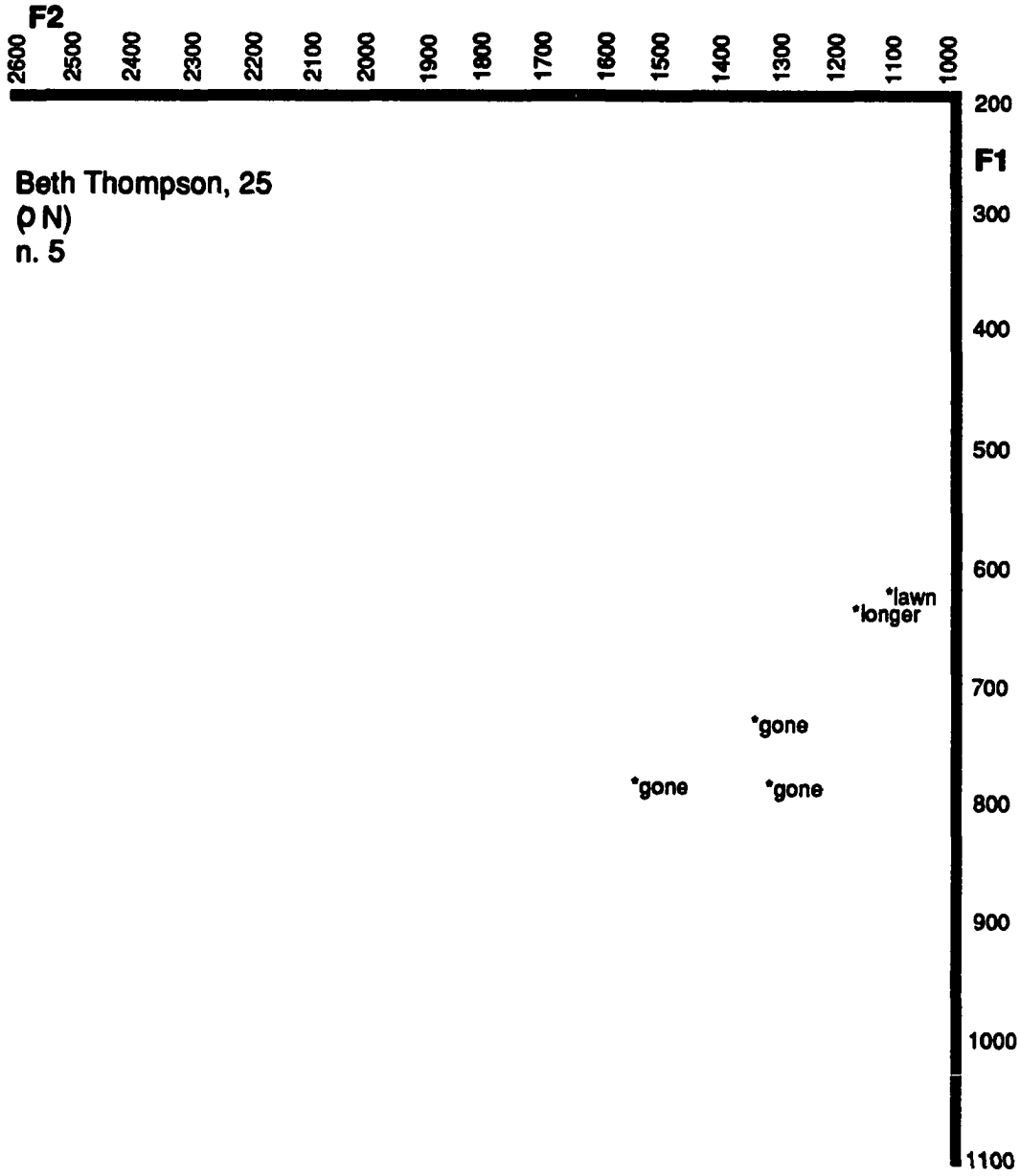


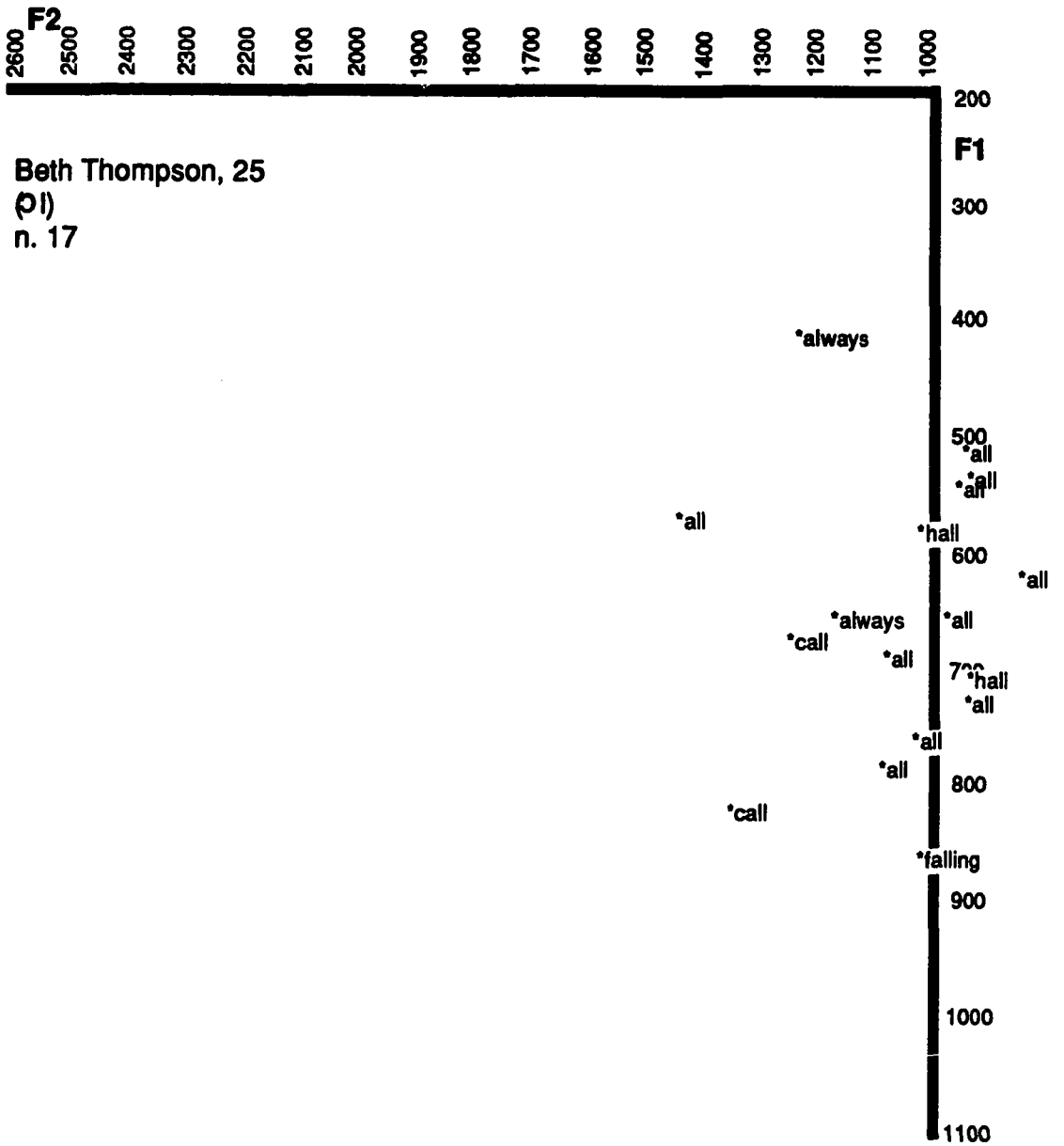


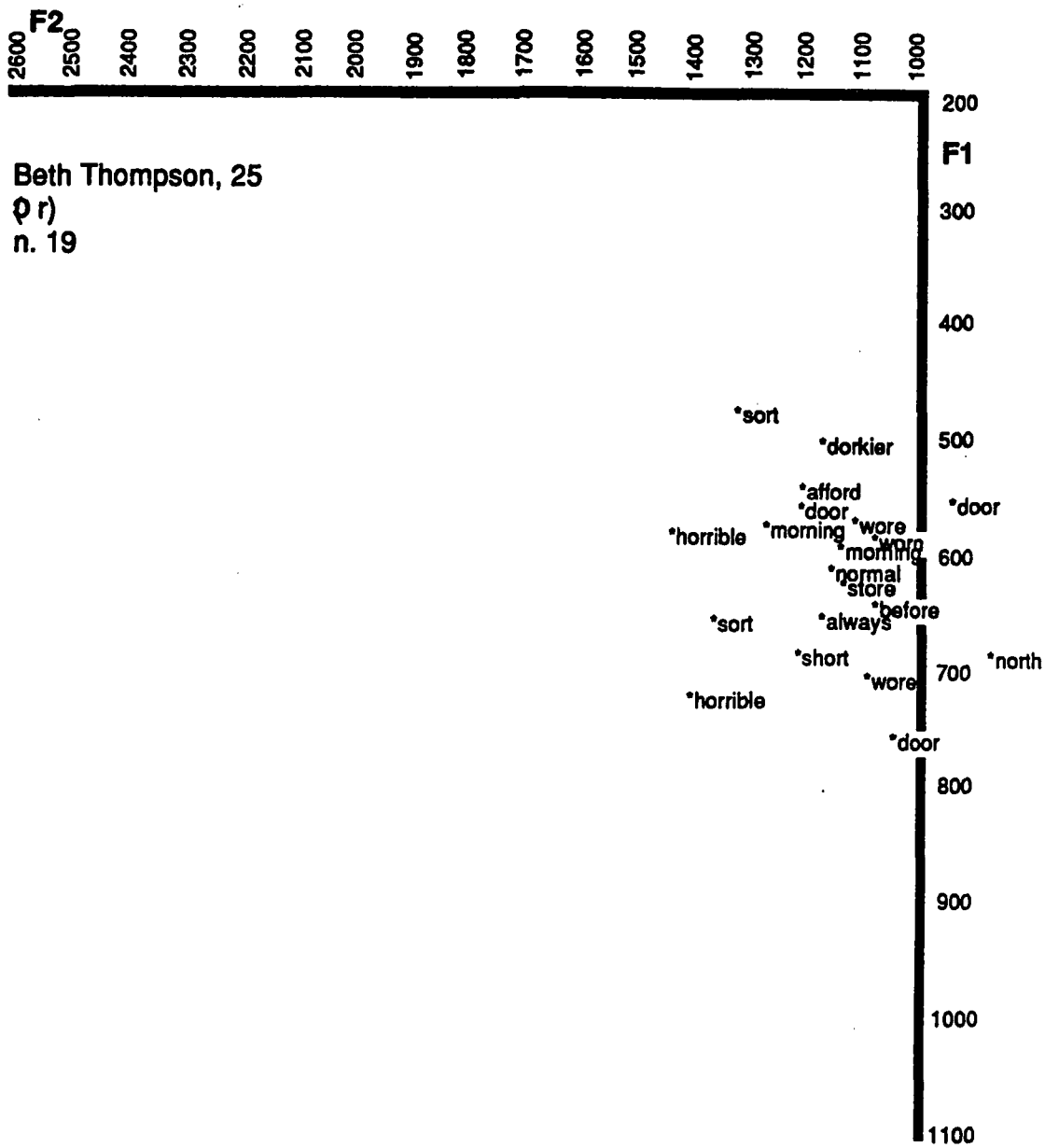


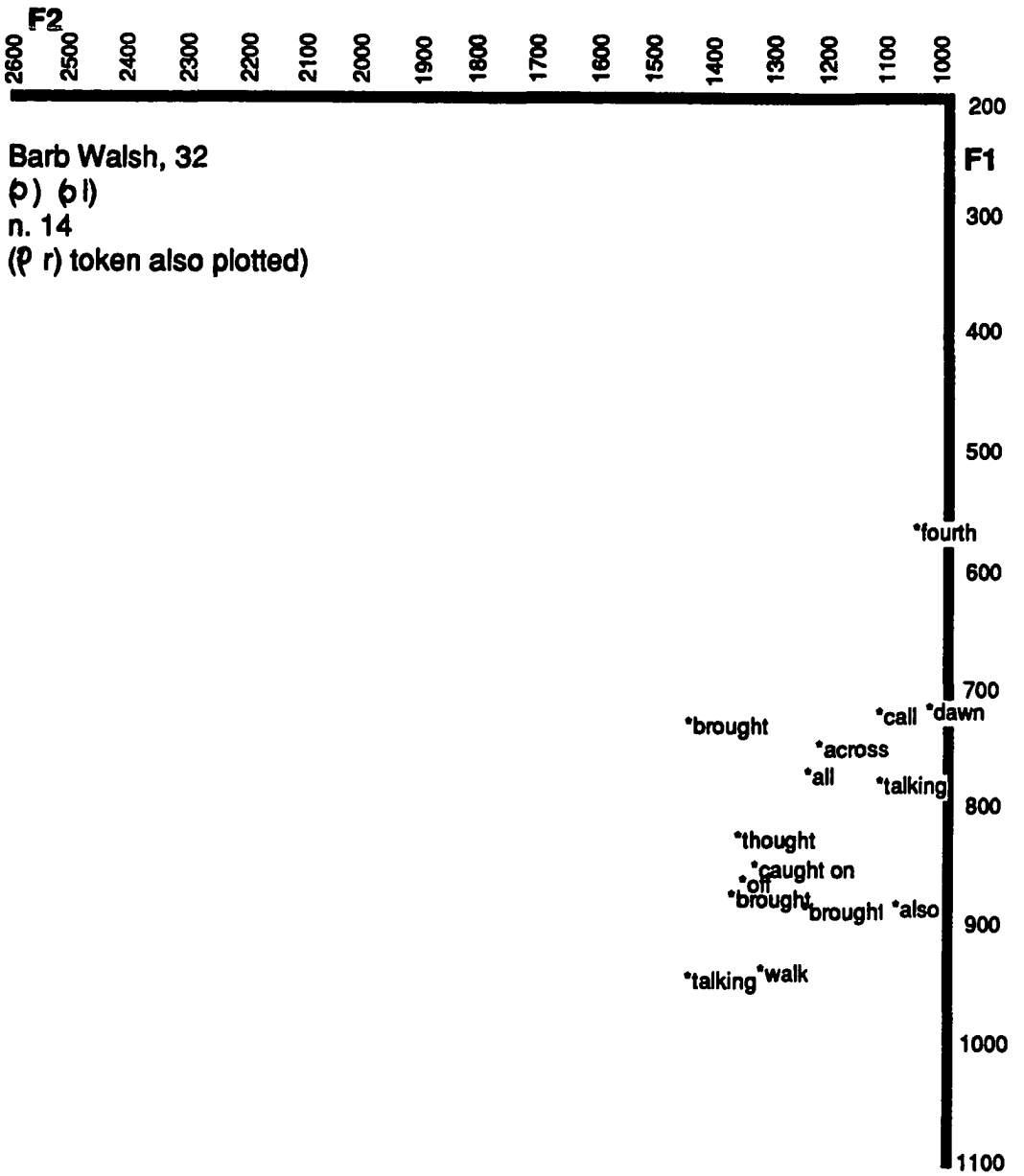


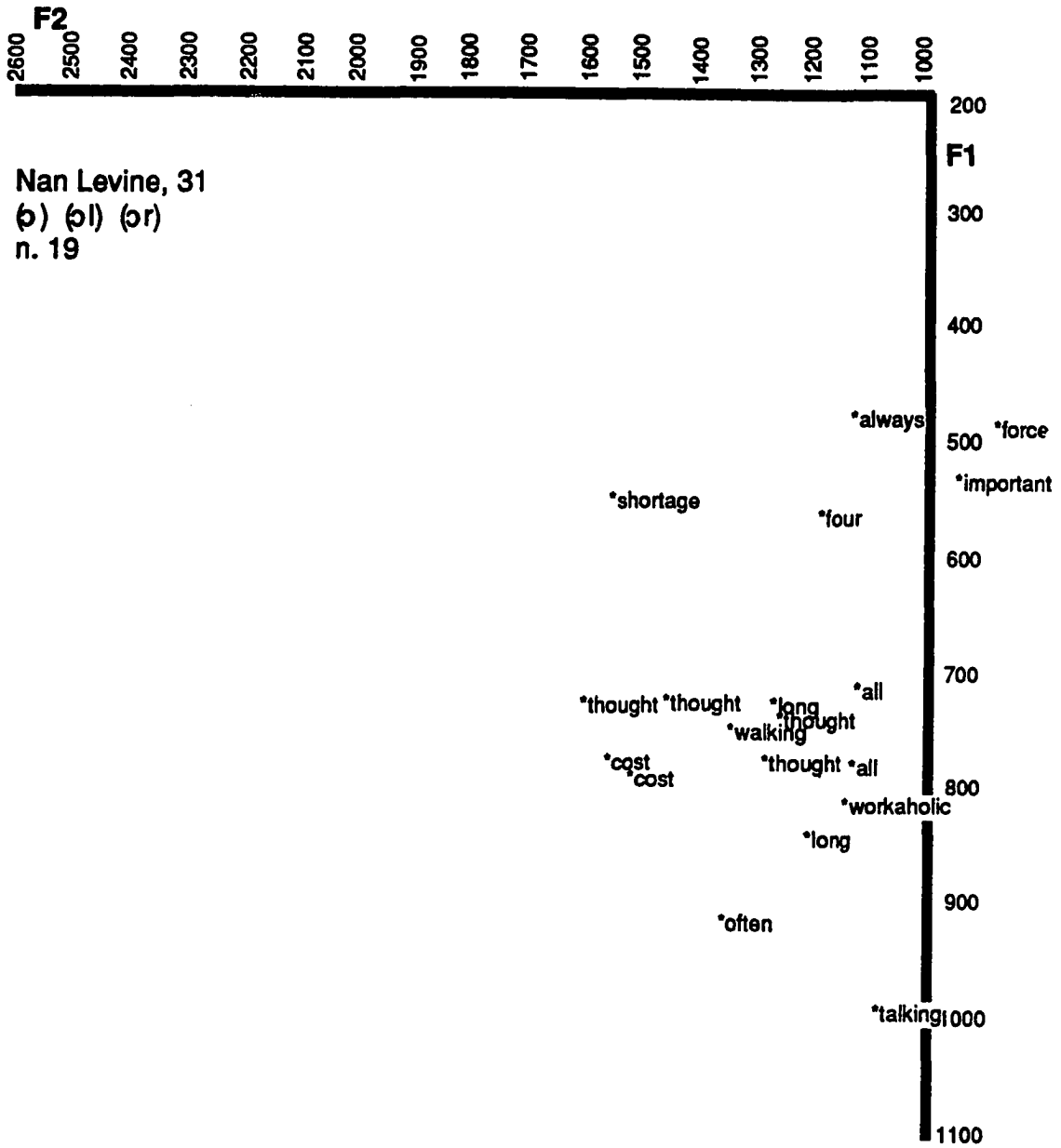


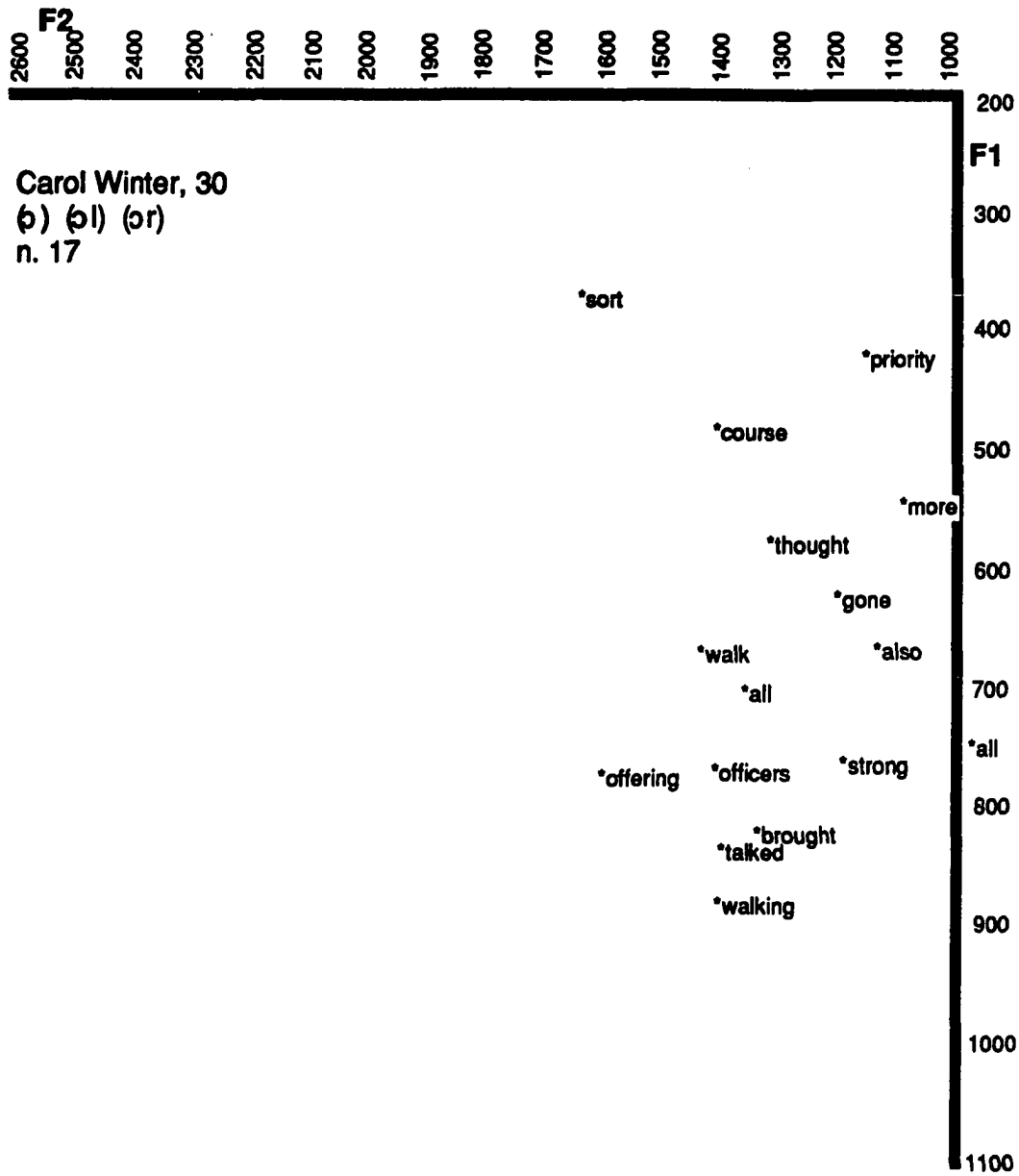


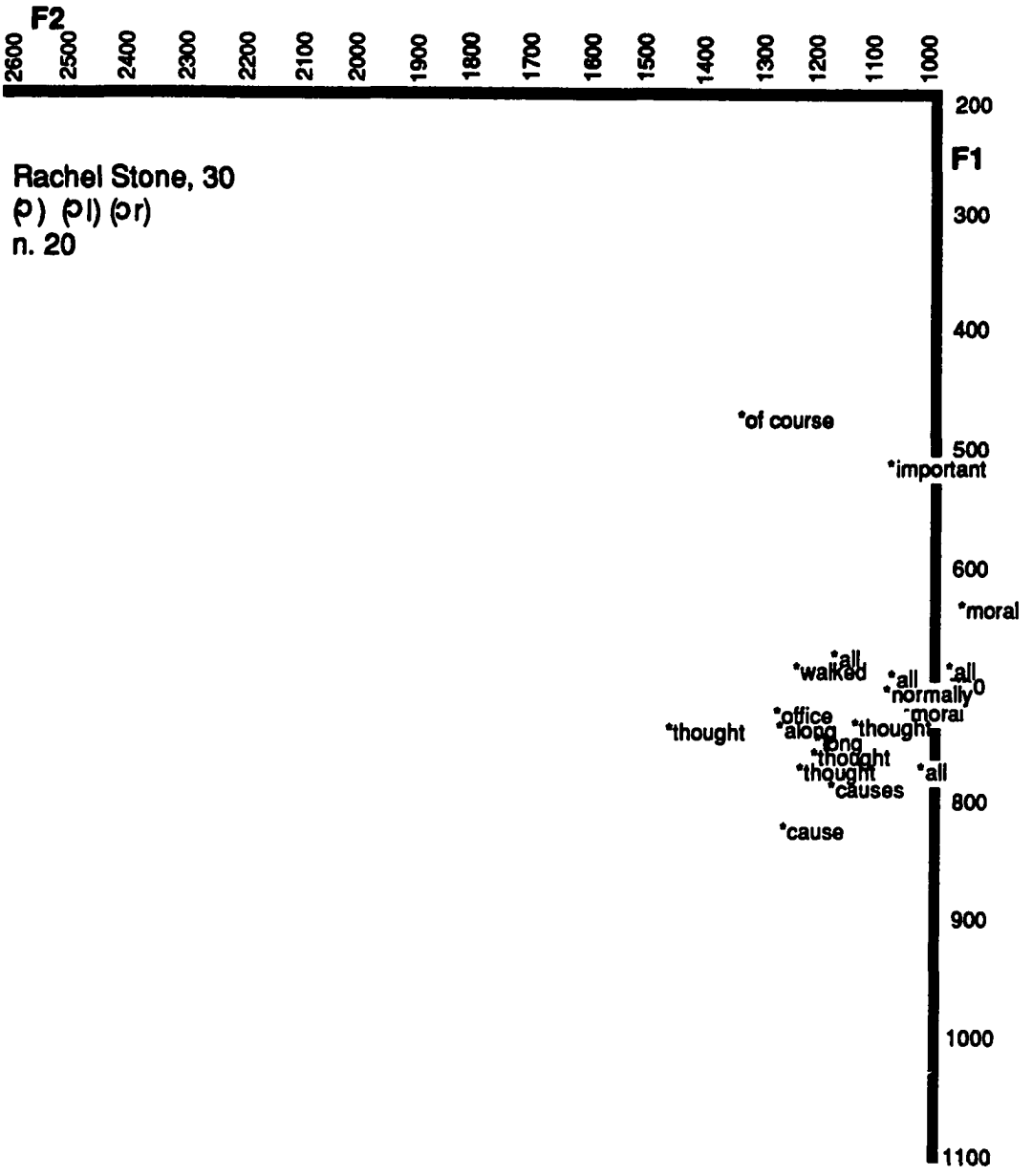


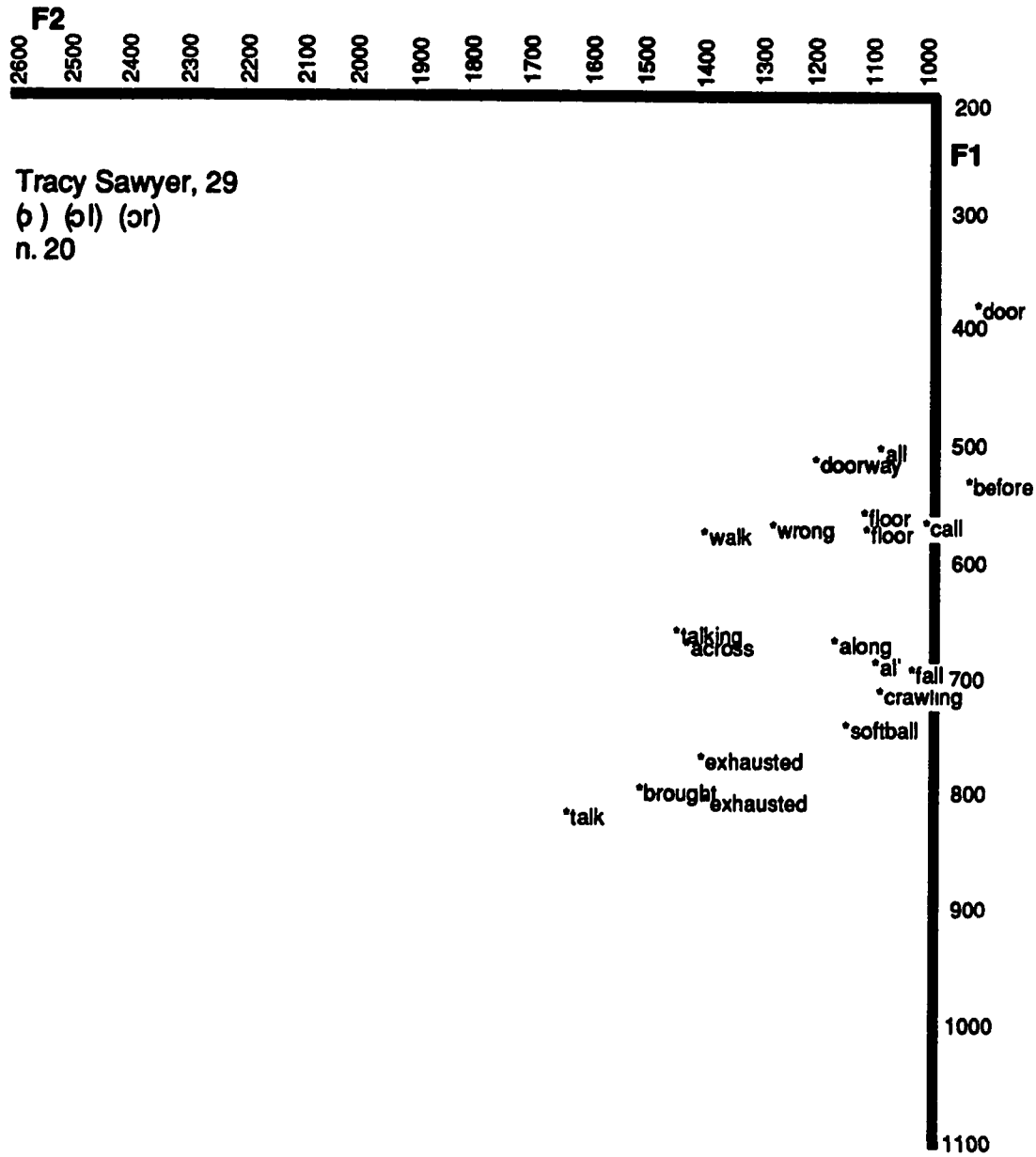


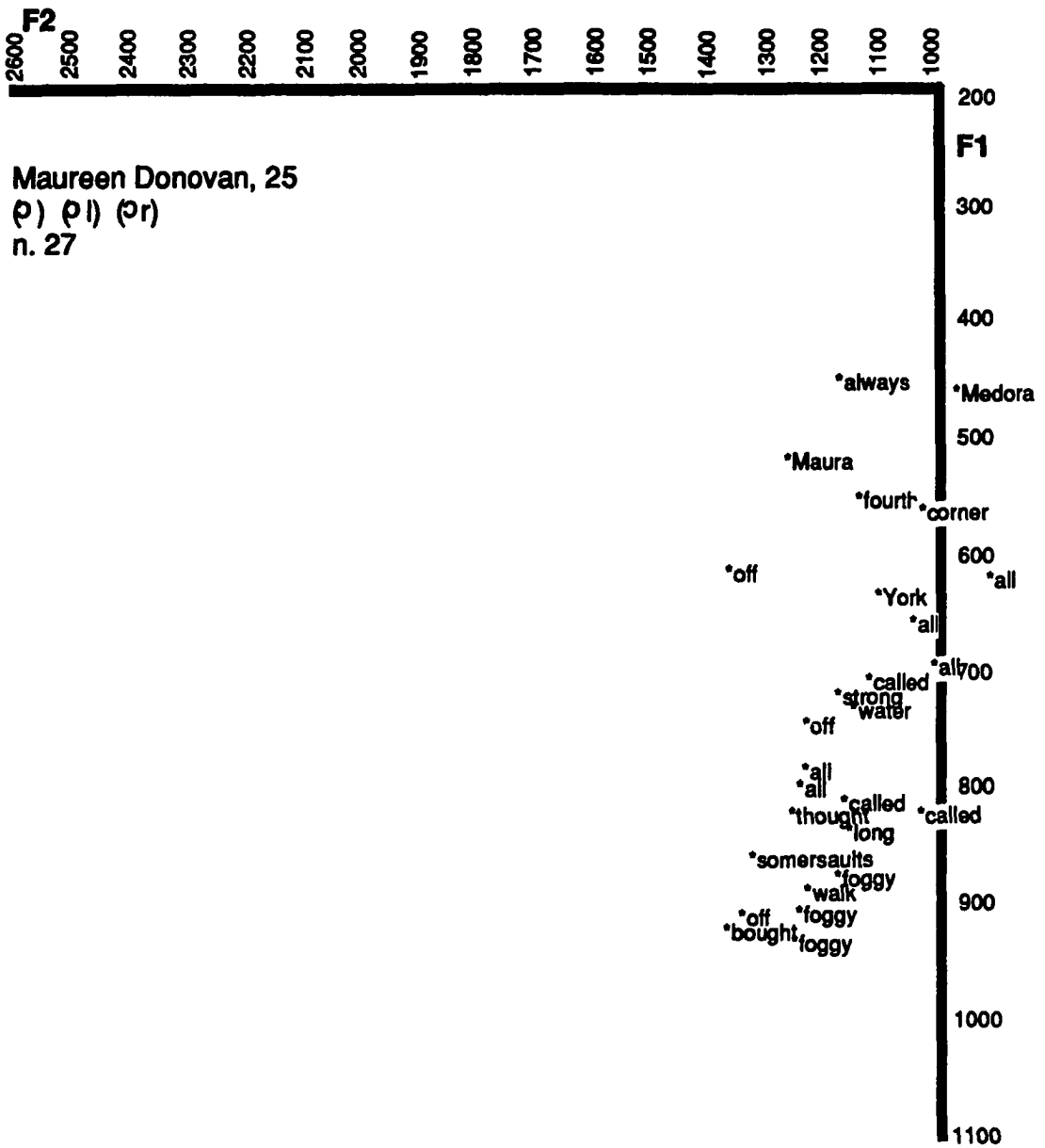


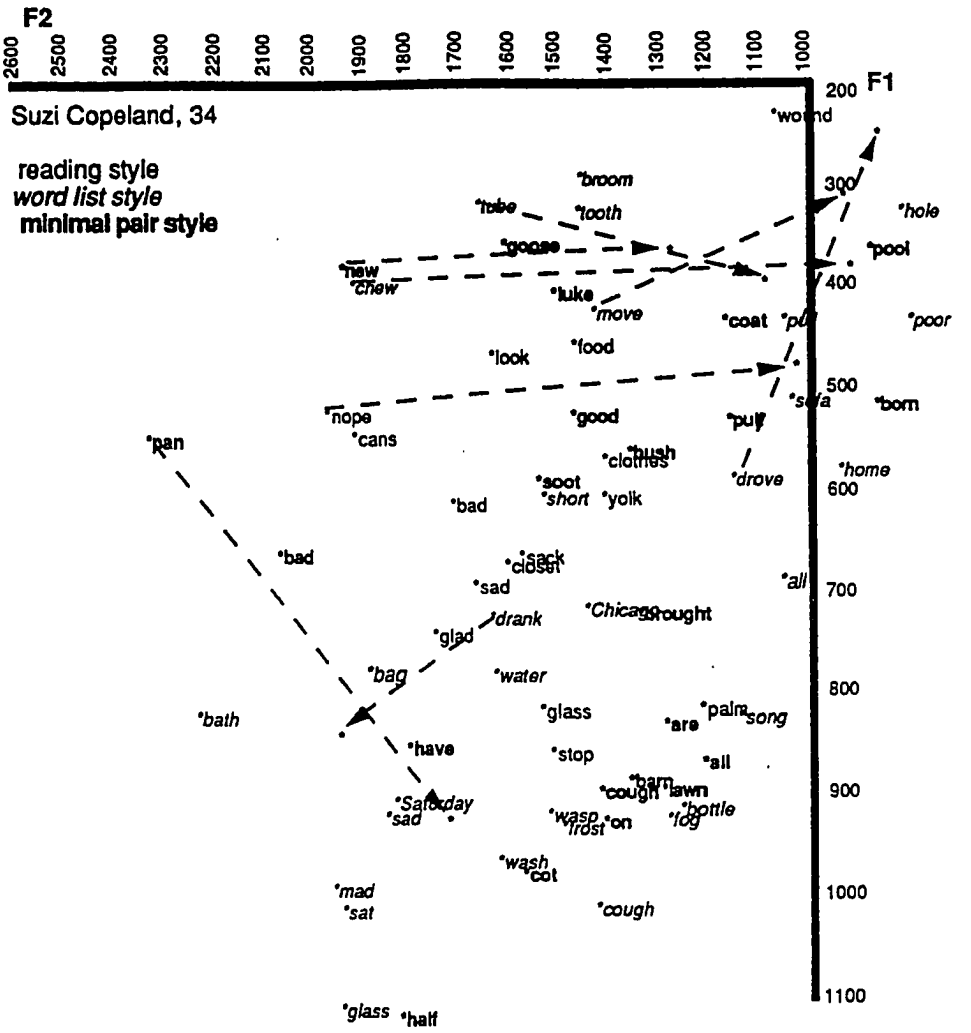


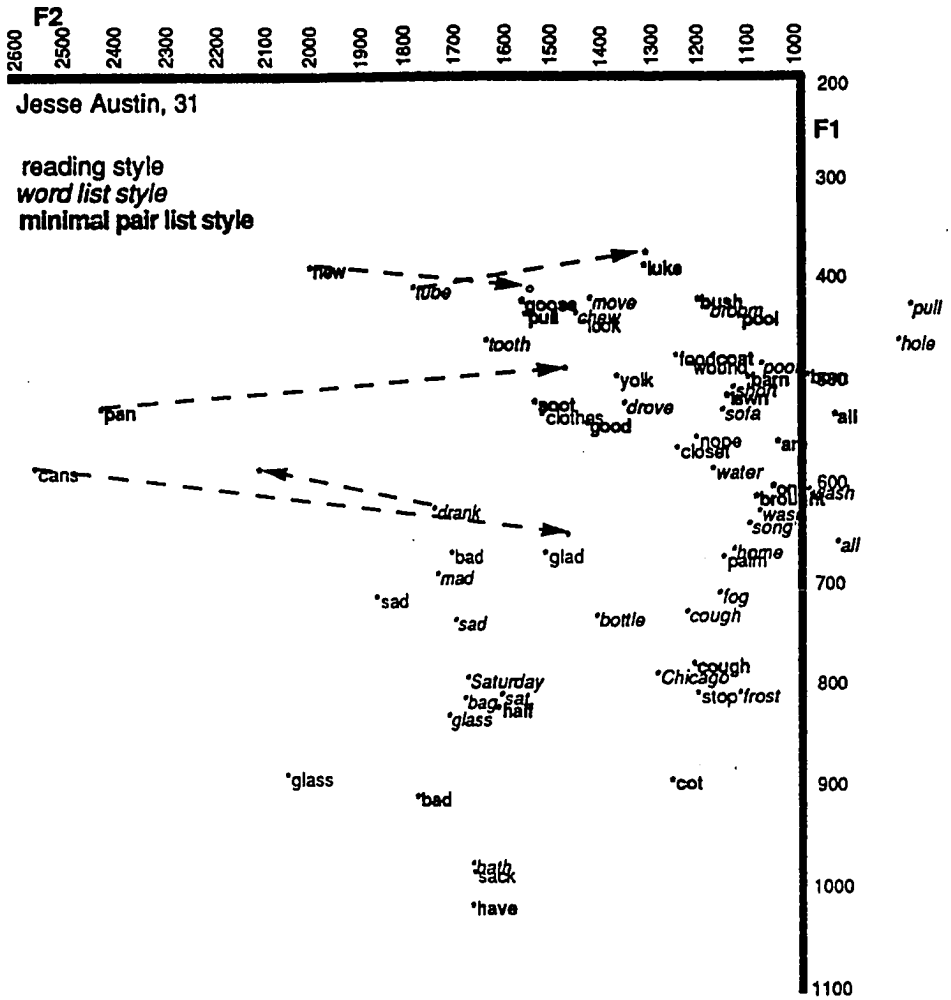


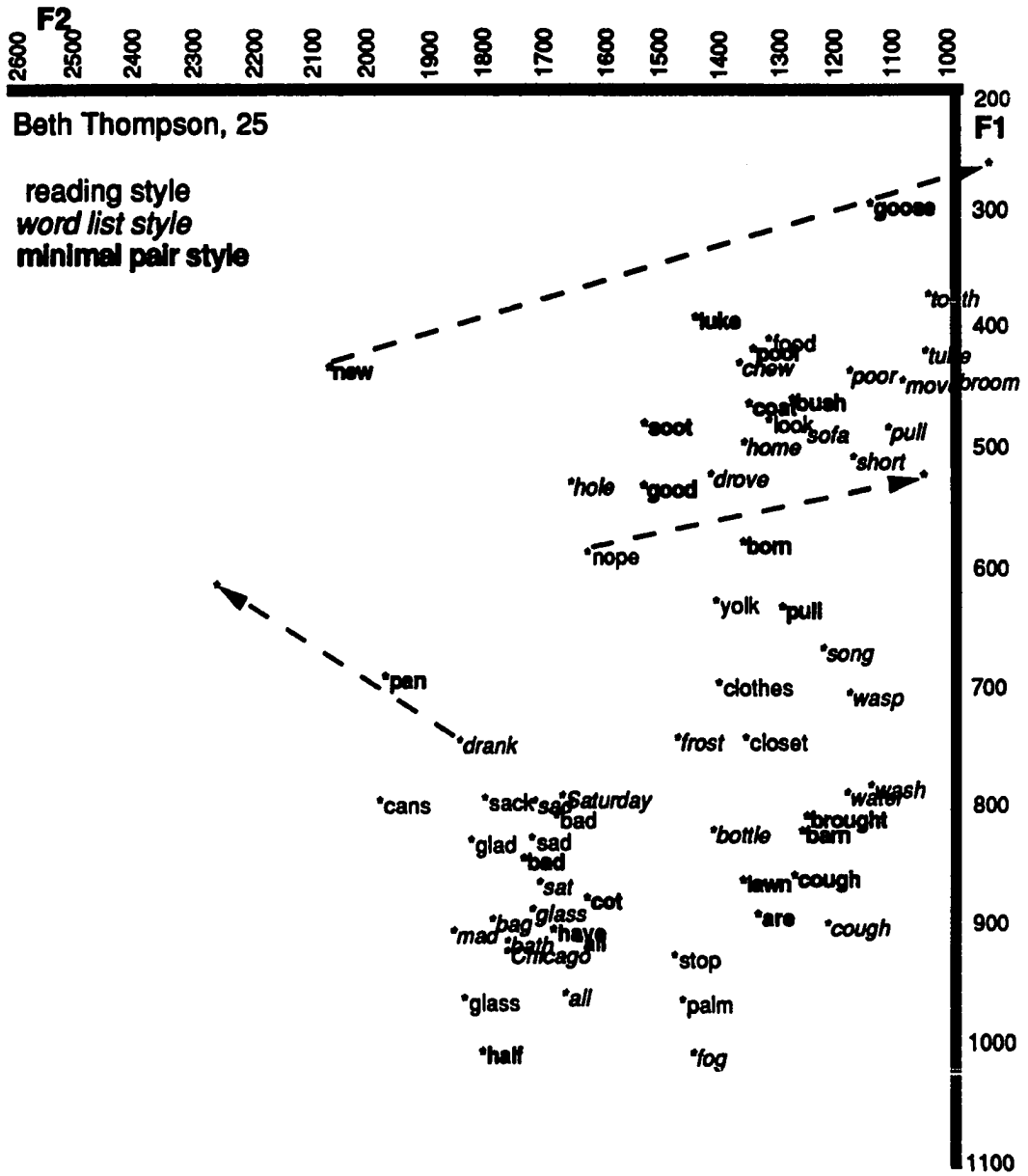


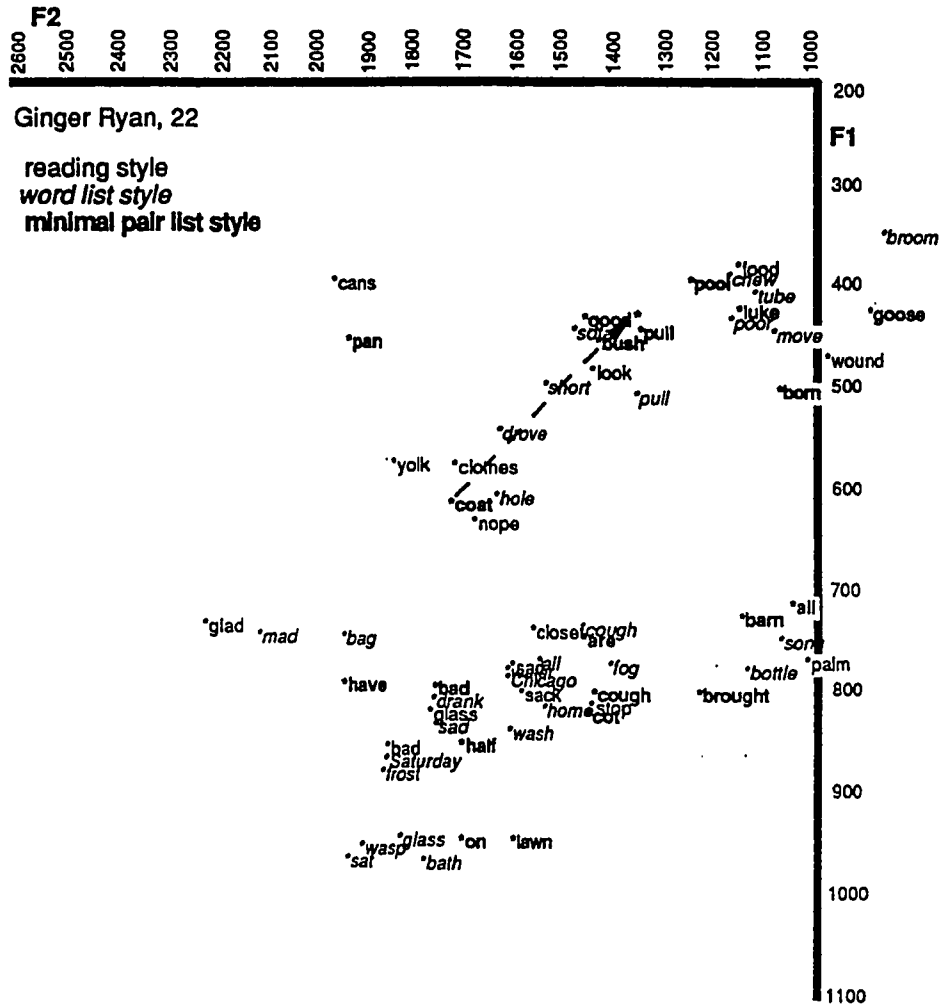


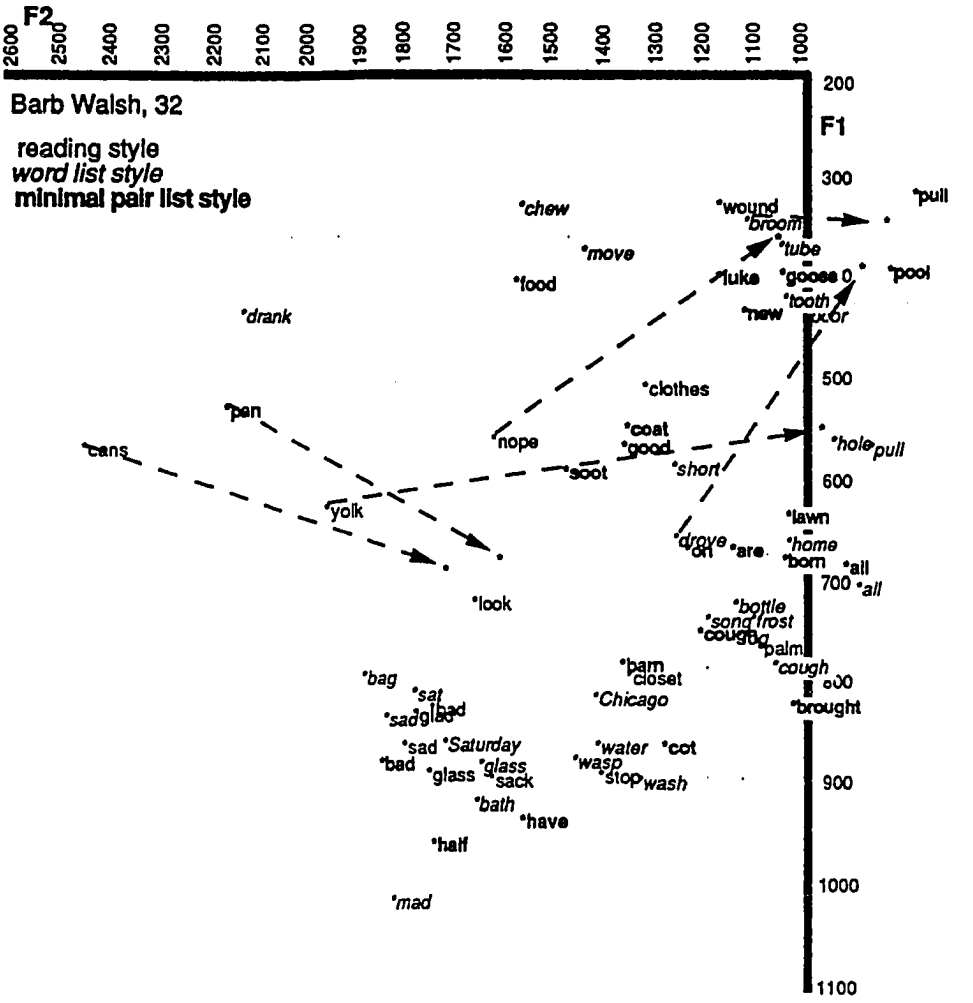


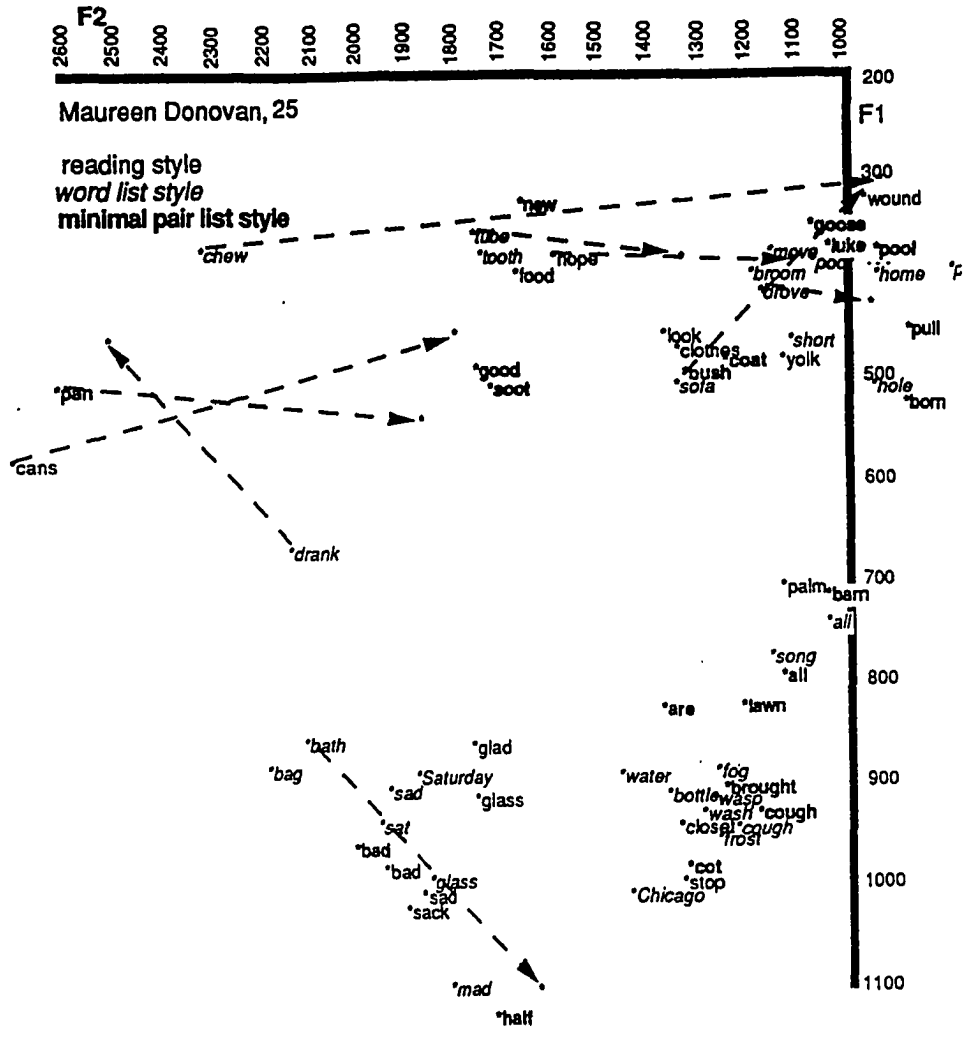












Appendix B: Text samples

This appendix contains small samples of the text used to produce vowel charts for each speaker. Main group speaker texts precede suppllementary group speaker texts. Main group speakers are arranged by age dyad, from oldest to youngest, with the working class informant of each pair first. Spectrograms of the stressed vowels in each word given in bold have been made, formant centers measured, and the F1 and F2 values plotted against each other in vowel charts for the individual. Instances of words with variables (æ), (a), or (ɔ), and associated variables, that are not in bold could not be used either because the vowel was too short, the bandwidth was too large, or the formants were not clear enough. [ ] indicates that I inserted a comment or question. Periods separated by spaces mark pauses, on period for each second pause, e.g. 'uh . . you'd just take turns'. Comments in parentheses, e.g. (laughs, (coughs), refer to interjections by speakers that sometimes overlap with stretches of speech.

The texts show something of the personalities of the informants and the difficulties and pleasures of their lives. There are accounts of childhood experiences, including memories of kids' games, getting in trouble, living with racial tension in San Francisco shcools during the bussing era, and accounts of adult experiences such as childbirth and several kinds of danger stories: earthquake experience; near death experience; the experience of coming out as a lesbian to parents. All four working class informants speak of the influx of Asian immigrants to the Sunset as a threat to White presence and community in that district. In general the interviews with these 14 speakers are made up of talk that shows the trails of daily life in the City and reveals lifestyle, philosophy, and politics.

Meg Cork, 74; SES score: 10

1. When I was a youngster there weren't as many **automobiles** as there **are** now and you could play out on the street. And we'd skate up and down. [ ] uh . . [ ] Well, you'd go out on the street, you know what the gutters **are**, the curbstone, well, uh . . you'd just take turns running across the street and you'd **have** to get one foot up for the other person would **tag** you. And, like a game of **tag**.

2. My . friend lived up the street, in a house similar to this, our children grew up together, her **daughter** and my **daughter** were best friends, and . her husband died and I was a widow and we just . . we **travelled all** over. From one end clear down to the other . . We arrived at Rome and then took this, uh, bus tour where they **have** a guide and went . everywhere. Wonderful. **Have** you ever been there? [ ] O, I would love to go **back** again. [ ] Um hum, **Milan**, Capri, Rome. [ ] . . . . . Let's see, I think Rome. And **Milan** . . [ ] Uh, um, yes, uh huh. Rome mostly though. I mean I found that . . Coliseum and we went to the **catacombs** and . . just everything about it was beautiful [ ] Right. It is . . The leader would have a **candle**, be real **dark** and sometimes the **passage** was real narrow. But as I say, I, I'd love to go **back** again because you go for the . first time, no it's **always**, uh, just so much time here so much time there, but then the second time you know where you **want** to go and spend most of your time.

3. Almost every home that's sold in this Sunset is being **bought** by Asians. The same way in the Richmond. But at one time **alot** of Russian people lived in the Richmond. But they would be my age. So they're kind of dying **off** and now the Asians are living, moving in there, and they're moving in here. **All** the young Caucasians with little children have moved to the suburbs, because they **cannot afford** to buy a house in **San** Francisco. As I say, it's mostly a, I mean, I'm **not** racist

or prejudiced or anything like that, but uh, so many people live there now, that they, they're going into busineess. They own little dress shops, uh, all kinds of restaurants. There must be fifteen between Twentieth and Twenty-Fifth. Must be fifteen restaurants. [ ] And they own the flower shops, and uh, but so this is, uh, the whole, used to be uh . . maybe a lotta Irish people living out this way, but no more. This, now right across the street there, there, that's a young woman, she has four children. And then over here, that's a mixed marriage, uh, she's Caucasian and he's, uh, Chinese, and they have a coupla children. And right next door they just moved in about six months ago. They're Japanese, and they have two little, two little ones. But years ago, when I was young and my kids were young, they were all, uh, Caucasian kids. But now, it's, uh, becoming very integrated . . . But the main reason is because they young people cannot afford to buy the homes. [ ] Well, uh, the Chinese, I don't know . . I, uh, people say they pay cash. I guess it's money from home.

4. Well, I was on a fishing trip once . . way out in the . ocean, and the motor conked out, and the, uh, waves y'know kept . . uh, washing the, uh, boat up to the cliffs . . and, uh, I was pretty scared then. [ ] O no, I was with, uh, with the, it was a big fishing boat, y'know, commercial y'know, uh, you'd rent, uh, you'd pay to go on the fishing . cruise. Maybe about ten people, We were being washed up against the . rocks. Up the coast there. We were just, had my shoes off . . life jacket on, getting ready to jump in . . try to swim to shore. And then some other . it was so foggy . and, uh, some other boat came along and . helped us out, towed us in . . [ ] Yep. (laughs). Huh! [ ] Yes, uh huh. As I said, I had my shoes off and I was ready to dive in. Just waiting till the last minute. My husband was with me [ ] No. Not very good, no. I would never have been able to make it to shore, but of course I had a life jacket on. Whether that would have saved me or not I don't know.

Marion Thompson, 65; SES score: 16

1. Mac got a wheel chair and starting wheeling me in, uh, to the place, and there was some poor guy sitting there with I think he had a fractured leg, and the nurse was very carefully taking the, um, uh, information and so forth, and I'm just getting more purple by the moment, y'know. I just couldn't breath. I co barely gasp out. I couldn't even talk at that point. And uh, Mac gets, uh, pretty authoritative when he has to, and he said, 'I know that this is difficult, but,' he said, 'my wife may be dying. I want attention now.' (laughs) And this poor guy with his cracked leg, 'It's allright, it's allright, go ahead, go ahead, go ahead.' And they backed him off and the nurse got all flustered and, um, they got me into the emergency room. She's got the oxygen tank there, she grabs this little awful rubbery mask and slaps it over my face. And the blasted thing wasn't working. So adding to my con trouble, she was suffocating me. (laughs) And I was so weak I kept pushing this thing aside, and she kept trying to push it over. I pulled the thing off. I said, 'Mac, it doesn't work.' (laughs) Y'know. And, and Mac said, 'It doesn't work.' And in the meantime this bloody machine is hissing away and uh . . I thought, 'O god, they're gonna blow this place up, and the whole place is gonna come down around my ears. I'll be buried under here and I won't even have the pleasure of passing out. I just be under all this. (laughs) gasping (laughs) y'know. And, uh, so, uh, the poor nurse's about out of her skull by then, Mac is untangling the cord, and he finally he got it working.

2. O, when I was in the army I was, I mean, I was lucky. I was, uh, hitching a ride. It was one of the first, um, uh, Tokyo bombers that had come back. And all of a sudden we started heading down . . and the G.I. who'd been riding . . and he was riding in the nose cone, he came on his hands and knees crawling as fast as he could past me. I moved my foot, and he went past, and I noticed . and we were heading for that field,

that straight down, and all of a sudden I looked up and I w saw this door open, y'know, this hanger door open at the end, and here comes the ambulance and everything tearing along . . I thought, 'I wonder what's going on?' (laughs) Not being very bright, cha know, and all of a sudden I looked and I sudd, I realized we, we were heading straight down, and it was . . . dead quiet in that cockpit all of a sudden. The pilot was jamming things. The incredible instrument panel there with those. There was one of the newer, it was the new bomber at the time. Pulling on levers and drawing this and drawing that. We went down and all of a sudden, just as we got just to the ground we started to turn up again. But we hit, and we bounced up in the air, straight up in the air like that, and then we came down again. In the meantime I could see, I could see y'know, you could see right out there. I could see all the firetrucks and everthing pulling around, and we went down again and we nosed over, went off the runway, and nosed over, like that. And, um, of course these fellows were trained and of course they pulled open the hatch and they were zip, zip, zip out the door. Meantime, I, nothing was happening, I'm gathering up my coat and everything, and the poor G.I was sort of giving me this sort of women and children first look, y'know. He didn't know what to do. And all of a sudden I hear some, 'There's still somebody on the plane.' I hear this voice down there. I, I, 'O, some poor devil's trapped in the back.' (laughs) So I went out and some nice young officer caught me as I went down. (laughs). And luckily there was no fire.

Sharon Ryan, 43; SES score: 10

1. And, uh, I used to swim out there every day, even by myself on the coldest [ ] on the coldest days of the year, I'd go out there swimming. And then one of the guys on the swimming team, uh, took me to the beach, and taught me how to body surf, and I gave up competitive swimming and I just became a beach bum. (laughs) I wasn't really a beach bum, I spent *all day* in the water. *All day* I would spend in the water. That was when I was young. I didn't give up going in the water til I was about thirty-five . . thirty-six. I go in once in a while now, but not every day like I used to rain or shine. I'd go in - there'd be snow on the sand dunes and I'd go in the water swimming. I was crazy. [ ] Uh I just started wearing a wet suit. Just started. I boogie board, I don't use the surf boards. I use the uh - it's like a belly board. You just lie down on it, it's plastic—foam? [ ] And I catch the uh waves in. It's a lotta fun for me. I haven't gone since the operation, haven't decided to go.

2. Yeah I had Ginger up on, um, Geary Boulevard. I had her at home, and I look back on that and said that was crazy to do too. But Jewel I had in the hospital, uh, S. F. General? And, uh, I had a pretty easy birth, childbirth, so it's no - no complications. Nothing bad. And it's funny that, uh, when we went to, uh, S. F. General to deliver Jewel . . I didn't have a doctor or anything. I didn't, I never went to the doctor when I was pregnant. I just ate good and exercised, and, um . . First we went to Friends' Hospital and they wouldn't take us cause I didn't have a doctor. And I was get, I'm in labor and everything so we had to drive all the way back out to, uh, S. F. General, and, uh, they wanted to do all kinds of tests and all kinds of stupid stuff and I, I said no. I was really into this nat, nature trip. y'know? So I started walking out, I was walking out of the hospital. I had on one of those hospital gowns? I told Bill 'We're going.' And a doctor came running after me. O, I remember what it was, they wouldn't let Bill

into the. uh. delivery room. So I **got mad** at em and told em. 'No, I **want** Bill in there.' And we were the first people,, uh, to **have** the father in the . . delivery room and ever since then they allow the father in. [ ] I know, isn't it? It's a, yeah, it's a milestone.

3. I had my bicycle. I love my bike. I rode my bike. I've been . . I've been all over the place on my bike. I've been to the **top** of Mount **Tam from** this **spot** to the top of Mount **Tam** on my bike. [ ] Ah, I know, I used to . . . And I was *old* too! I was old. Um, I-I've driven my bike from here to **San** Jose and **back** The trip to **San** Jose and **back** killed me. (laughs) I **stopped** going **on** trips **after that. That** was terrible. I was **lost** in the **dark**, way down there in **San** Bruno? [ ] It was scarey. I was scared to death. I **had** to have adventure in me. But, and, uh, when I **got** older I kinda slowed down. It became **more** of a struggle. [ ] (laughs) So, um, **that's** why the operation doesn't **bother** me ' cause I've *done* , I've done everything . . I'm willing to slow down. I enjoy **walking**. I like walking.

4. Yeah one day, uh, I went out and, uh, I was riding the **shore** break, and, uh, the wave took me and drove me head first into the **sand**. I thought I broke my neck. Did Bob tell you about breaking his neck? Well, it **happened** to me too. Only it didn't break. But it, I felt the **impact**, y'know, hitting, it was like hitting **concrete**. Y'know when you hit **sand**? It was terrible.

5. I remember one time, I **got** to take home the, uh . . the little **box** for the Pope's poor children, and it had all kinds of nickels and dimes and **quarters**. And I spent the money, and then I **asked** my **dad**, y'know, to reimburse me, and I ca. came to school the next day and I gave the teacher . the money? **All** that was there, in **dollar** bills. And she got **all mad** at me, cause I spent the, uh, change. That was scarey.

6. I even feel, uh, I consider myself a native. But I even feel as though Oriental, native Orientals? Y'know that are **born** and raised in **San** Francisco **are** different than the Orientals that c, that is, uh . . . what, what immigra-immigrates here? They, they're different. They're just different than the uh . . the other ones. [ ] Well they're much **more** firendly. And they can speak better English . . . . . [ ] No, they were **all** up in the Richmond . . . . [ ] . . Yeah it's changed **alot** ever since the **war** was over, and **all** these peop- all the Oriental people came in. It just seemed to consume every, every bit of us . . . every bit of us.

Jean ORoark, 45; SES score: 13.5

1. I can remember playing in building sites. When you got a little bit older these things got more organized and we played, um, kickball, tag, hide-and-go-seek, . . um . . one-foot-off-the -gutter, Red Rover, Red Rover. Everybody had to line up on one side of the street, and somebody . . had to stand out in the center, and , you could have one foot . . off the gutter, and if they spotted somebody with two feet off then they ran after them and if they were running after one person then the whole troop could run to tthe other side of the street or . . . just a mass run across the street.

2. And then the other class that I had was an H class. So I had to go from the third floor of the building down to the first floor. Out one building around the corner and down two stories underground [ ] to this . . other class and there was a group of boys in there who, uh, they were not called the retarded class, but they couldn't hold pencils, they couldn't read, they could barely write their name, um, and the teacher thanked me for coming and walked out the door.

3. My mother always saw the Boulevard as the great dividing line. [ ] Well, we grew up on Thirty-Second Avenue which is above the Boulevard. And I can remember when I first rented that house across the street. I called her and I told her I'd rented a house and she said, 'O great,' she said. 'Where is it?' and I said,' It's on Forty-Seventh and Judah.' 'O, you can't live out there. That's the wrong side of the tracks.' So then I said, 'Well, do you wanna come over and see it anyway?' And she said, ' Yeah.' And she came over and she thought that the house was wonderful, and she forgot about the neighbohood being the wrong side of the tracks. And when John and I got married, I called her and I said, um, 'We bought a house.' And she said, 'O, that's wonderful. That's great. Where is it?' And I said,' Well, it's right across the street from here.'

'You mean it's on Forty-Seventh Avenue?' And I said, 'Yes.' And she said, 'Well, you can't live out there. That's the wrong side of the tracks.' I said, 'Well, that may be. Do you want to come out and see it anyway?' She said, 'Yes', and came along and she liked the house. Y'know, and she forgets about it being where it is.

Suzi Rockland, 34; SES score: 8

1. The scariest fun thing is the roller coaster at Santa Cruz. Scared the dickens outta me. Cause I'm tall, and when you're going through this thing the crossbars on the, u, how it's made, the structure itself. I always felt like I was going to get decapitated, like right about here. But that was just because I couldn't slide down far enough. And granted there was enough room, there was plenty of room, but not as far as I could tell. I just knew that I was, uh. It just. I loved it. I'd get back on that thing and scream to death.

2. And, the scariest scary thing was when I got mugged on MUNI. [ ] It was. I was in the fourth grade?—fourth grade—and taking the bus home from school and always sat up in the, in the front, on like the front seats, just so that I could know where to get off, and there wasn't gonna any, any hassles in the back of the bus or anything like that. And I guess were four or five Black girls that got on the bus, and started harassing me. Course I used to get called four eyes alot, because I wore glasses as a kid. And—uh—they were harassing me about one thing or another and ended up like grabbing my glasses and throwing them to the other end of the bus and just messing with me totally. [ ] We—there wasn't really a whole lot I could do. I just sort of, y'know, cried and cringed. Um. And I guess, somewhere along the line I guess the bus driver got em, got em to leave me alone or got em to get off the bus. Or whatever or another. Anyway, a week later I was able to get transferred to the school closer to where I lived.

3. It's more family-oriented out here. um. It's more comfortable. um.n. Not that anybody is any, that people are . . . more open than they are anywhere else, in the city, but it's, the area itself is open. You can talk to people alot easier than you, if you want to, than, than you can like over in the Clement area, you have alot of, uh, um . . uh, language, uh, barriers, because it's predominantly Oriental, over in the Clement area.

So, uh, and they pretty much stick to their own. (coughs) And unless you, y'know, get to know someone or there's the rare people who are open, predominantly that is their neighborhood, and . . they're . . they seem to be for the most part, uh. pretty oriented to their own families, to their, to their own group.

4. It was school. You wore uniforms. The worst part of parochial school is during the fall, when you started school, because summer in San Francisco doesn't exist. Summer in San Francisco hits about September, October, right when you go back to school. And you wear wool uniforms, and of course you had to wear the full uniform; that was the sweater, the wool skirt, the whole gear. And of course you're, y'know, dealing with seventy degree weather, or whatever it was, in, in full wool. (sound of disgust) Gross. Nasty. But, uh, it was school.

5. I think my grandmother drove me to school like the first year and I took the bus . . after that . . . to school [ ] O yeah. I*was* a big kid. but I always took, always took the bus, well I took the bus pretty much wherever we went. My grandmother had the car for a while and that was it. Once she made a, made a, a wrong turn onto the, onto the Golden Gate Bridge, she decided that the car was gonna be history. (laughs) She went too far. And got onto the approach to the, for the Golden Gate Bridge. And U-ied back around before they had the, the dividers, and U-ied around in the middle of rush hour traffic in the morning after dropping me off at school. And I think that's about the point in time that my mom and my grandmother both, both together agreed that, that driving in the city was not a very wise thing for her to do. She didn't particularly care to drive. No, she was very lucky. She got onto the approach, went 'O god, I'm not supposed to be here', U-ied, and came back around, din, no accident, didn't get into any trouble or anything, I mean, she was just, y'know, god was with her or something was with her, because (sighs) y'know, you try to do that now and forget it. [ ] You're dead.

Yeah. That's it. [ ] Yeah. But this was . . . 1960, or so. (coughs) So. Traffic was not then what it is now, either. But, y'know, even still, it was a little dangerous manoever to do. (chokes) And that was, that was the point in time where we all learned how to use MUNI real well. (laughs) Got to where I'd get anywhere in this city!

Jesse Austin, 32; SES score: 15

1. Yeah, it's definitely a class difference. O, yeah. I don't know how else to put it. I don't fit in with those people. They, I, I work for them now. I own a catering company. I work for them. I go into the homes that I grew up in. And I work. I'm not a servant. I won't be treated like one. But I am. I mean I supply a service to these people. I'm not a servant cause I'm not there all the time. I suppose if I was, if I was there all the time I would be a servant.

2. I mean I had no hair. I was bald. (laughs) For [ ] about two years. And I was heavily involved in music . . . of several sorts, um, mostly what they call punk rock for a long time, for about almost ten years, and when I got to New York it was sort of a self-defense thing. I would never get hassled, I would never get bothered. I could take a subway at three, four, five in the morning and noone is ever going to say a word to you. Who is this crazy woman with no hair?

3. I think it's gotton to the point I mean, look at, look at this moronic fool in the White House. [ ] We wanna trust this I mean OK, granted Reagan was worse. Reagan was worse, but the head of the CIA is now running the whole government? I mean the whole fucking government is a covert action. It's ridiculous. It's ludicrous. O, no, we didn't send anyone to China. . . Bullshit. We had someone there within a month . . talking on the high level talks with them. After they . . gone and murdered people in the . . in public and then denied it and then be, are killing more people just because they want. Standing up and saying what they want. . It's one thing to say, 'No, you can't have what you want. . And no, we're gonna keep this,' y'know, uh, a . . a um . . . au is autocrat? . . Or . . I dunno the word I'm looking for but [ ] totalitarian government here. Y, that's one thing, say, 'No, we're gonna . . you know, we're gonna stay dishonest,

and we're gonna keep this, and you **can't have** what you **want.'** It's another thing altogether to go out and shoot them and **keep shooting** them. [ ] **And** it, **and** then us saying, 'O, it's OK.' It's, that's bullshit. [ ] **And** he's just, he's a lying **sack** of shit, He's a lier.

4. I was here! Um, the bookcases **came down, and stuff,** and shit went flying **all** over the place. **Got** a few **cracks** in the **walls.** I was **right there** asleep. And I **thought** the computer was gonna go over, cause it was **on.** I **was flipped out.** I'm **like,** it wasn't even **parked.** I was like—which on these means th, it pulls the needle things up, out of the data, so that it doesn't mess it up—and I was flipped out. I just flipped it **off** and just went, 'O, **god.** I pray to **god** I didn't lose everything on **that.'** (laughs)

5. My head waiter just died, um, right **before** Christmas. And my . . business **partner's** lover's best friend just died . . . **And** two of their really good friends just died this year. **And** his **goddamn dog got** run over **last.** night. He just went **off** the edge **after that.** He just lost it. I dunno. But, um, yeah. I knew **that** would **happen** when I came **back** from New **York,** that alot of people I knew would . . die. Hum, yeah. It's **part** of the reality, if it's not , if it's **not** polio like it was when we were a kid now it's AIDS. Y'know. It's always something. It's the **Black** Plague, and then it's y'know . . whatever. Y'know? Uh, uh, the **Black** Plague and then the Plague and then, y'know, polio, **small pox,** German measles, all those things. They, they come up with a cure, and then it's something else. Y'know? So . . . **that's part** of the cycle too I guess, unless, **of course,** this one was **manmade,** which noone can really figure out. Who's to say? I mean I don't **wanna** think that anyone has . . . that **warped** (laughs). [ ] Yeah, it's very wearing and it's very trying, but to think that we can we can control all this stuff. . . through the ages, is a **crock** of shit. We **can't.**

Ginger Ryan, 22; SES score: 8

1. This is the story my **dad** told me, and and they were, um, gonna tear down the house. They're gonna build up condos, and they were **asking** my **dad** to leave and my **mom**, that they **had** to leave the house, but they didn't **have** anywhere to go, so they stayed there as **long** as they could until the sheriff came and blew out the windows so that they couldn't stay there. [ ] And (laughs) so we were living on Mount **Tam** while I was in her stomach. We were living on Mount Tamalpias for a few days, and then my **dad** found a house on Geary Boulevard on a **Saturday**, moved everything on Sunday, and I was **born** Monday **morning**. My **dad** delivered me. [ ] Yeah. Heavy.

2. So I think my **dad** was the first **man** allowed in the uh delivery room - in Children's Hospital. (laughs) 'Cause my mom wasn't gonna do it. I mean they would've - my **dad** would've delivered it right there in the uh, waiting room if they were gonna do **that**. **That's** ridiculous though! How could they do that, **not** let the husband in the room? [ ] **That's** wierd. Yeah. That's ridiculous! I'd **rather have** my husband doing all the work while they watched just in case a complication **happened**. I mean I be hap, feel **more** comfortable with my husband - between my legs than (laughs) [ ] I know! Thick!

3. But he **can't stand all** the Chinese people living there. (laughs) There's just too many Orientals. He **can't stand** it. Cause they own everything, and they're taking over **San** Francisco. I mean, you may as well **call** it China, the amount that . **that** are here. [ ] Oh yeah. Every . I mean my **dad** said that when he was uh a child, there were . . twenty kids on the **block** to play with, just on *your* **block**. And now, you don't see kids playing in the streets, for one thing. And, if you do, they're **always** Chinese and . every house on the **block** you might see um Caucasian **family**, per block. And they own everything. They get money from the government. They live . . twenty million

people in one house so they can **all** save up money and buy another house. I mean, it, it amazes me the amount of Oriental people. I mean, it's terrible to be racist but . it amazes me on the amount of Oriental people that will, um . . . **have brand** new Mercedes, **brand** new BMWs . . and you wonder how they get that money. I mean, h, and **not** even speak English. (expel giggle breath) **That's** what gets me, they should be able to . they should speak English if they're in our country.

4. Yeah. Well, they're trying to get money any way. I got a ticket the other day for not - um, para- not um, curbing my wheels . . twenty bucks! [ ] No, on Taraval Street? [ ] Couldn't believe it. I mean I **walked** up going 'What is that ticket doing on my car? The street cleaning- it's **not** street cleaning day. Why have I got a ticket?' And I go 'Not curbing my wheels! I **can't** believe you'd give me a ticket for **that**.' [ ] Twenty **dollars**. I mean I ha- that's twenty **dollars** that I can't **afford** to lose. [ ] They're just out there to get any money that they **can**, and I **can't** believe they say they're broke when they're **charging** two **dollars** a person to **cross** the Golden Gate Bridge. You know they're making billions **off that** bridge. How could they be in debt? Or- whatever it is? [ ] Yeah. But even then, how could they take that much money? I mean they make billions of **dollars off** the bridge. You figure thousands and thousands of people **cross** that bridge a day. Times two? . . . They're making money. They're getting over. (chuckles) [ ] I know, one section at a time, they go so slow. Leave it. Let it rust. (laughs)

5. I **thought** it was gross. (laughs) I was just like 'ew, two tongues an' saliva, (sound of disgust). [ ] I know, but I felt like - you see it on tv and you think that, that you're just gonna be totally pressured to do this every time you go on a date. I made him pick up my sister to take her with us cause I didn't wanna be left alone with him. (laughs) So she came **along** with us and, well, she **got** drunk and **passed** out in the **closet**, but (laughs). Meanwhile I was sitting on the couch twiddling my thumbs cause it

was so **boring.** It was nothing. I don't see why people like it, cause you feel **all antsy** and you wanna do something but you don't wanna do anything and . . it's a weird feeling. I don't see how anybody could be addicted to something like that.

6. The best surfing day I ever **had,** I'll never forget it. The sunset went down. It was beautiful. The orange in the sky and I just did **not want** . the waves were perfect for me. Perfect height, they were breaking perfect. And my **dad** was out there surfing with me **across** the street from our house. And, uh, I didn't wanna get out of the **water.** I didn't **want** the ay, day to end. It was so perfect. And, uh, I was having a great time just catching waves, left . . right . . every wave that came by I was, just me my **dad** out there by ourselves. And he **paddled** in. I stayed out for another hour. (giggles)

Beth Thompson, 25; SES score: 14

1. So during a sale, there'll be a line **all** the way down the **block**, and we can only let so many people in the store. Somebody has to **stand** at the **door**, keeping people out, because it just gets too crowded, and . . There are two people working the register, and two people in the **back**, making sure people aren't **cramming** too much into the dressing rooms, and putting clothes away and stuff and, and just, I mean, the noise level is amazing because there are all these women in there tearing things **off** the **rack**, and everything, and, I remember there was like a line of like twelve women waiting and each of them had like **armloads** of clothes, and um, and one woman came up and said. 'Do you gift **wrap**?' Well, it was the last thing we were gonna do, it, especially during a sale.

2. It was really strange mixture of kids, at the school, they had, um, this was when they were really sort of at the height of bussing, and they had, they were bussing kids from Chinatown, from Hunter's Point, and from Pacific Heights. So it was like **probably** the worst mixture that you could have, y'know. I think if, I think if, um, . . . I think if, if there'd been **more** awareness among the students of, of the different . **backgrounds**, that everybody come from it woulda helped, but I mean, you **had all** the Chinese **gangs**, you had **all** the **Black gangs** from Hunter's Point, and the you **had** the rich kids from Pacific Heights coming in, and, it just didn't lead to a really good mixture at **all**. I would run from **class** to **class** to get the next **class**. Everybody's ,'Hey, did you see that fight in the hall,' and they were talking about this great fight in the **hall**, and I sit there going, 'Fight? Fight? What fight?' And I'd **walked** right by it, y'know, hadn't even seen it. But . . and I think, I, I went down there, um, my mother was teaching there for awhile and I went down, like to meet her or something, and they'd completely changed the, the students, y'know, from where the students came from to go to the school. And I **walked** in th, in there, and there were **all** these, like nice, little students, who **had** like, their shoe

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and unavailable from author or university.
Filmed as received.

U·M·I

I have read the description of Birch Moonwomon's proposed study of English in San Francisco and I agree to participate in the study as an informant. I understand that I can stop participating at any time. I also consent to the possible release of my name, address, and phone number, from the key, to a future investigator of language. I understand I am not obliged to participate in any future study.

Signature_____ Date_____

D.3. Reading, word list, and minimal pair list texts.

Elicitation material for more careful speech is given below. In the story (R style) items in bold are the ones around which the story was composed. Vowels appear with various following consonants and at word boundary. The words were of course not in bold type in the copy of the story read by informants. In the R, WL, and MP style texts, items finally selected for spectrographic analysis appear in outline here.

April sixth. I hear the rain **drizzling** outside, filling the **creek** over the **picket fence**. Yesterday I **hauled** my **laundry** from the closet onto the **chair**, the **Osh Kosh B'Gosh** overalls on top. Next step, get them to the **basement** garage—every awkward pound of **clothes—Mitch's blue wool** sweaters, damp **Canyon** towels, four **pillow** cases dirtied by **Duke's** paws, etc. **Climbing** up and down those **cement** steps! O, I love to gripe! I **look** around for another deed. Something more of a **pleasure**, since I'm going to be **cooped** up in the house.

First, some of **Sal's coffee**. I drink, eat a **doughnut**, and listen to the **faucet** drip. Then I'm glad to **feel** inspiration. I'll clean the refigerator. I know I'm **brave**! I **reach** for the door, open it, and **peep** inside, into the forgotton **region** of old **cornbread**, dry **yeast**, and mysterious **tin** cans. There's the **pumpkin** pie **Beth's mother** made on March **fifth**. It's **mud**! There's some **applesauce** from a former **supper**. Worse than the **usual hodge podge** of **food**, and no one to **blame** but me. This is bad. I get **gruff** with myself and go to get a **bucket**. Got to get **rid** of this junk now. I bend over for the **pail** and hit my **jaw** on the counter, wrench my **neck. Ouch**!

When I return to the fridge, I'm suddenly **afraid**! I hear tiny **cries**! Underneath a **strip** of dried **yellow yolk** something is moving. It's **seething**. Now it has broken **free**! It's **like** a **toadstool**. No, it's **like** a **spider** with a **paunch**. It has **teeth**. No it has **tusks**. I am **hushed** in **fear**. (This is more repulsive than **roaches** and **mice**.) The THING has almost **drowned** itself in the **ocean** of the gravy bowl. I wouldn't be sad. But it has made a **smooth groove** through the dish of **peanuts**, climbed the **packets** of soup mix (**missing** a sack of take-out food), and is now **clawing** its way **blithely** toward the freezer. It wants to **mooch** my **thawed chicken**. How can I stop it? Can I even **wound** it? Courageously, I catch it in my palm and it **breaks** . . . into nothingness.

I get a glass of water. Should I **be** honest with anyone about what happened? **Nope**. This very **odd** occurence is best **kept** to myself. Clearly I'm cleaning the refigerator just in time!

absent
adobe
aisle
all
apple cobbler
bag
bath
bathe
boat
bottle
bright
broom
brother
brush
bug
came
chew
Chicago
coach
couger
cough
craw
cream
does
drank
driven
drove
drunk
eight
February
fetch
fists
flies
flower
fluff
fog
foot
frost
froze
glass
grease
gulch
gums
leash
hay
hem
hole
home
itch
Jenkins
kiss
label
launch
league
legion
libel
lie
mad
mat
midget
move
notch
notion
nut
out
owl
papa
patience
peach
pig
pooch
poor
pouch
pull
quit
ram
razzle dazzle
reef
rouge
rubber
sad
sat
Saturday
short
shrimp
singing
slave
sofa
song
suit
sun
swam
sweet
thrash
three
time
tired
tooth
treasure
trough
trowsers
tube
Tuesday
vase
wash
wasp
water
weather
wet
yard
yoga

ache	egg
age	h
Al	all
ape	Abe
apt	abdomen
bail	bell
barn	born
bat	bad
batch	badge
bean	bin
bear	bar
beat	bead
bit	bid
bliss	blizzard
brought	broad
bush	butch
coat	code
cop	cob
cot	cod
cough	cloth
dish	ditch
fate	fade
feel	fill
fife	five
find	fond
foul	fool
fuss	fuzz
goose	goos
gross	grows
half	have
hauled	holed
hefty	heaven
heifer	heather
hour	are
house	houses
ice	eyes
known	noon
lawn	loan
leaf	leave
ledger	lecher
loop	lube
lout	loud
lover	other
luke	luger
ma	maw
mash	match
mauve	moths
mere	mare
merry	marry
mesher	measure
mike	migraine
muck	mug

gruff	glove
mush	much
new	now
oaf	oath
oath	oaths
on	awning
one	wan
opal	obel
pain	pen
panned	pond
peace	peas
peck	peg
pick	pig
pie	pow
pin	pan
pull	pool
raced	raised
rack	rag
rave	wraith
rich	ridge
rip	rib
roof	roofs
root	rude
safe	save
sauce	saws
saw	sue
see	say
set	said
shut	shudder
soot	good
sup	sub
tin	ten
unravel	raffle
wept	webbed
white	wide
wound around	wand

Notes

1. Dr. Gumperz has retired. Original tapes will be kept elsewhere.

Appendix E: Abbreviations and symbols

Abbreviations:

LAGS	Linguistic Atlas of the Gulf States
LAMSAS	Linguistic Atlas of the Middle and South Atlantic States
LANCS	Linguistic Atlas of the North Central States
LANE	Linguistic Atlas of New England
LAO	Linguistic Atlas of Oklahoma
LAPC	Linguistic Atlas of the Pacific Coast
LAPC-Ca/Ne	Linguistic Atlas of the Pacific Coast-California/Nevada
LAPN	Linguistic Atlas of the Pacific Northwest
LAUM	Linguistic Atlas of Upper Michigan
LAUS	Linguistic Atlas of the United States
NORMs	nonmobile, older, rural, males
MP	minimal pair list style
WL	word list style
R	reading style
OE	Old English
ME	Middle English
EME	Early Modern English

Symbols:

(æ, æN, æT,æS,æP, æt, æd, æg, æn, æm. æŋ, æl, ær) (æ) followed by various consonants; upper case letters represent general environments.

(a,aN, aT,aS,aP, at, al, ar) (a) followed by various consonants; upper case letters represent general environments.

(ɔ,ɔN, ɔT, ɔS, ɔt, ɔl, ɔr) (ɔ followed by various consonants; upper case letters represent general environments.

(æh) and /æh/ are used in Labov, Yaeger, and Steiner (1972) and elsewhere to refer to the tensed front vowel, historically low.