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**THE ROLE OF BEHAVIORAL ECONOMICS IN RESIDENTIAL CHOICE:
A PILOT STUDY OF TRAVEL PATTERNS, HOUSING CHARACTERISTICS, SOCIAL
CONNECTIONS, AND SUBJECTIVE WELL-BEING**

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ABSTRACT

Do people make imperfect decisions about where to live and how to travel? There is some evidence that people may overvalue privacy and material goods like housing and undervalue time for activities and social connections. We surveyed 84 individuals, almost all of them university students, before and after a planned move between homes. Respondents answered questions at two points in time about six months apart, before and after moving. They reported ratings of subjective well-being, information on travel patterns, characteristics of homes and neighborhoods, the number and type of social connections, demographics, and significant life events. This working paper describes the survey design and data collection process, and reports on survey results.

ACKNOWLEDGEMENTS

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INTRODUCTION

The urban sustainability agenda focuses on reducing auto use and land consumption in order to reduce energy consumption and minimize environmental impacts, in part by adopting policies to influence how households decide where to live and how to travel. Residential location choices represent trade-offs between many factors, such as housing price, commute time, school quality, and proximity of friends and family. Movers may choose lower levels of happiness in the short term in order to maximize their future happiness, or the happiness of other members of their family. But movers may also make “irrational” choices, failing to take into account important characteristics of their new homes or neighborhoods due to the unavailability of pertinent information, or because they inaccurately forecast their future happiness. Evidence from the psychological (or “behavioral”) economics literature suggests that people may tend to overestimate how much they will enjoy private material goods such as larger houses and private yards, and to underestimate how much they will value public goods such as parks, social goods such as relationships with neighbors and casual contacts with passersby, and the activities that may be enabled by the time savings from shorter travel distances.

This study explores whether evidence of such imperfect decision-making appears to exist, using a survey of undergraduates before and after a planned move. Moving from dormitory to off-campus apartments could mean spending more time commuting and less time with friends. This could inadvertently reduce happiness, or, as presumably intended by people deciding to move, it might just make them better off. Multiple criteria—including not just housing size and commuting distance, but also shopping trip distance and distances for other kinds of travel, housing tenure, and access to social activities—must be considered to fully understand how and whether location choices are irrational in this classic sense.

The behavioral economics literature provides relatively limited evidence about how people choose where to live and work, or about their travel plans regarding mode and distance of the commute or of other trips. This study attempts to probe more deeply into how people make a residential location choice and how their reported happiness changes along with their material circumstances, and thus to provide evidence about whether decision-making around where to live and how to travel is suboptimal in terms of well-being. By surveying people before and after they move to a new home, we can attempt to identify what factors in the location decision they are trading off and to what extent they are aware of making them. In this pilot study we explore data from a survey of 84 individuals, mostly undergraduate students, collected both before and after a planned residential move. The survey included questions about well-being, travel, housing, social interactions, demographics, and life events.

LITERATURE REVIEW

Behavioral economics research has established a number of exceptions to classical rational economic behavior (Ariely, 2008; Kahneman et al., 1991; Diener, 2009; DellaVigna, 2009). Some of these phenomena are applicable to residential location decisions. A distinguishing characteristic of this research is the use of surveys where participants are asked to rate their life satisfaction using scales developed by psychologists. These subjective well-being ratings are then used as the dependent variable in models that include variables thought to influence happiness.

People may fail to accurately forecast their future preferences due to over- or under-weighting of relevant information, a mechanism called “projection bias” or “focalism” (Wilson et al., 2000). A study of how undergraduates predicted their happiness at a set of prospective new dormitories, prior to being assigned a dorm, found that they tended to focus on the physical features of the buildings and environs, even though they predicted that social

interactions would be more important in their happiness. In follow-up surveys after assignment to living quarters, physical features were not correlated with subjective well-being (or in one case negatively correlated) while social interactions were highly positively correlated (Dunn et al., 2003).

People may overvalue salient and readily perceived goods, such as large private houses, because of a tendency to fail to anticipate their own adaptation over time to the new conditions. The initial benefits or disbenefits that people receive from the novelty of a new home and neighborhood tend to become significantly attenuated over time because people become rapidly accustomed to their new material conditions, a tendency labeled “hedonic adaptation” (Loewenstein and Ubel, 2008, Frederick and Loewenstein, 1999).

While people adjust quickly to changes in material conditions, they are less able to adjust to changes in social networks. The flows of benefits from daily activities and daily interactions with people are significantly less peaked, and thus not as salient in the choice process, although social benefits are thought by some to contribute more towards well-being in the long run (Frey and Stutzer, 2007: 181-185). People who are more oriented toward seeking such “intrinsic,” rather than material, rewards have been found to be more accurate at forecasting what will make them happy over the long term (Welsch and Kühling, 2010).

Another phenomenon that may affect residential location choices and commuting distances is the underweighting or unavailability of information during the choice process, or reliance on suboptimal choice rules (e.g., DellaVigna, 2009: 347, 354). For example, when deciding where to live, a household might focus on readily available information such as the quality of the school district or easily visible features such as structural conditions, and not consider changes in commuting or how their social lives may change, if those factors are more difficult to predict. Activities may be harder to visualize than material goods.

There is some evidence that people underestimate the disutility of commuting, in particular. Swiss behavioral economics researchers Stutzer and Frey coined the term “commuter paradox” to describe their finding that people with long commutes were less happy, based on a comparison of time spent commuting and reported life satisfaction in an 18-year German panel dataset (Stutzer and Frey, 2008). Similarly, the Gallup-Healthways Well-Being Survey found a strong correlation between minutes spent commuting per day going up, complaints of health problems going up, and overall life satisfaction ratings going down (Gallup/Healthways, 2010). A survey focused on commuting asked 900 Texas commuters to rate their well-being during a variety of life activities and found that subjects assigned the lowest rating to time spent commuting (Kahneman et al., 2004).

DATA COLLECTION

The survey was administered to a panel of participants in two phases, before and after a move from one housing unit to another. The questionnaires included questions on subjective well-being, commute and non-work travel, characteristics of the housing unit and neighborhood, characteristics of the household, social connections, and demographic information. In both phases, participants were also asked to rate their satisfaction with their housing, their commute to school or work, and their social contacts.

The pre-move survey (Phase I) was conducted between May 11 and June 13, 2011. The post-move survey (Phase 2) also collected information about major life events (such as the death of a family member or the end of a romantic relationship). The post-move data were collected from February 10 to February 24, 2012.

QUESTIONNAIRE DESIGN

We relied largely on pre-tested questions from other surveys for both the before- and after-move questionnaires. Questions were drawn from a variety of sources, including the Census, national and state travel surveys, and the behavioral economics literature.

The subjective well-being section tested several questions for use at the dependent variable in this study, including global ratings of satisfaction with life in general, as well as personality indicator questions. As the subjective well-being rating will be used as the dependent variable for data analysis, we tested four different subjective well-being questions to determine if one could be identified as the most reliable, or consistent from Phase 1 to 2. The first two subjective well-being questions we tested were both one-question surveys. The first was developed by Andrews & Withey (1976), "How do you feel about your life as a whole?" Responses are given on a 7-point school where 1=Delighted and 7=Terrible, also known as the Delighted-Terrible scale.

The second is an instrument, called the "Life Ladder," is used by many subjective well-being surveys, including the Gallup poll (Cantril, 1965). It asks, "Please imagine a ladder with steps numbered from one to ten. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? On which step do you think you will stand about five years from now?" Respondents are asked to select a number between 1=Worst to 10=Best for each question. Due to technical limitations with our survey host software, respondents in this survey were given a 9-point scale, with 9=Best as the highest possible response.

The other two subjective well-being rating instruments we tested were both multi-question surveys which ask subjects to make a subjective well-being evaluation in two dimensions, positive and negative affect. The first was the Alternate Measure of Life Satisfaction Scale, which asks subjects to make evaluations between positive and negative affect using a 7-point scale (Andrews & Withey, 1976). With the survey prompts, "I think my life is..." and then asks respondents to choose a rating on a scale between one pole representing positive affect, and another representing negative affect, such as Enjoyable:Miserable or Full:Empty. This survey is designed to thwart rote responses by switching the positive and negative poles, so that subjects must pay close attention, and be more likely to give reflective responses. For instance, the first question might have the positive pole (e.g. Enjoyable) is equal to 1, while on the next question the negative pole (e.g. Lonely) is equal to 1. In this working paper, we also refer to it as the 'My Life Is' survey.

The second multi-question subjective well-being rating instrument that we tested was the Bradburn Affect Balance Scale (Bradburn, 1969). This presents respondents with a series of questions that ask them to rate positive and negative affect on separate scales. The survey prompts, "Focus on your feelings during the past few weeks," and then asks a series of 10 questions about their feelings. Respondents either agree or disagree by answering 'yes' or 'no', where yes=1 and no=2.

In the subjective well-being section, a question on personality type was included because certain personality traits are correlated with positive or negative affect, and higher or lower subjective well-being ratings. Specifically we sought to identify extraversion and neuroticism, which are two of the "big five" personality traits that may be identified using the personality marker scales developed by Goldberg in the 50-question International Personality Item Pool (IPIP) (Goldberg, 1992). We selected eight questions designed to flag these two traits from the IPIP and used them in both phases of the survey.

The Phase 1 survey included several questions to test the hypotheses about heuristics and focalism bias. Respondents were asked what characterized their ideal new residence, the

constraints they faced, and how they were making trade-offs among desired characteristics. They were asked factual questions such as whether they were searching together with another person or pet, as well as open-ended questions where they could describe desired features and constraints in their own words. A question asking respondents to rate how easily they could visualize their new residence was taken from a previous survey testing location choice using behavioral economics theory (Dunn, Wilson, and Gilbert 2003). This question required respondents to focus on their ideal future residence and search process, warming them up for the open questions. The ability to visualize is also correlated with personality type, positive and negative affect, and ability to make accurate predictions.

The rest of the survey was similar in both phases, the Current Residence section asked respondents for factual information about their current residence, such as number of bedrooms and vehicles kept by residents. The Household section asked respondents for factual information about their household, like the number of members, ages, and how related, and the number of vehicles and bicycles available to residents. Finally, the Demographic section asked respondents for basic personal facts like income, education and employment status, as well as for their address and the amount of their rent or mortgage payment. Standard language from the US Census American Community Survey was used for most of the questions in these sections. The data is used as explanatory variables in a regression with subjective well-being ratings as a dependent variable.

The Commute and Travel section included questions about the respondents' commute specifically, and about the frequency and mode used for other common types of trips. It also included questions about bicycling and walking behavior, which will be used as control variables for people who habitually have higher levels of physical activity (which is correlated with higher subjective well-being ratings). These questions were taken from the National Household Travel Survey and the New Jersey Survey on Transportation and Housing (Chatman and DiPetrillo, 2010).

The Social Connections section asked respondents factual questions about the type and frequency of their contact with friends and family. It measured social connections on three dimensions: magnitude, frequency, and quality of contacts. They were asked about the number of close friends and family, how often and how much time was spent socializing, and by what means (i.e. in person, phone, email, Twitter, etc.). Questions from this section were drawn from the Harvard Social Capital Survey. The data will be used as explanatory variables in a regression with subjective well-being ratings as the dependent variable.

The Neighborhood section asked respondents about the characteristics of their neighborhood and how safe and connected they felt. It began with a question about the definition of a neighborhood, in order to focus respondents in a consistent way. Questions for this section were drawn from the Los Angeles Family and Neighborhood Survey, both the version for adults and for children. The data will be used to understand decision heuristics.

RECRUITMENT AND RESPONSE

We made use of the U.C. Berkeley Experimental Research Laboratory (XLab), a dedicated 40-seat facility with a pre-recruited pool of approximately 2,500 subjects recruited from campus (primarily students). This facility allows a highly structured survey-like experiment to be conducted on a pre-screened, stable subject pool using a longitudinal panel design. Recruitment for this study took place in May 2011. About half the surveys were administered in the XLab itself during the last week of the semester, and the remainder were completed by participants on their own computer, using a secure link.

A pre-screening survey was designed to recruit participants from the XLab pool who were planning a residential move, and who met two other criteria: travel to the UC campus at least three days per week, and no children in the household. A total of 694 potential participants

took the pre-screening survey during two rounds of recruitment. Of these, 498 completed it without being screened out by the survey questions, a response rate of approximately 20% of the pre-recruited pool. 196 potential respondents were screened out based on not meeting the study criteria.

The first round of recruitment resulted in a screened pool of 304 potential study participants. They were then invited to the study based on their commute mode and residential zip code. The pool had an overrepresentation of people who commuted exclusively by walking and who lived in the two zip codes where the student dormitories are located. Therefore those who commuted by multiple modes or lived in other zip codes had a higher chance of being invited into the study. We sorted the 304 respondents by zip code, and selected all 52 respondents not residing in 94704 or 94720, and all eight respondents who reported that they never walk to campus. We divided the remaining respondents into two lists, 'exclusive walkers' and 'multi-modals,' and randomly selected the first 10 walkers and the first 20 multi-modals in each zip code (for a total of 57 respondents, as there were only 17 multi-modals in 94720). After this round of recruitment, 117 respondents were invited to participate in the study during two sessions in the X-Lab. Of these, 57 completed the survey at the XLab facility: 27 during the first session, and 30 during the second session.

An additional question was added to the pre-screening survey between the two rounds of recruitment. We discovered that some students intended to move home for the summer and back to the same residence in the fall, so the survey was modified to disqualify these. For the second round of recruitment, the email for the pre-screening survey was re-sent to the X-Lab pool, and we also asked colleagues on the UC campus to post the recruitment email on their departmental listservs. This prompted some potential participants to join the XLab pool in order to take part in this study.

The second round of recruitment drew 194 respondents to complete the pre-screening survey. They were divided into three lists: exclusive walkers, those who never walked, and those who used different modes at different times. We selected all 34 respondents who reported that they never walk to campus. We then sorted by zip code those respondents who reported commuting by multiple modes, selected all 16 respondents living outside the 94704 or 94720 zip codes, plus an additional five selected at random from 94704. We invited these 55 respondents to participate in the study by sending them a secure link to the survey online. We later invited 63 more respondents from the pool of 194, including 24 who had failed to respond to the initial invitation, and an additional 39 from the lists of 'exclusive walkers' and 'multi-modals' who lived in zip codes 94702, 94705, 94703, 94704, and 94709. Of the 157 who were invited to the study after this round of recruitment, 83 completed the survey online.

A total of 140 respondents took the Phase 1 survey either in the lab or online, a response rate of 60%. Of these, we immediately eliminated five incomplete surveys. Five respondents had completed the survey more than once; for these respondents the data were sorted by end timestamp, and only the first completed survey was kept. Responses from seven participants who responded yes to the screening question, "Will you be moving back to the same residence or building you currently live in?" were deemed invalid for analysis. The remaining dataset contained 123 valid cases for analysis in Phase 1, for a participant response rate of 52%.

A recruitment email for the Phase 2 survey was sent to a total of 130 Phase 1 participants, the 123 whose responses were used for Phase 1 analysis, and an additional 7 who had stated their intention to move back to the same residence in the fall. Of these, 89 logged into take the Phase 2 survey. All the surveys were completed, but five were deemed invalid because the respondents reported living at the same address as in the Phase 1 survey. Thus participant response rate for Phase 2 was 84 participants who moved, for a participant retention rate of 65%.

Table 1: Summary of Survey Recruitment and Subject Selection

	Invited	Completed	Response Rate	Screened out	Responses deemed valid	Valid Response Rate
Pre-screening survey	2,500	694	28%	196	498	20%
Phase 1 survey	235	140	60%	13	123	52%
Phase 2 survey	130	89	68%	5	84	65%

DATA SUMMARY

Table 2 shows average pre-move and post-move values for travel, housing, social, and other measures of interest, as well as the mean change across the respondent pool. We discuss some of these differences below in more detail. Note that the average values changed relatively little. As we note below, however, fairly large shares of respondents had meaningful increases or decreases in the measures. Because differences were in both directions, the average changes were small.

Table 2: Means and standard deviations of key variables before move, after move, and change

	Pre-Move		Post-Move		Difference		
	Mean	SD	Mean	SD	Mean	SD	p-value
Travel variables:							
Mean commute time (minutes per day)	16.2	12.6	17.3	12.9	1.16	16.6	(0.550)
Minutes per week spent driving alone for commute	6.54	30.4	17.7	51.2	11.2 +	56.0	(0.092)
Minutes per week spent walking for commute	35.7	38.4	31.0	40.8	-4.73	54.7	(0.463)
Total time spent walking (hours per week)	3.33	2.19	3.43	1.93	0.0952	2.28	(0.703)
Total time spent bicycling (hours per week)	0.798	1.70	1.11	1.33	0.310 *	1.16	(0.017)
Grocery trips via auto (per day)	0.101	0.154	0.228	0.500	0.128 *	0.471	(0.015)
Grocery trips on foot (per day)	0.122	0.204	0.219	0.366	0.0967 *	0.376	(0.021)
Visiting friends/family trips via auto (per day)	0.175	0.295	0.152	0.246	-0.0230	0.356	(0.554)
Visiting friends/family trips on foot (per day)	0.206	0.408	0.338	0.438	0.132 *	0.605	(0.048)
Housing/neighborhood variables:							
Sum of housing/building amenities					0.643	5.31	[0.270]
Monthly rent	1346	730	1015	522	-331 **	889	(0.003)
Moved out of student housing					0.226	0.421	
Moved to a single family home					0.143	0.352	
Perception of neighborhood safety	0.571	0.498	1.74	1.04	1.17 ***	1.15	(0.000)
Number of bedrooms	2.69	1.42	2.44	1.54	-0.250	1.93	(0.239)
Number of rooms	4.90	3.13	4.99	2.64	0.0833	4.02	(0.850)
Interior state of repair	3.47	1.23	3.38	1.16	-0.0855	1.85	(0.675)
Exterior state of repair	3.44	1.22	3.43	1.16	-0.0120	1.75	(0.950)
Social connection/interaction variables:							
Number of neighbors known	2.85	0.752	2.90	0.816	0.0595	0.961	(0.572)
Whether best friends live in the neighborhood	0.500	0.503	0.512	0.503	0.0119 ***	0.591	(0.000)
Number of close friends	3.13	0.833	3.23	0.827	0.0952	0.845	(0.305)
Number of close family	2.60	0.730	2.58	0.698	-0.0119	0.720	(0.880)
Time spent during weekday socializing	163	92.5	174	95.0	10.7	105	(0.352)
Demographic variables and life events							
'Extroverted' personality rating					0.214	0.413	
'Neurotic' personality rating					0.190	0.395	
Had a new baby					0.012	0.109	
Enrolled as full-time student					0.190	0.395	
Graduated from school					0.286	0.454	
Suffered from a serious injury or ailment					0.036	0.187	
Moved out of parent's house					0.119	0.326	
Moved into own apartment or house					0.357	0.482	
Moved in with parents or other family					0.155	0.364	
Married/moved in with girlfriend of boyfriend					0.131	0.339	
Started a new job					0.417	0.496	
Became unemployed					0.071	0.259	

~ p<0.2, + p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Rejects hypothesis that mean equals to zero

SURVEY RESPONDENT MOVES

The map below (see Figure 1) illustrates residential moves. A summary of statistics about the movement patterns is included in Table 3 below. Of the 89 respondents who completed both survey phases, 17 moved out of the Bay Area after taking the Phase 1 survey. Also below in

Table 4 is a summary of respondents who live in areas we call “high quality transit” cities, such as New York, San Francisco, Berkeley, and Oakland. This classification is helpful in understanding commute satisfaction, as discussed in later sections of this report.

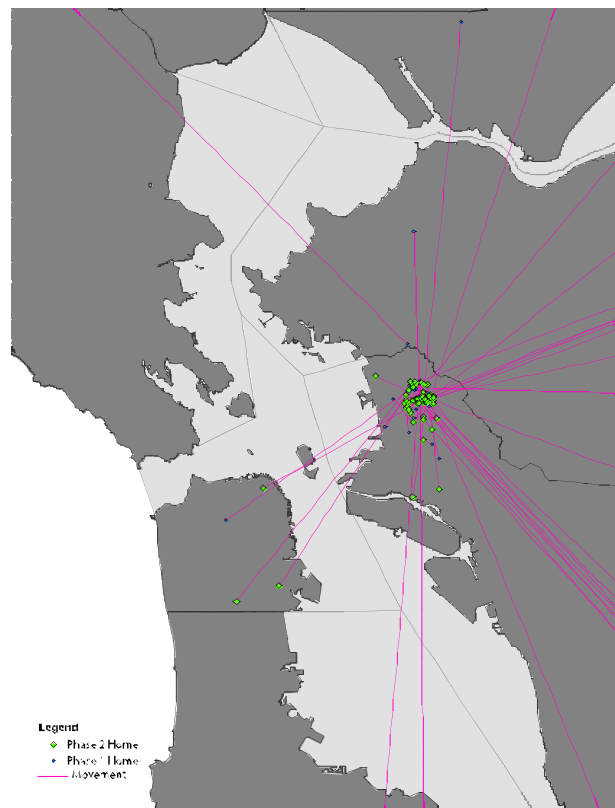


Figure 1: Map of Phase 1 and Phase 2 addresses

Table 3: Facts and Figures on Phase 1 and Phase 2 Home Locations

	87 Respondents (excludes 2 who moved out/in of the U.S.)	72 Respondents who remained in the Bay Area	67 Respondents who moved within the Bay Area (5 respondents did not move)
Average	223.57	5.15	5.63
Median	0.91	0.66	0.72
Standard Deviation	626.06	11.55	11.96
Max	2506.12	66.26	66.26

Table 4: Summary of Moving Locations

Phase 2 home address in Berkeley	54	** All 54 lived in high quality transit locations in Phase 1
Phase 2 home address in high quality transit location (for example: San Francisco, New York, Oakland)	12	** All 12 lived in high quality transit locations in Phase 1
Phase 2 home address in low quality transit location (for example: Fullerton, CA)	18	** All 18 <i>except</i> 1 lived in high quality transit locations in Phase 1
Total	84	

SUBJECTIVE WELL-BEING REPORTS

Four different ways of measuring subjective well-being were tested, in order to see if one method of asking participants to assess their own happiness would yield more reliable results. The first came from the question, “How do you feel about your life as a whole?” using a 7-point scale where “delighted” = 1 and “terrible” = 7. Respondents reported a mean score of 2.65 in Phase 1, and 2.60 in Phase 2, a statistically insignificant difference (Figure 2). More people in Phase 2 reported low or high scores than in Phase 1. A plurality of respondents (31) reported the same score, and so had zero change. Slightly more respondents (28) reported a higher subjective well-being rating in Phase 2 than those who reported a lower one (25) (Figure 3).

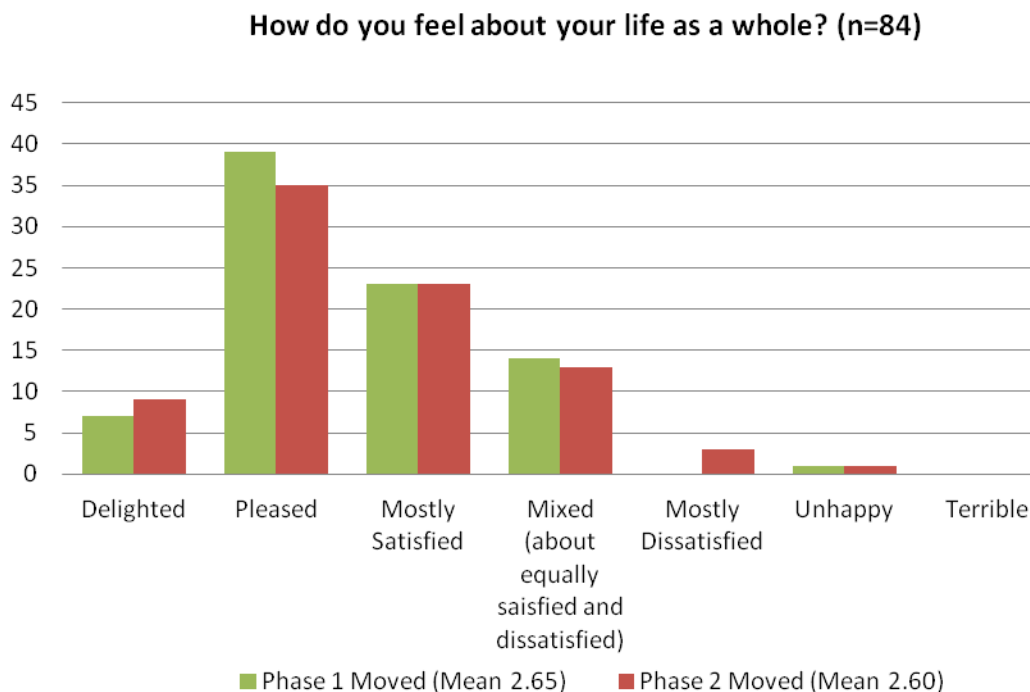


Figure 2: Comparison of pre- and post-move "life-as-a-whole" ratings



Figure 3: Distribution of changes in "life-as-a-whole" rating (-3=best)

The second subjective well-being measure used in analysis came from the "life ladder" question which provided rankings from 1 to 9, where 9 is the best rating. The mean score was statistically indistinguishable across the phases: 6.17 in Phase 1, and 6.30 in Phase 2 (Figure 4). A plurality of respondents (31) reported the same score in Phase 1 and 2, while 27 reported a higher score in Phase 2 and 26 a lower score (Figure 5).

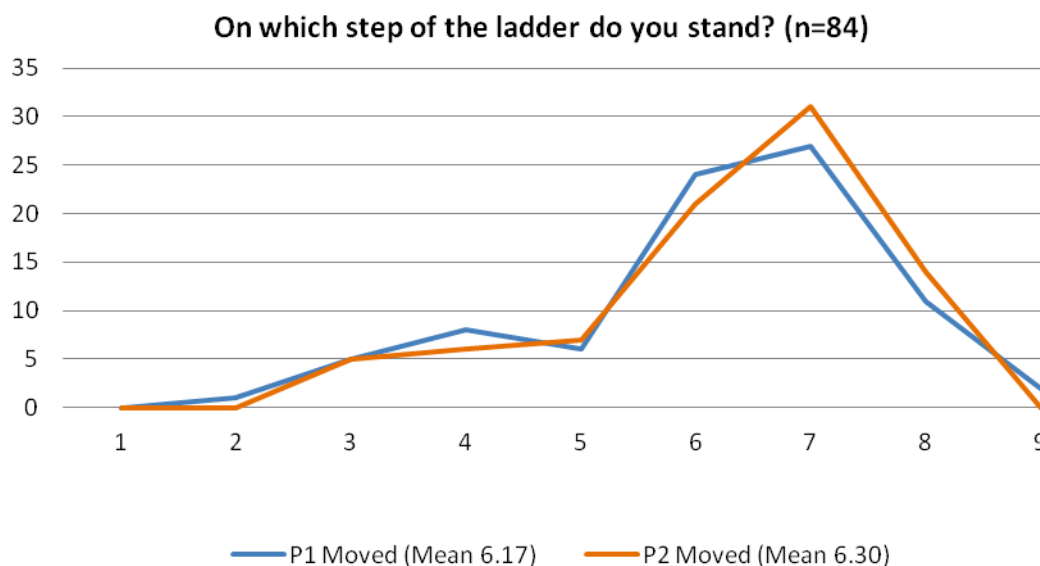


Figure 4: Comparison of pre- and post-move "life ladder" ratings (9=best)

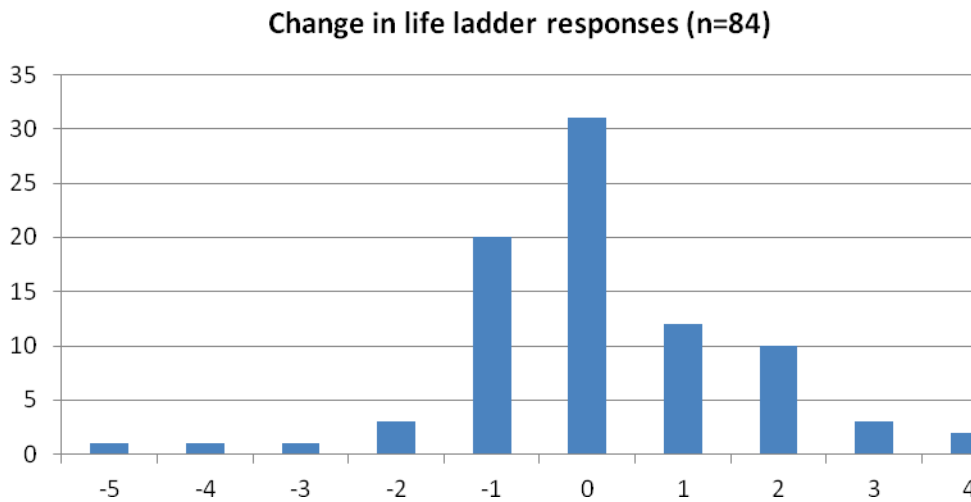


Figure 5: Distribution of changes in "life ladder" rating (4=best)

To control for personality issues that could be correlated with subjective well-being measures, we flagged respondents with neurotic and extroverted personality characteristics based on an eight-question personality survey. As shown in

Table 5, questions 1 through 4 were indicators of neuroticism, and questions 5 through 8 were indicators of extraversion. Of respondents flagged for these traits, 16 were neurotics and 18 were extroverts.

According to the psychological literature, personality scores were supposed to be stable from Phase 1 to 2, to be considered reliable. In order to check the stability of these scores, we compared how many respondents had reported scores 2 or 3 points different between surveys. The comparison indicates that roughly 10% of respondents' scores were unstable.

Table 5: Percentage of personality ratings that changed by 2 or 3 points from Phase 1 to 2

Personality Questions	Percent
1. I don't talk a lot.	5%
2. I don't like to draw attention to myself.	12%
3. I get stressed out easily.	7%
4. I worry about things.	14%
5. I am relaxed most of the time.	12%
6. I don't mind being the center of attention.	12%
7. I seldom feel blue.	8%
8. I feel comfortable around people.	8%

Percentages among the 84 respondents are shown in Figure 6. A correlation test result of $-.09$ showed that these personality traits are not related, as expected. A paired t-test was run for each personality traits, and the only one which was statistically significant (10% level) was the question 'I feel comfortable around people', which had a p-value of $.0553$.

Personality Ratings (n=84)

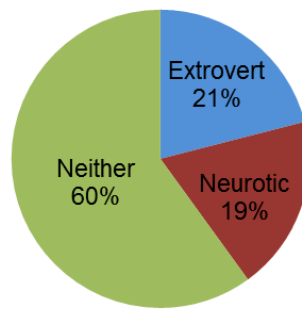


Figure 6: Respondents who identified certain personality characteristics

ALTERNATE MEASURE OF LIFE SATISFACTION SCALE

Instruments with multiple questions are more complicated than those with just one question, but they offer a more nuanced view of the two major components of subjective well-being, positive and negative affect, which these instruments are designed to measure. We collected these to see whether they showed more variability or seemed more related to any of the measures of travel, housing, or social connections.

The Alternate Measure of Life Satisfaction Scale survey asks participants to rate their well-being using a 7-point scale between two opposing descriptors of positive and negative affect. This instrument is designed to disrupt rote pattern responses to provoke more accurate reporting of subjective well-being (Andrews & Withey 1976). The survey instrument consists the question prompt, "I think my life is...", followed by eight ratings scales with a descriptor of positive and negative affect, such as "Full:Empty". On the rating scales, 1 is sometimes assigned to the positive end, and sometime to the negative end, with the intention of forcing the respondent to pay more attention to the question and to reflect internally before answering. In this report, we refer to this survey instrument as the 'My Life is' survey.

For ease of analysis, results are shown with the positive affect descriptor always equal to 1. Respondents tended to select ratings toward the positive ends of each scale - the means are all far closer to 1 than to 7. Respondents were also remarkably consistent in their ratings, as the means from all eight questions were nearly unchanged from Phase 1 to Phase 2.

Figure 7 shows a summary of the mean scores for each of the eight questions. A lower mean score in Phase 2 indicates that more people were reporting score closer to 1, or a positive affect. Therefore a lower mean score in Phase 2 indicates an *increase* in subjective well-being ratings on average. A higher mean score indicates that more people were reporting scores closer to 7, or a negative affect, in Phase 2. So a positive difference of means indicates an overall *decrease* in subjective well-being ratings. As can be seen, the change of means was positive on five scales, but the differences were quite small in magnitude. The greatest difference in means was an increase of .19 points in the direction of 'Brings out the best in me'. The mean moved toward negative affect on three scales, toward Useless (-.06), Boring (-.03) and Disappointing (-.03). None of these results were statistically significant in a paired t-test.

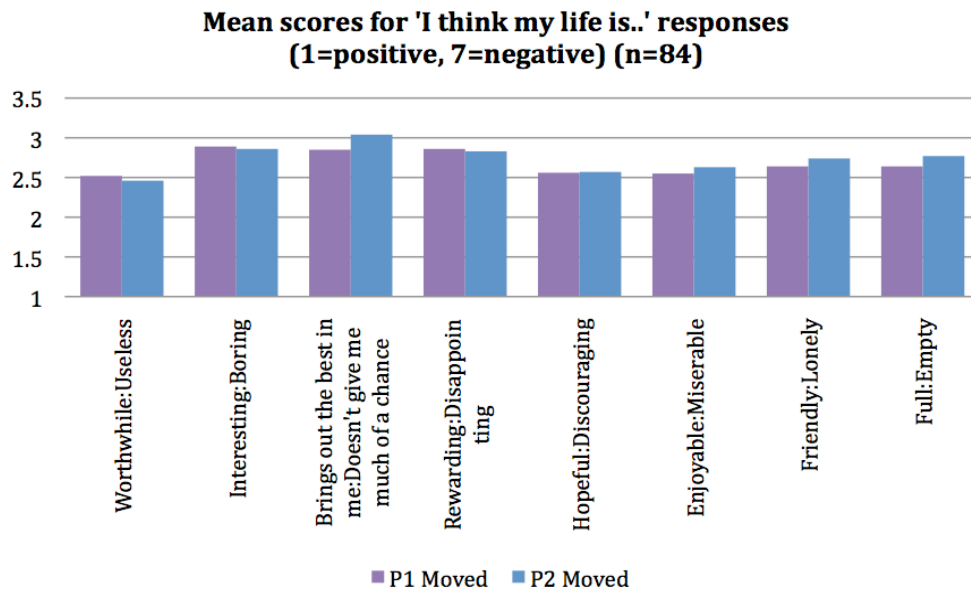


Figure 7: Response summary for subjective well-being ratings, "I think my life is..."

Individual changes in subjective well-being scores are shown in Figure 8. The chart shows the delta variable, or how many people had a score change of 1 to 5 points in either direction, from Phase 1 to Phase 2. If respondents reported a number closer to 7 in Phase 2, or more negative affect, their subjective well-being delta would be positive on this chart. Conversely, if they reported a more positive affect in Phase 2 with a score closer to 1, their delta would be negative. Changes are skewed toward the right, meaning that most people reported subjective well-being changes in the direction of positive affect.

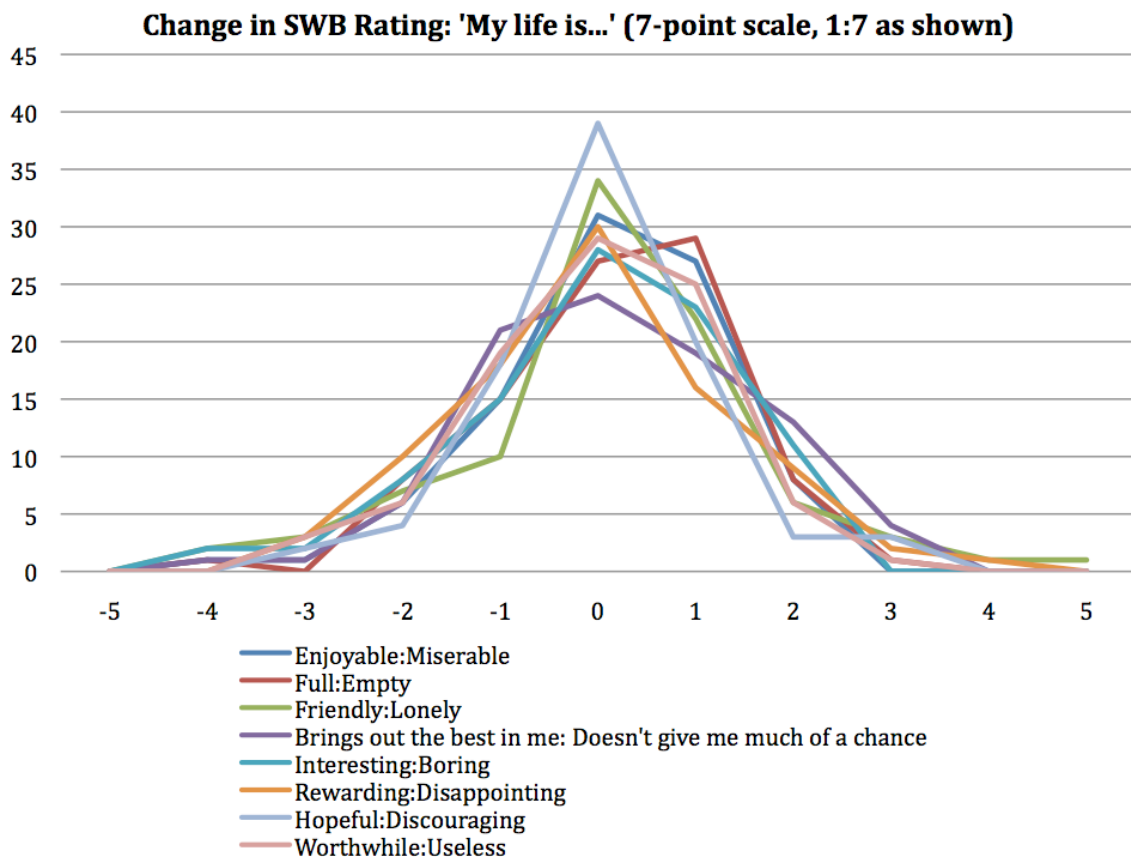


Figure 8: Individual changes in subjective well-being ratings

In order to compare this eight-question survey to the one-question surveys, we summed up the deltas for all the questions. That is, the number of responses where subjective well-being had increased from Phase 1 to 2 were summed up across all eight questions, and similarly, the number of responses where subjective well-being had decreased. Figure 9 shows the distribution and magnitude of the summed changes in reported life satisfaction. For the plurality of responses (36%), participants gave the same rating in Phase 2 as Phase 1, meaning there was zero change. This analysis revealed that respondents were more likely to report a higher score in Phase 2 in the direction of positive affect than negative affect. Of the summed responses, 36% were an increase in positive affect, while only 29% were a decrease. We also noted a greater percentage of responses showing large magnitude (3 to 5 point) gains or losses of subjective well-being from Phase 1 to 2. Of the summed deltas, 3% were large magnitude gains in subjective well-being, and 3% were large magnitude losses. However, a paired t-test revealed that none of these results was statistically significant.

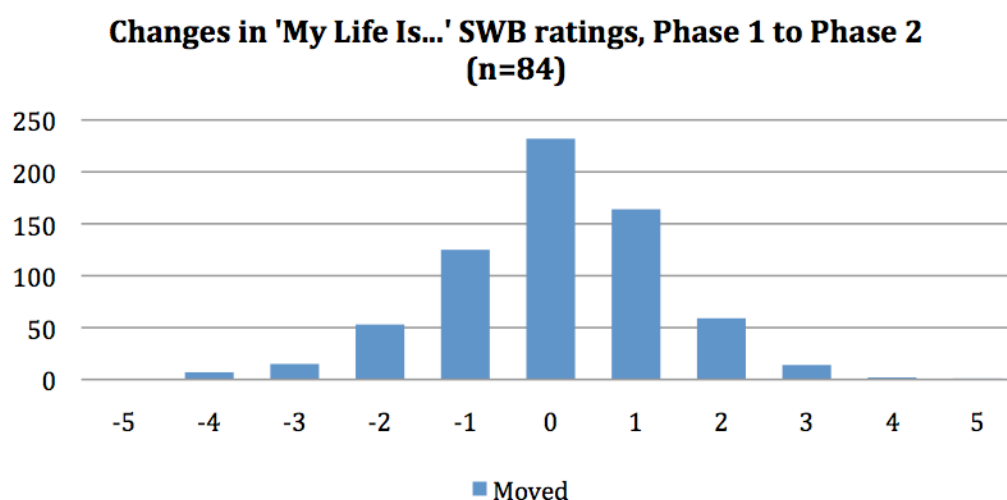


Figure 9: Changes in individual responses to Alternative Measure of Life Satisfaction survey

BRADBURN AFFECT BALANCE SCALE

The final subjective well-being measure we collected was a ten-question survey with five questions on positive affect and five on negative affect, the Bradburn Affect Balance Scale (Bradburn 1969). The survey asks participants to rate specific emotional levels with the prompt, "Focusing on your feelings during the past few weeks..." Participants could answer yes or no, coded as 1 and 2, respectively. A summary of the mean ratings to these ten questions in Phase 1 and 2 is shown in Figure 10.

Mean ratings on the Bradburn scale (1=Yes, 2=No) (n=84)

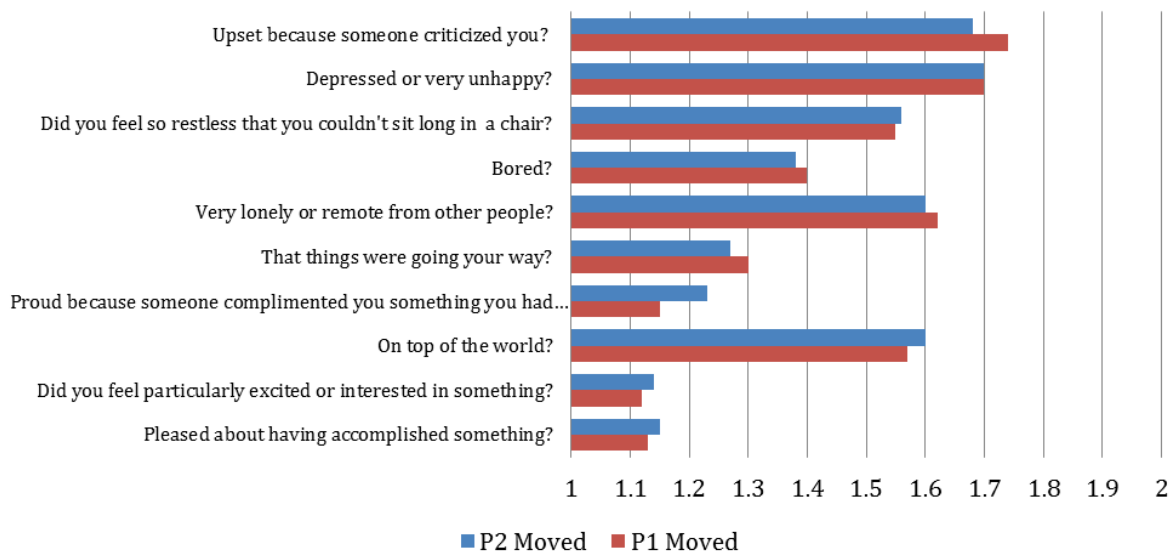


Figure 10: Responses to the question prompt "Focusing on your feelings during the past few weeks..."

The mean scores tended to move in the direction of higher subjective well-being overall from Phase 1 to 2, but the changes were very small in magnitude. For instance, the mean score for the question about feeling bored declined by .02 between Phase 1 and 2, indicating that more people had replied "yes" in Phase 2.

On the positive affect questions, an increase in mean scores between phase 1 and 2 indicated that more people were responding "no," or that there was a loss of positive affect. Conversely, on the negative affect questions, if the mean scores increased, that also indicated that more people were responding "no," thereby indicating a gain in positive affect.

In order to compare this 10-question survey to the one-question surveys, the deltas were summed up. Figure 11 shows the distribution of changes in reported life satisfaction. For most questions, respondents gave the same rating in Phase 2 as Phase 1, meaning there was zero change. The sum of responses to all positive and negative affect questions shows that respondents were more likely to report a higher score in Phase 2 in the direction of positive affect than negative affect. 16% of all responses reflected a gain in subjective well-being, while 13% reflected a loss. Because this survey uses yes/no responses rather than a Likert rating scale, it is only possible to observe the direction of change, and not the magnitude. A paired t-test indicated that none of these results was statistically significant.

Changes in Bradburn scale ratings, Phase 1 to Phase 2 (n=84)

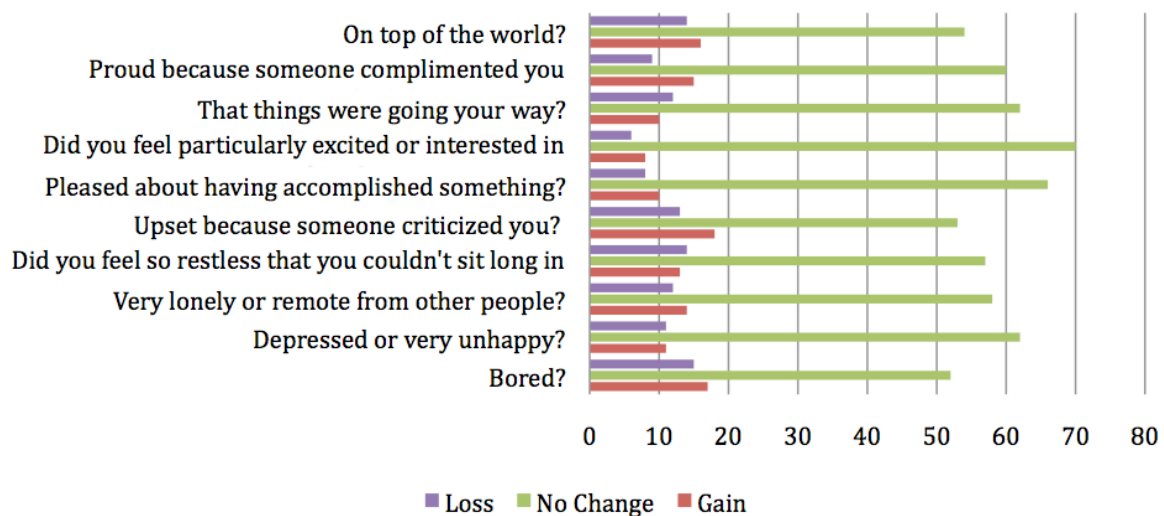


Figure 11: Changes in individual Feelings subjective well-being ratings among those who moved, (Yes=1, No=2)

COMPARISON

In order to compare the subjective well-being ratings we collected using these four psychological survey instruments, the number of people reporting a gain or loss on each was summed up. That is, we looked at the percentage of subjects whose subjective well-being rating increased or decreased from Phase 1 to 2, on each survey. For the multi-question surveys, the results were summed for all the questions. The results are shown in

Table 6, with the number of individual responses shown for the one-question surveys, and percentages of summed individual responses for the multi-question surveys. A paired t-test of Phase 1 and Phase 2 results revealed that none of these results were statistically significant.

Table 6: Comparison of results from subjective well-being survey instruments (n=84)

Subjective well-being rating Deltas for individuals from Phase 1 to 2	Delighted- Terrible scale	Life Ladder	My Life Is...	Bradburn scale
No change	31	31	36%	71%
Increased 1-2 points	27	22	33%	16%
Increased 3-5 points	1	5	3%	N/A
Decreased 1-2 points	24	23	26%	14%
Decreased 3-5 points	1	3	3%	N/A

On all four instruments, subjects were most likely to report no change in subjective well-being from Phase 1 to 2. Interestingly, the same number of people (31) had no change in SWB scores on both of the one-question surveys, a percentage of 37%. The sum of 'no change' responses on the 'My life is' survey was 36%, which likely corresponds with the responses of these 31 individuals.

Results on the two one-question surveys were nearly identical, with a slightly greater share of people reporting an increase in subjective well-being than a decrease. The 9-point Life

Ladder scale allowed for a wider variance of responses, and so a minority of respondents who experienced a large magnitude (3 to 5 points) change in subjective well-being was revealed. This indicates that it may be more useful as an instrument to detect the magnitude of change in subjective well-being, rather than simply the direction.

On the 'My Life Is' survey, where respondents were forced to consider different scales between positive and negative poles for each question, participants were more likely to select to select responses on the positive affect end of the scales and to shy away from the negative affect end. On the Bradburn Affect Balance survey, where respondents were forced to agree or disagree with a statement describing positive and negative affect, they were most likely to report the same 'yes' or 'no' answer in Phase 2 and in Phase 1. A slightly greater share changed their answer to reflect an increase in positive affect.

In terms of correlation with each other, the Delighted-Terrible scale and the Life Ladder had the highest correlation, at .536. The Delighted-Terrible scale had the highest correlation with the My Life Is survey, perhaps because they both use a 7-point scale, with correlations ranging from .332 to .518. The Life Ladder had the highest correlation with the Bradburn Affect Balance scale, with correlation values ranging from .058 to .428.

HOUSING CHARACTERISTICS

HOUSING TENURE AND RENT

Most people were renters in both survey phases. However, on average, respondents in Phase 2 paid significantly less rent than those in Phase 1. Using midpoints of rent ranges (and a flat \$2,500 for rents of \$2,500 or more), the mean rent for Phase 1 respondents was \$1,442 (and a standard deviation of \$523), while the mean rent for Phase 2 respondents was \$1,000 (with a standard deviation of \$679). The difference in mean rent between Phase 1 and Phase 2 is statistically significant with a p-value of 0.003. Only one Phase 2 respondent reported paying a mortgage, with monthly payments in the \$1,000-\$1,500 range. The lower rent after moving could be partly due to people moving in with parents after graduating, or seeking out lower rents after losing parental financial aid in later college years. But neither explanation is strongly supported by the data. Of the 24 respondents who reported graduating from school, eight reported occupying housing without payment of rent; one owns their residence with a mortgage; and the remaining 15 graduates pay rent. None of those reported paying more rent after the move. We also collected information on dependent and independent financial status. Of those who became independent between survey phases, 47 percent had lower rent, and 23 percent higher rent (with 30 percent falling in the same rent category), a pattern not dissimilar to the remainder of the respondent pool.

Housing Tenure, Phase 2

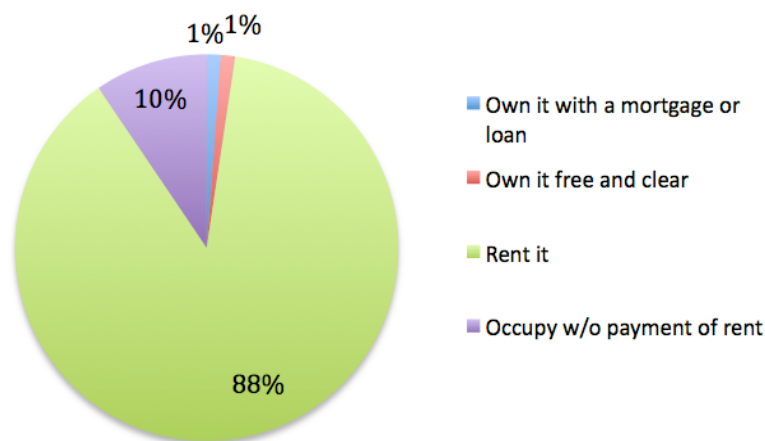


Figure 12: Phase 2 housing tenure

Monthly rent

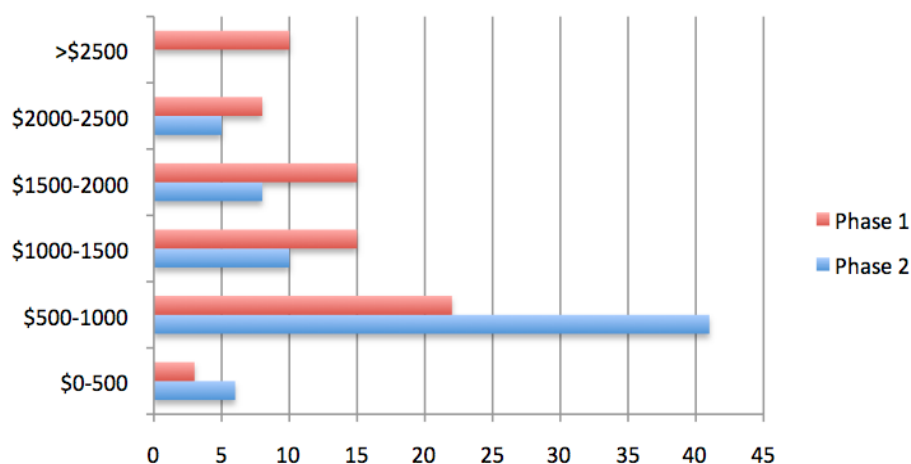


Figure 13: Phase 1 & 2 Monthly Rent

HOUSING TYPE

The average housing type changed between moves, though at both time periods the majority group—65% and 79%, respectively—lived in apartment buildings and single-family detached homes. A far greater number of respondents lived in student dormitories in Phase 1 than in Phase 2, highlighting the fact that this sample is largely comprised of moving students. Additionally, a number of Phase 2 respondents occupied housing types unrepresented in Phase 1, such as student co-ops and row-houses or townhouses.

Since the group moving out of dormitories from Phase 1 to Phase 2 was significant, and earlier observations indicated greater residential satisfaction between Phase 1 and Phase 2, cross-tabulations provided a deeper analysis of this group and their residential satisfaction. Of the 14 people who moved from dormitories, 29% were less happy with their residence, another 21% responded with no change to their residential satisfaction, and 50% were more satisfied with their residence. Trade-offs between dormitory life and more traditional housing are varied. While moving out of a dormitory often affords more space and a greater number

of amenities, social networks could be compromised as friends move away from one another.

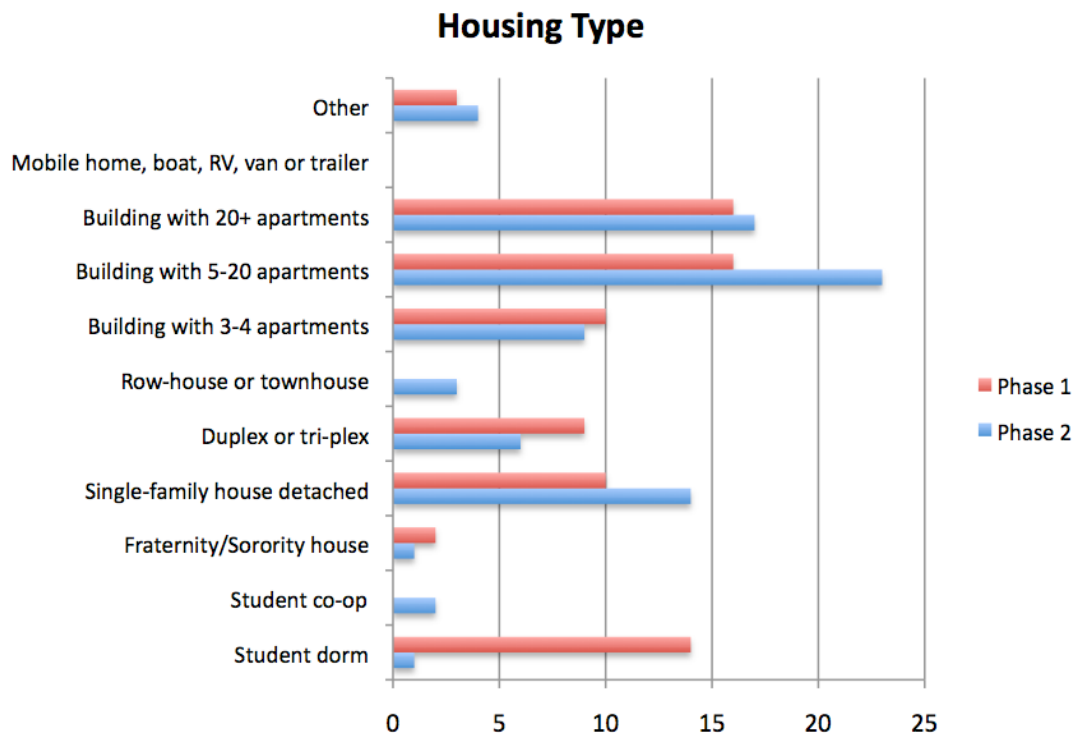


Figure 14: Phase 1 & 2 Housing Type

SIZE OF RESIDENCE

Overall, the distribution of bedrooms in Phase 1 and Phase 2 was similar, with the mean number of bedrooms equaling 2.69 (with a standard deviation of 1.42) and 2.44 (with a standard deviation of 1.54), respectively. The distribution pattern in total rooms, however, was less apparent. While the predominant number of total rooms in residences of both Phase 1 and Phase 2 respondents are in the three- or four- room range, there is variation when the number of bedrooms is less than two and greater than eight. The mean number of total rooms in Phase 1 was 4.90 (with a standard deviation of 3.13) while the mean number of total rooms in Phase 2 was 4.99 (with a standard deviation of 2.64). Note: in Phase 1, the answer choice “0” bedrooms was not offered, but in Phase 2 respondents were instructed to choose “0” if they lived in a studio apartment.

To examine the hypothesis that residential satisfaction is positively related to size of residence, we use the total number of rooms as a proxy for size of residence. Of the 40 respondents who live in the same size or larger residences, 53% are more satisfied with their housing. The small margin of majority suggests that other factors might also contribute to residential satisfaction.

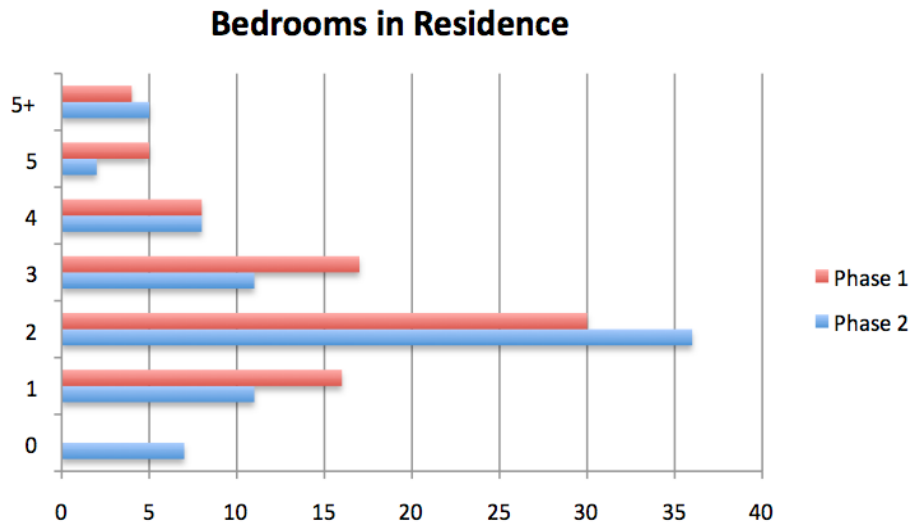


Figure 15: Phase 1 & 2 bedrooms in residence

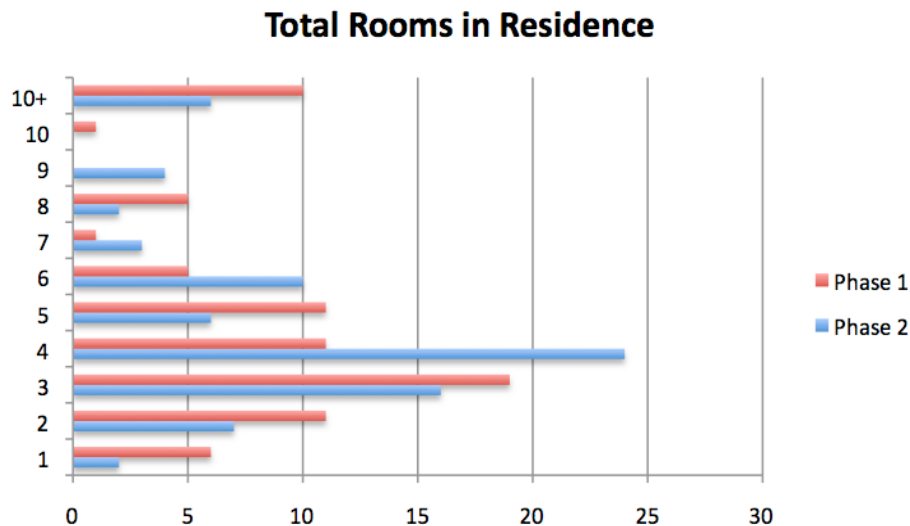


Figure 16: Phase 1 & 2 total rooms in residence

HOUSEHOLD SIZE

Household size tended to be larger for Phase 1 respondents. In Phase 1, household size was determined by asking, “How many people live in your household?” In Phase 2, the survey distinguishes between those living in student housing such as dormitories, student co-ops, fraternities and sororities, and other housing options. Household size for non-student housing is counted as the total number of people living in a residence, while the household definition of student housing asks, “How many people live or stay in your room?”

The mean household size for respondents in Phase 1 was 3.30, while the mean for Phase 2 respondents was 2.94. Interestingly, by counting total number of rooms—a proxy for size of residence—Phase 1 mean total rooms (4.90) was similar to that of Phase 2 (4.99), with no significant difference in means (reporting a p-value of 0.85). As mentioned before, 14 respondents moved out of dormitories, and the open interpretation of the household size question in Phase 1 likely accounted for the larger mean household size in Phase 1, despite the insignificant difference in total rooms in residence.

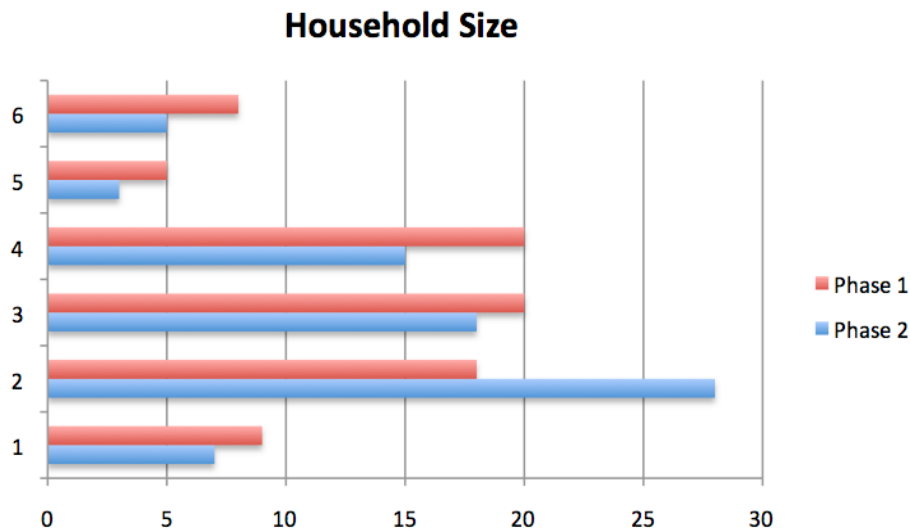


Figure 17: Phase 1 & 2 household size

HOUSING AMENITIES

Respondents were asked to report specific housing amenities, because physical housing amenities are relatively easy to report, and they may affect well-being. Of the 20 amenities listed, only six were less available after a move (including having a gym in the building, a balcony or deck, carpet, hardwood floors, views, or a yard/patio). Of the 84 respondents, 43 (49 percent) saw an increase in the number of amenities, and 43 percent a decrease. When considered with the fact that Phase 2 residents paid lower overall rents, this observation is somewhat surprising since it suggests that lower rents actually lead to more amenities. However, increased amenities coincide with residential satisfaction from Phase 1 to Phase 2.

Further analysis delves into the hypothesis that people tend to overestimate residential satisfaction arising from physical attributes of residences. Cross tabulations between the difference in the total number of amenities and whether or not residential satisfaction increased or decreased unveiled interesting findings. Perhaps not surprisingly, 54% of those with fewer amenities were not more satisfied with their residence, while 56% of those with more amenities were more satisfied with their residence. Of those who had the same number of total amenities, 80% were more satisfied with their residences. These findings demonstrate that further analysis is warranted to test the hypothesis concerning physical amenities and overall residential satisfaction.

Table 7: Residential amenities change from Phase 1 to Phase 2

<i>Residential amenities</i>	<i>Change in number of respondents with amenity from Phase 1 to Phase 2</i>
Fenced in yard	+21%
Gym in building	-40%
Dishwasher	+3%
Garbage disposal	+8%
Gas stove	+22%
New kitchen	+6%
Air conditioning	+47%
Balcony/deck	-64%
Basement	+189%
Carpet	-27%
Garbage	+63%
Hardwood floors	-26%
Central heat	+6%
Natural light	+19%
Off-street parking	0%
Storage	+45%
Views	-13%
In-unit washer	+113%
Yard/patio	-18%
Elevator	+84%

HOUSING SATISFACTION

Respondents were asked to rate their level of happiness with their current residence on a 7-point scale, where 1 denoted “Delighted” and 7 denoted “Terrible.” The question was: “How do you feel about your current residence?” More people felt Terrible, Mostly dissatisfied, or Mixed about their current residence in Phase 1 than Phase 2. Similarly more people felt Mostly Satisfied or Delighted in Phase 2 than Phase 1, with an equal number from Phase 1 and Phase 2 reporting to feel Pleased. The mean residential satisfaction rating for Phase 1 respondents was 3.11 (with a standard deviation of 1.26), while the mean satisfaction rating for Phase 2 respondents was 2.5 (with a standard deviation of 1.18), indicating a greater overall residential satisfaction in Phase 2 than in Phase 1.

How do you feel about your current residence?

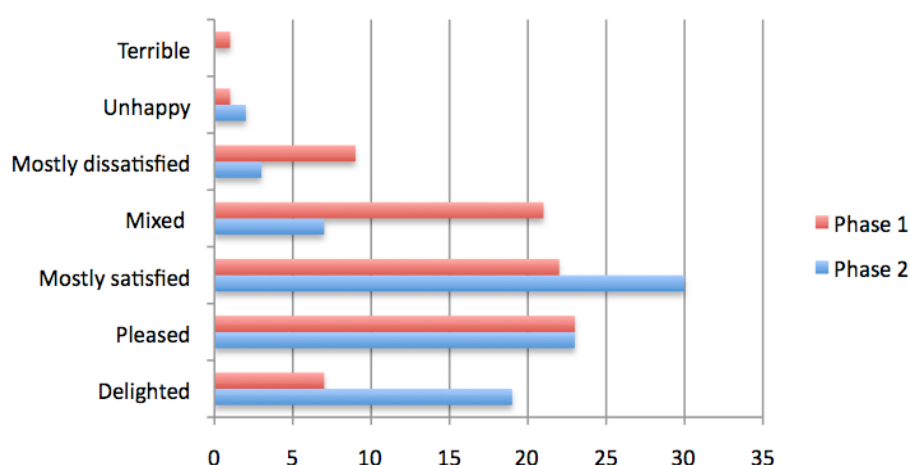


Figure 18: Feeling about current residence comparison

Examining the change in residential satisfaction, 21% of respondents responded with no change from Phase 1 to Phase 2. Just over half of respondents (52%) responded with an increase in residential satisfaction, and 26% responded with a decrease in residential satisfaction. The difference in mean residential satisfaction from Phase 1 to Phase 2 was statistically significant, with a p-value of 0.001.

In terms of residential satisfaction and recent graduates, 15 of the 24 recent graduates were more satisfied with their housing in Phase 2 than in Phase 1. The remaining 38% were equally or less satisfied. The recent graduate who owned his/her residence was more satisfied, while 60% of recent graduate renters and 63% of those living rent-free were more satisfied. Of those who remained renters from Phase 1 to Phase 2 (13 respondents), 62% were more satisfied with their residence, while paying less or the same as in Phase 1. Of all renters, 48% were less satisfied with their residence in Phase 2 than Phase 1. Of renters who paid less rent in Phase 2 than in Phase 1, 55% were more satisfied with their housing. Conversely, of those that paid more rent, 46% were more satisfied with their residence in Phase 2 than Phase 1. And for respondents whose rent did not change, 61% were more satisfied with their housing in Phase 2. While it seems that lower rents tend to indicate greater residential satisfaction, the proportion of those more satisfied was not overwhelming. Rents may only partially explain residential satisfaction.

HOUSING SEARCH METHODS

To better understand how search methods result in greater residential satisfaction, respondents were asked to report how they found their Phase 2 residence. One hypothesis is that using social networks to find housing might yield choices more closely related to what respondents are seeking. However, large classifieds might also offer a larger choice set from which to choose housing. Respondents overwhelmingly used Craigslist or relied on referrals from friends and family or someone else to find housing for them. Very few people used third-party resources, such as agents, and no one used university resources like Cal Rentals.

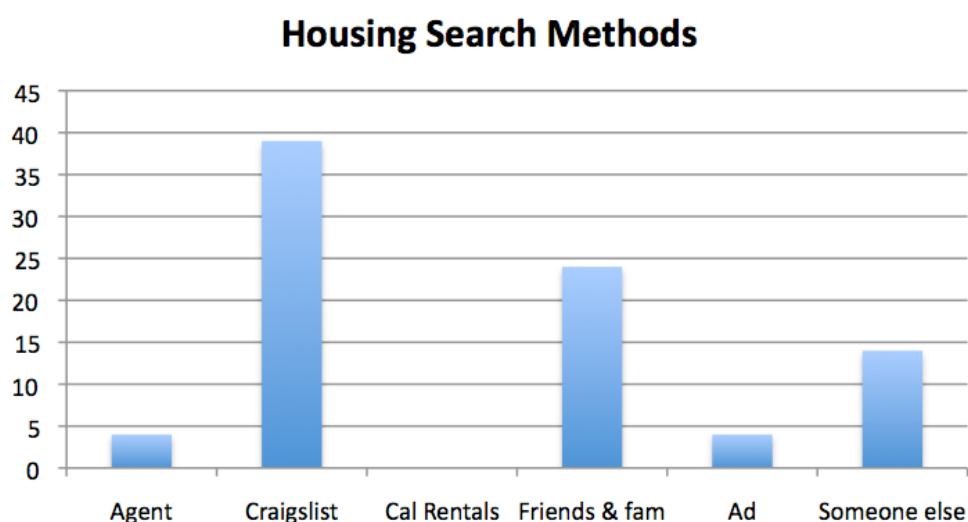


Figure 19: Housing search methods

NEIGHBORHOOD

Reasons for Choosing Neighborhood

To understand priorities regarding neighborhood selection, respondents were asked; “For what reasons did you select your current residence?” They were provided common reasons, selected those applicable to them, and ranked them in order of importance. In Phase 1, a quiet, clean neighborhood and reasonable rents were high ranking factors. Both Phase 1 and Phase 2 respondents cited moving to live with parents or family as the primary factor in choosing their residence, with mean rankings of 2.28 and 2.13, respectively. It is important to note that in Phase 1, 25 respondents selected moving to live with parents or family as a factor for moving, while only 8 respondents selected this as a reason in Phase 2. However, this still suggests that the highest-ranking residential choice factor is socially motivated, but in the case of students might also be a financially driven decision. In Phase 2, good schools (mean rank of 2.5, 4 respondents), centrally located residences (mean rank of 2.41, 39 respondents), and housing availability (mean rank of 2.65, 34 respondents) were high ranking factors. These factors reflect different categories of priorities. For example, proximity of schools and centrally located residences might reflect neighborhood priorities rather than social ones.

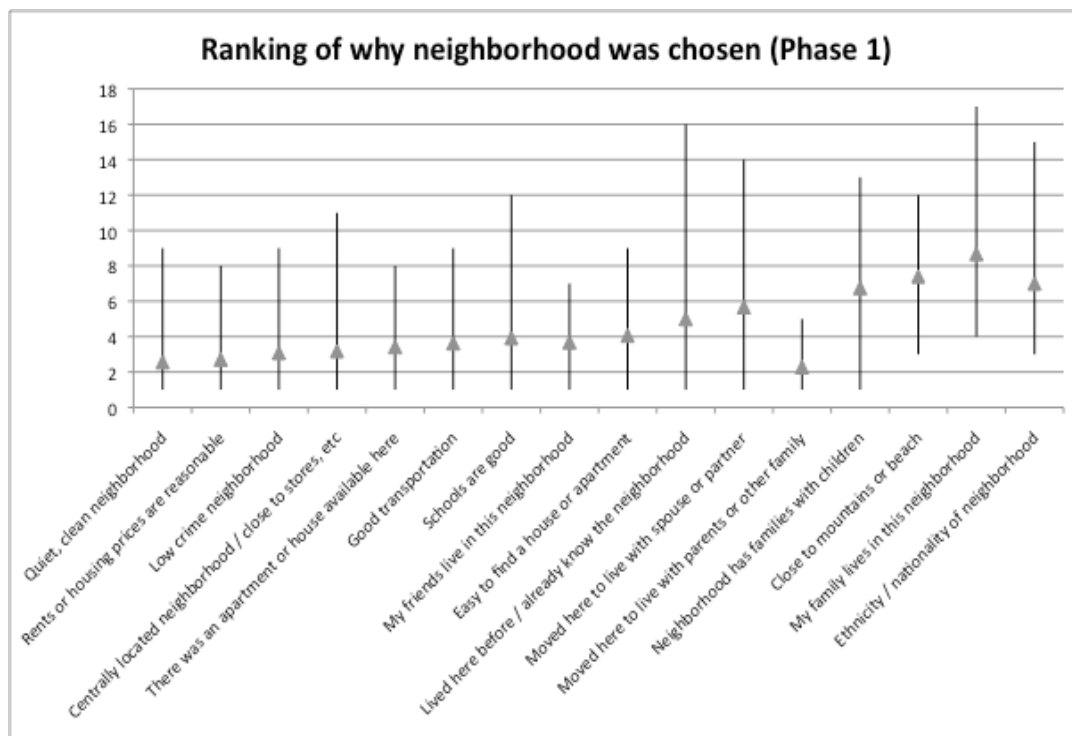


Figure 20: Phase 1 ranking of why neighborhood was chosen

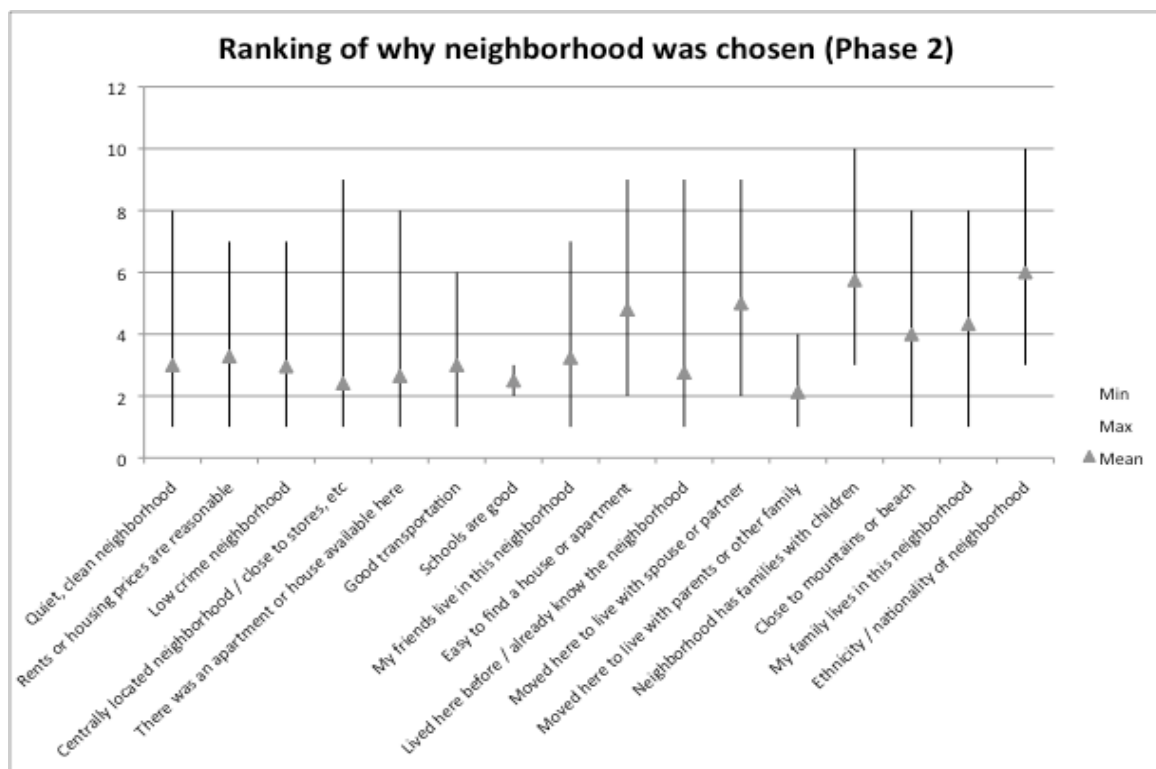


Figure 21: Phase 2 ranking of why neighborhood was chosen

Number of Respondents Ranking Reasons for Choosing Neighborhood

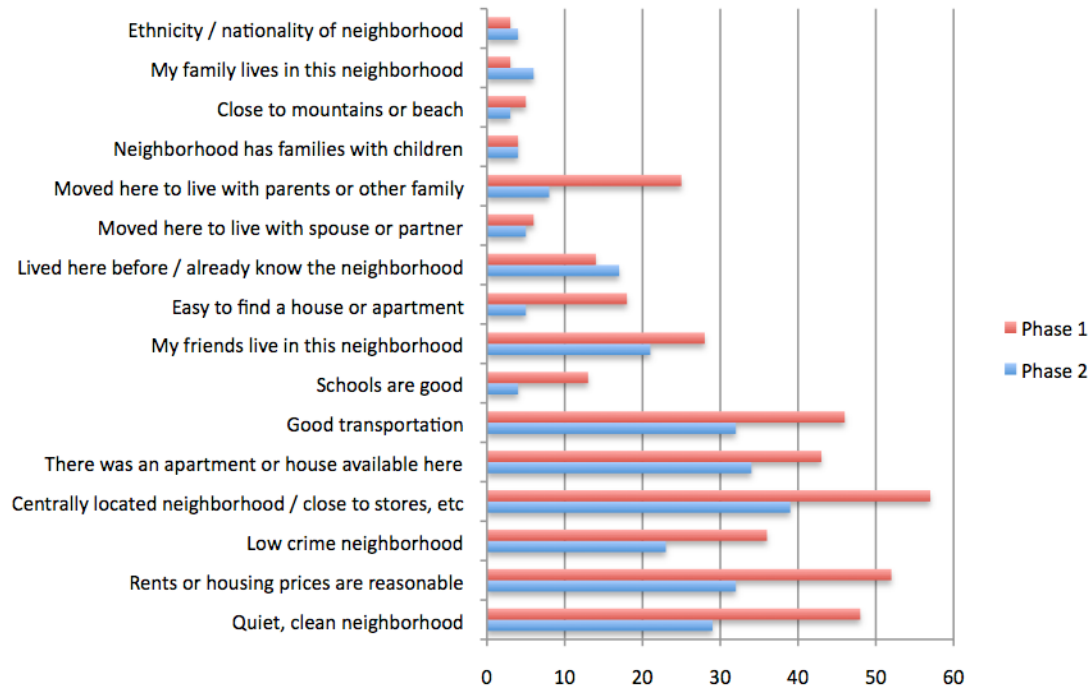


Figure 22: Number of respondents ranking reasons for choosing neighborhood

Neighborhood Social Connections

The relationship between neighborhoods and social connections was measured by asking; “Do any of your best friends live in your neighborhood?” and “How many people do you know if your neighborhood?” In both Phase 1 and 2, 50 percent of respondents had best friends in the neighborhood. In terms of number of known neighbors, respondents selected from the choices “most,” “some,” “only a few,” or “none.” The distribution of known neighbors followed a similar pattern in both Phase 1 and 2 with the greatest number of respondents in both phases reported knowing “only a few” neighbors. However, more Phase 2 than Phase 1 respondents reported knowing both “some” neighbors and “none.” The length of time living in one’s residence may account for the number of neighbors one knows, as does housing type and tenure.

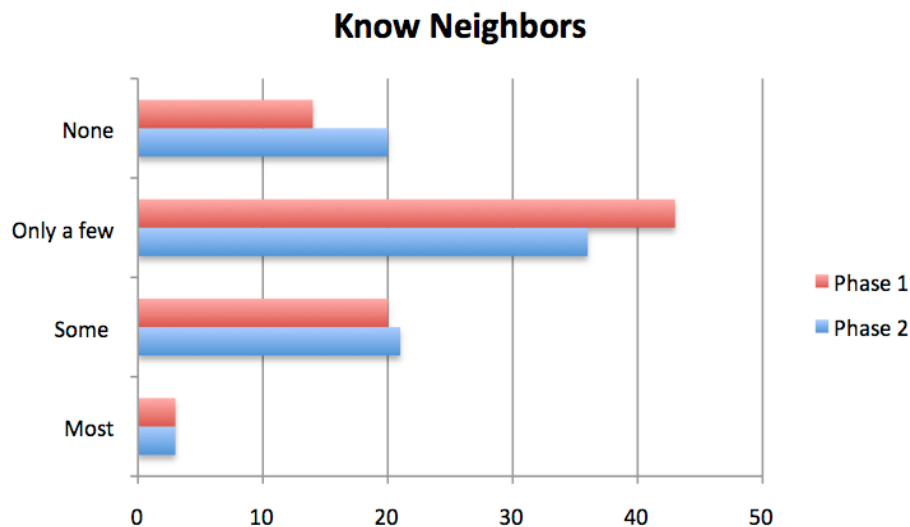


Figure 23: Phase 1 & 2 know neighbors question

HOUSING SUMMARY AND SATISFACTION

Reported residential satisfaction improved from 3.0 to 2.5, possibly because rents were significantly lower, reducing from \$1,429 to \$1,019 (all but one respondent rented). Household size also decreased, from 3.17 to 2.88, while the total number of rooms in the residence increased from 4.78 to 5.03. Sixteen respondents moved out of dormitories from Phase 1 to Phase 2, which may explain the increase in size of residence with a concurrent decrease in household members.

As residential satisfaction increased from Phase 1 to Phase 2, so did the existence of physical housing amenities. Of the 20 amenities counted in Phase 1 and 2, only 6 saw a decrease in the number of respondents living in residences with that particular amenity. These included having a gym in the building, balcony or deck, carpet, hardwood floors, views, and a yard or patio.

In terms of neighborhood characteristics, in Phase 1, a quiet, clean neighborhood and reasonable rents were high ranking factors. Both Phase 1 and Phase 2 respondents cited moving to live with parents or family as the primary factor in choosing their residence, with mean rankings of 2.27 and 2.13, respectively. In Phase 2, good schools (mean rank of 2.33), centrally located residences (mean rank of 2.45), and housing availability (mean rank of 2.43) were high ranking factors. Social priorities related to families accounted for the highest-ranking factor, however, there seemed to be a shift from Phase 1 to Phase 2, as location and neighborhood priorities took precedent over financial priorities. In general, social networks in neighborhoods remained consistent across Phase 1 and 2, with around 50% of respondents having best friends in their neighborhoods across both phases. In addition, respondents mostly reported knowing “only a few” neighbors.

The key caveat to using this sample is the fact that it is primarily comprised of students. Thus, housing choices related to rent levels and location reflect the budgets and mobility of the student population. While the sample may be limited in the variation of these variables, the changes from Phase 1 and Phase 2, particularly as students move out of student-specific housing and face significant life changes such as graduation are worth noting for future analysis.

DAILY TRAVEL

COMMUTE SATISFACTION

Respondents were asked to rate their feeling about their commute trip, using the 7-point “Delighted-Terrible” scale (1 equals “Delighted” and 7 equals “Terrible”, thus a lower number equates to a more satisfied commute). The mean dissatisfaction rating in Phase 2 was 2.53 (with a standard deviation of 1.19), a decrease from a mean of 2.79 (with a standard deviation of 1.06) in Phase 1, but not statistically significant.

Interestingly, the level of satisfaction drops to a mean of 2.47 (with a standard deviation of 1.10) for the 63 respondents who lived in “high quality” commute cities and responded to this question, which supports the notion that commuters who rely on auto commuting will be less satisfied. The commuters in the “high quality” commute cities also reported lower mean commute times (see Commute Time section below).

Although the sample is very small, the mean commute satisfaction for the four respondents who reported purchasing a new car between the Phase 1 and Phase 2 surveys was 3.25 (with a standard deviation of 1.5). Three of the four respondents relied on a car for work commuting and accordingly their mean commute satisfaction is lower. The overall commute satisfaction ratings for Phase 1 and Phase 2 are shown in Figure 24 below. Note: there were 84 respondents who commuted in Phase 1, but only 73 in Phase 2.

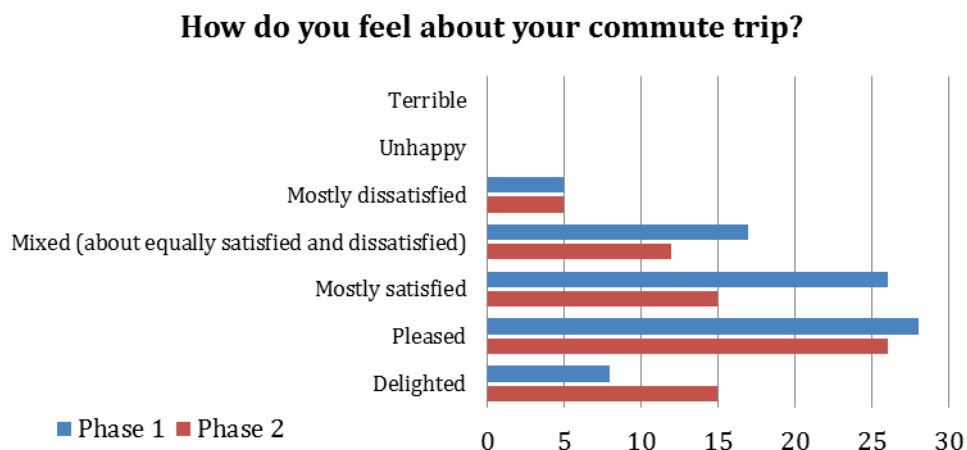


Figure 24: Commute satisfaction ratings

COMMUTE TIME

Study participants were asked to estimate the one-way travel time of their commute, with results shown below. In Phase 1 and 2, the majority (60-70%) traveled 20 minutes or less, while the remaining percentage travelled significantly longer, up to and over one hour. The mean commute time in Phase 1 was 16.1 minutes (with a standard deviation of 12.02 minutes), which increased in Phase 2 to 17.33 minutes (with a standard deviation of 12.87 minutes), a statistically insignificant increase. However, the mean commute time is lower and commute satisfaction is higher in cities with “high quality” transit.

Table 8: Commute Time All Respondents

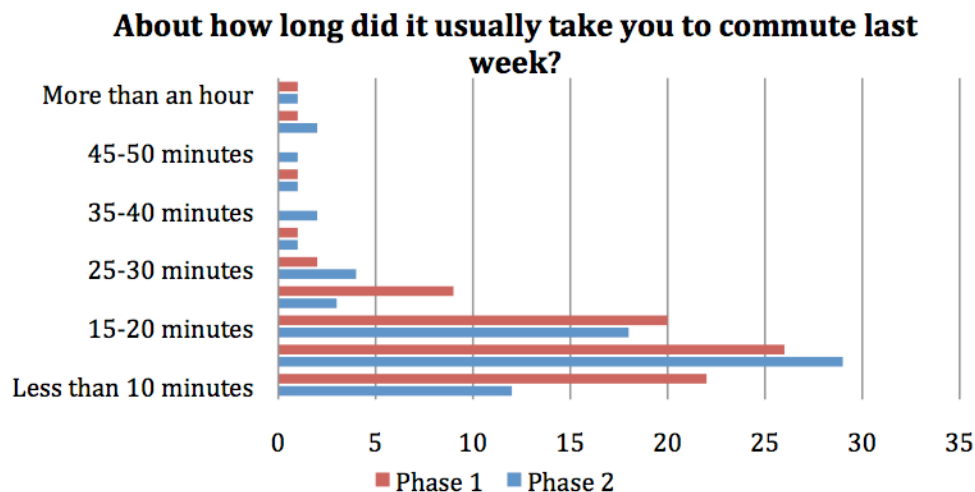
	Phase 1 Commute Time (All)	Phase 2 Commute Time (All)
Mean (mins)	16.1	17.33
Standard Deviation (mins)	12.02	12.87

Table 9: Commute Time Phase 2 - High Quality Transit Cities vs. Low Quality Transit Cities

	Phase 2 – Low Quality Transit (n=10)	Phase 2 – High Quality Transit (n=63)	Phase 2 - All
Mean Travel Time (mins)	28.75 (SD = 25.31)	15.52 (SD = 8.65)	17.33 (SD=12.87)
Commute Satisfaction Rating (lower is more satisfied)	2.9 (SD = 1.66)	2.47 (SD = 1.11)	2.53 (SD = 1.19)
% of commuters using automobiles	70% (commute alone)	6.4% (commute alone)	15%

Table 10: Commute Time Phase 2 - Auto vs. Non-Auto Commuters

	Phase 2 – Auto Commuters (n=11)	Phase 2 – Non Auto Commuters (n=62)	Phase 2 - All
Mean Travel Time (mins)	19.77 (SD = 16.63)	16.90 (SD = 12.19)	17.33 (SD=12.87)
Commute Satisfaction Rating (lower is more satisfied)	2.36 (SD = 1.36)	2.56 (SD = 1.17)	2.53 (SD = 1.19)

**Figure 25: Commute time (n=84 in Phase 1, and n=73 in Phase 2)**

COMMUTE MODE

Respondents also reported how they commuted for each day of the previous week. We used this information to construct an estimate of commuting minutes spent weekly on each mode of travel. The average time spent driving to work or school increased from 6.54 to 17.1 minutes per week across the pool, while the average amount of time spent walking to work or school stayed about the same, declining from 35.7 to 31.0 minutes. Results overall and for Wednesday as a typical day are shown below. The below graphs illustrate a mode split that could be considered typical only for a student population: 58% of respondents report using non-motorized modes (biking and walking), 23% reported using the bus or BART, and only 15% indicated that they drove alone or together with someone else. Compared to Phase 1 results, there was a decrease in active transportation commuting, an increase in public transit use, and an increase in driving in Phase 2:

Table 11: Phase 1 & 2 Comparison of Commute Mode Shares

	Phase 1	Phase 2
Active Transportation Commuting (Bicycling and Walking)	69%	58%
Public Transportation	11%	25%
Driving	8%	15%

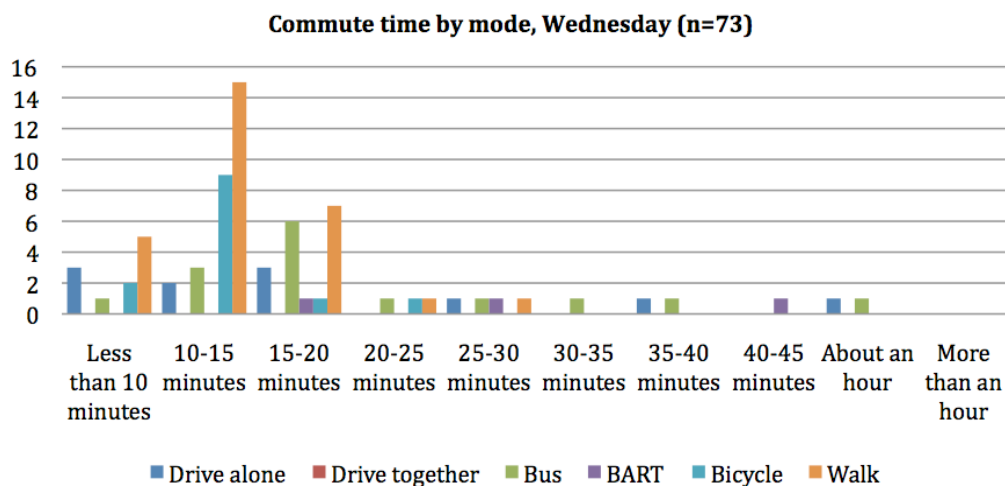


Figure 26: Phase 2 commute time by mode on a Wednesday

Phase 1

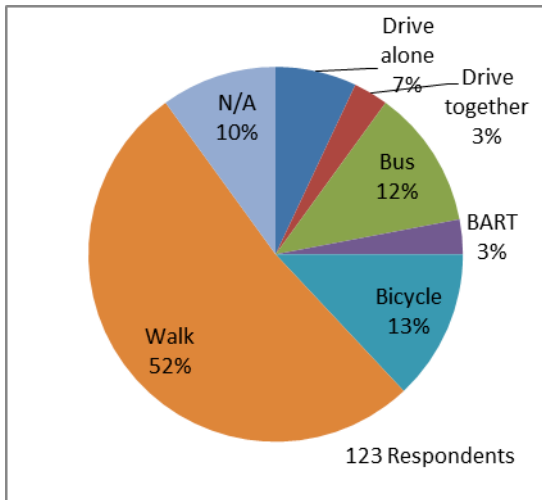


Figure 27: Phase 1 Commute mode on a Wednesday

Phase 2

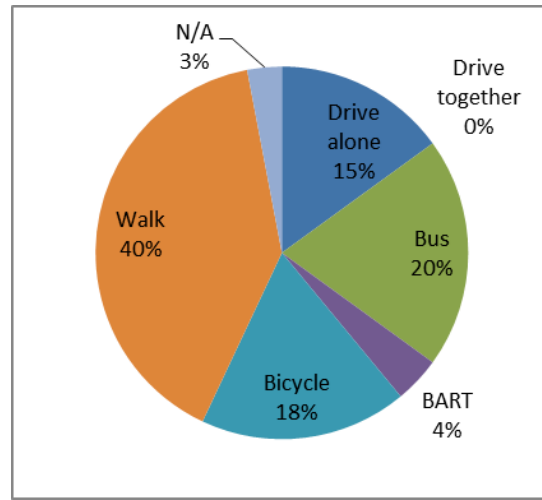


Figure 28: Phase 2 Commute mode on a Wednesday

Commute time by mode, Wednesday (n=73)

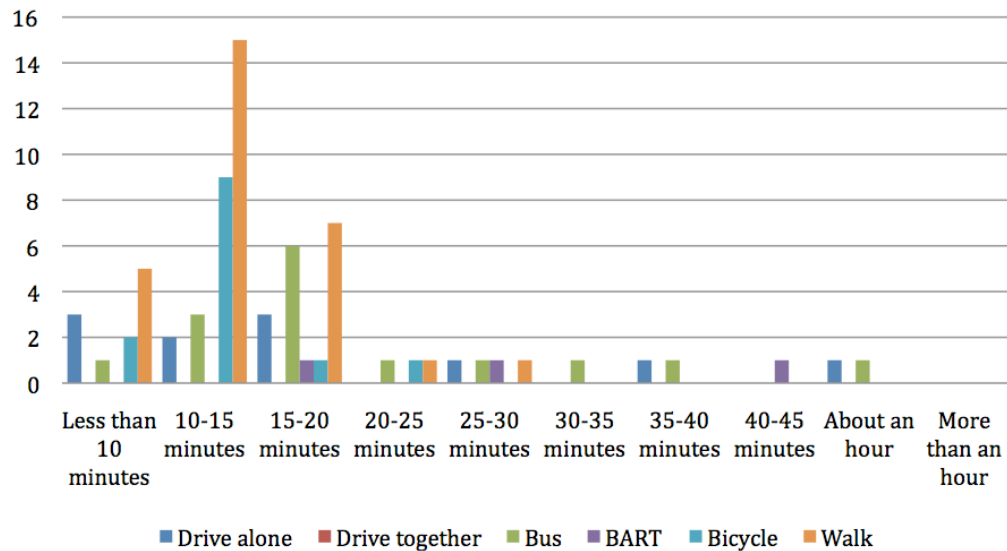


Figure 29: Phase 2 Commute time by mode on a Wednesday

What is the primary reason you travel to the UC campus?

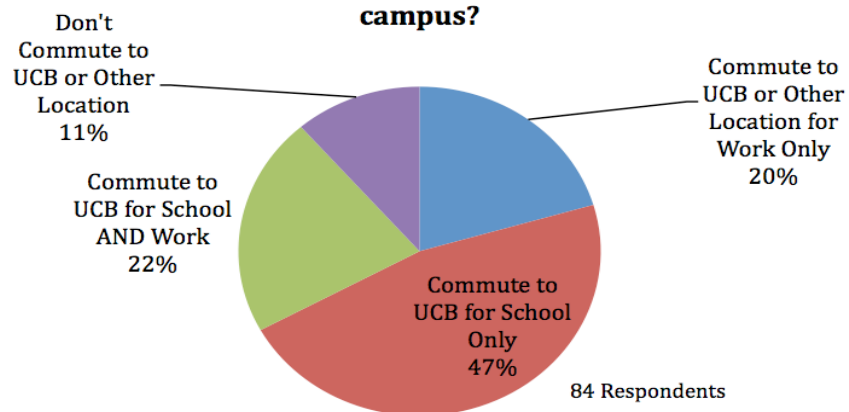


Figure 30: Phase 2 reason for commuting to UC Campus

The proportion of employed respondents decreased slightly, from 44% in Phase 1 to 42% in Phase 2 (see Figure 31). Looking at the 16 respondents who graduated prior to taking the Phase 2 survey reveals that 56% of them reported driving on a typical commute day after graduating (see Figure 32).

Which best describes your employment situation?

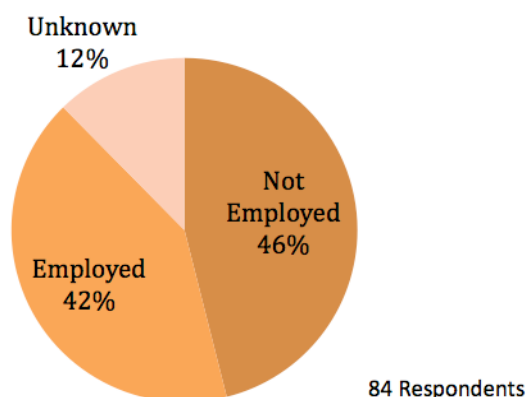


Figure 31: Phase 2 Employment Status

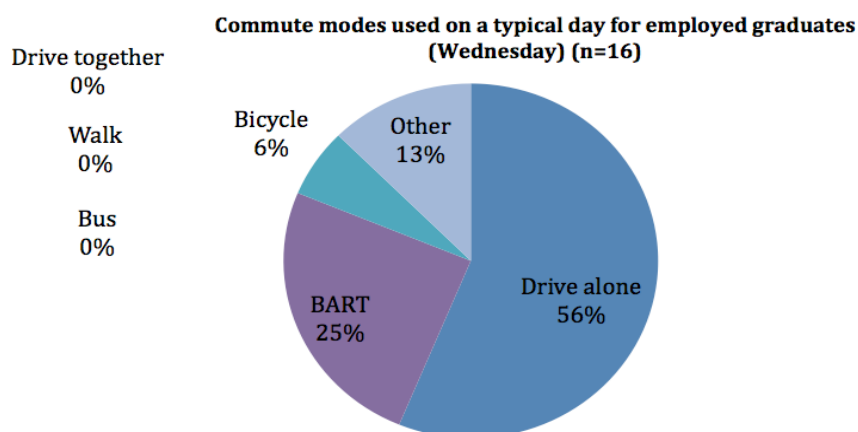


Figure 32: Commute Mode for Graduates on Wednesday

ACTIVE COMMUTERS

Survey respondents who biked or walked to work or school were classified into an “active commute” subgroup. Prior to the survey, 69 percent of reported days were via “active” commuting—bicycling or walking—11 percent on bus or rail, and 8 percent driving either alone or in a carpool. After the move there was a drop in walking and bicycling, to 58 percent, and increases in public transportation and driving, to 25 and 15 percent respectively. Over the period, 19 percent of commuting respondents switched from a passive to an active commute, while 27 percent switched from active to passive. When respondents who live in cities that were classified as having low quality transit are excluded from the sample, the percentage of active commuters increases to 64% (42 of 66). The assumption is that cities with higher quality transit are also denser which makes walking and bicycling easier and more convenient.

Respondents reported the total amount of time walking or bicycling in the previous week. There was a similar average rate of walking before and after the move, with 58% walking

from 1 to 4 hours per week after and 57% prior to moving. There was an increase in bicycling, with the number reporting 1 to 4 hours increasing from 17 to 21 percent.

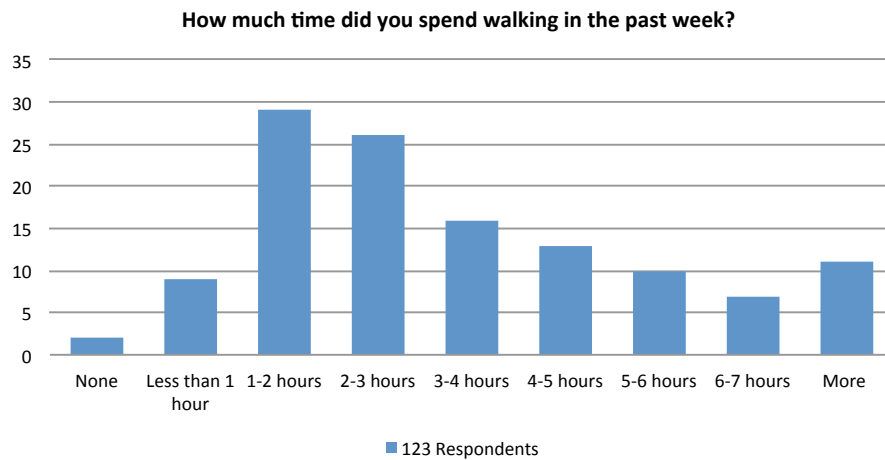


Figure 33: Phase 1 time spent walking



Figure 34: Phase 2 time spent walking

Finally, respondents were asked whether they made trips by foot or bicycle for specific reasons, with the aim of clearing up some of the ambiguity in responses for time spent walking or biking. A significant number of respondents selected exercise and running errands for reasons to walk.

Reasons for walking or bicycling this week (n=83)

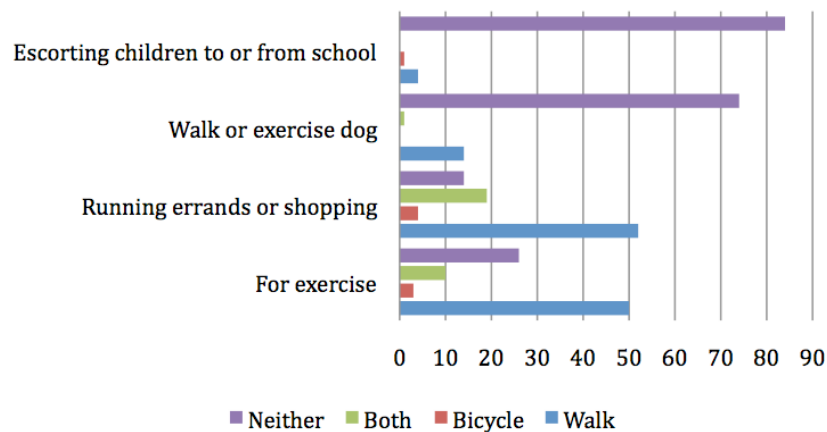


Figure 35: Phase 2 reasons for walking

COMMUTE CROSS TABS

Cross-tabulations of commute satisfaction ratings with commute mode and travel time for a typical day (Wednesday) yield some interesting results similar to results from Phase 1. Ratings by people walking, taking the bus and driving alone had the widest variance, from 1 to 5 (Delighted to Mostly dissatisfied). BART riders in Phase 1 all rated their commute satisfaction as pleased, while in Phase 2 BART riders ranged from pleased to mixed. Bicycle commuters were the happiest commuters in Phase 1; the 13 respondents in Phase 2 gave responses varying from 1 to 4 (Delighted to Mixed), with an average rating of 2.23. It was more difficult to find a pattern on the unhappy end of the scale, as no respondents used the lowest ratings of 6 or 7 for their commute. Only four respondents were “mostly dissatisfied” with their commutes, and these four used different modes: drive alone, bus, walk, and other.

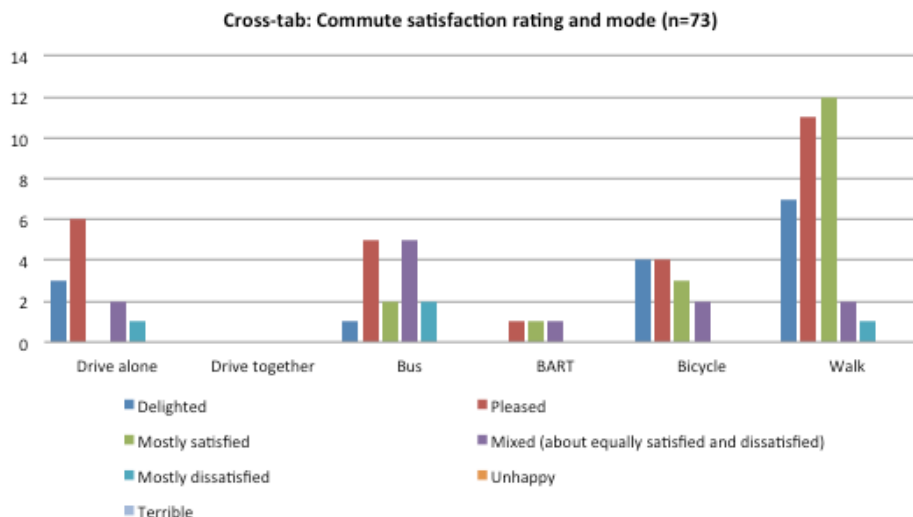


Figure 36: Phase 2 cross-tab of commute satisfaction and travel time

The relationship between the commute rating and travel time was clearer (see Figure 37). Satisfaction ratings went down with the length of the commute, with the exception of BART riders, who reported being relatively pleased with their commute despite an average duration of about an hour. Respondents shied away from the unhappy end of the scale, the same 5 respondents rated their commute a 5 (Mostly dissatisfied), with commute times ranging from

15-20 minutes to more than an hour. The correlation coefficient for these two variables was .54.

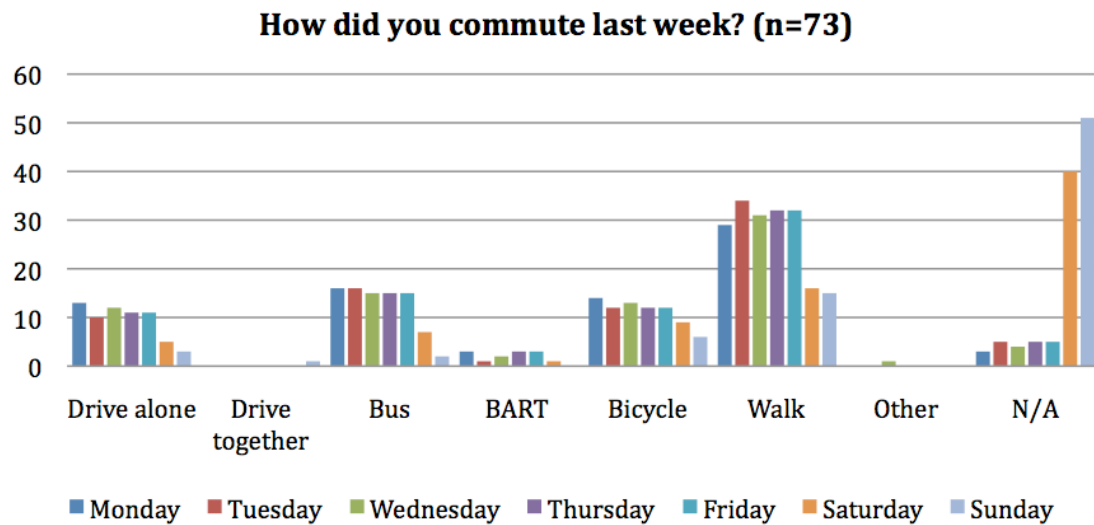


Figure 37: Phase 2 cross-tab of commute satisfaction and mode

GROCERY TRIPS

In Phase 2, the most common mode of travel to the grocery was walking at 32% of respondents for the last three trips made. Tied for second most common mode was bus and driving alone. These trips were either taken in the recent two days from taking the survey or someone in the last week. Between Phase 1 and Phase 2 the travel mode to the grocery changed dramatically. Bicycling and walking to the grocery store increased in Phase 2, but public transportation use dropped precipitously.

Table 12: Phase 1 & 2 Grocery Trip Mode Share

	Phase 1	Phase 2
Active Travel (Bicycling and Walking)	26%	50%
Public Transportation	22%	1%
Driving	41%	49%

Mode used for last three trips to the grocery store (phase 1)

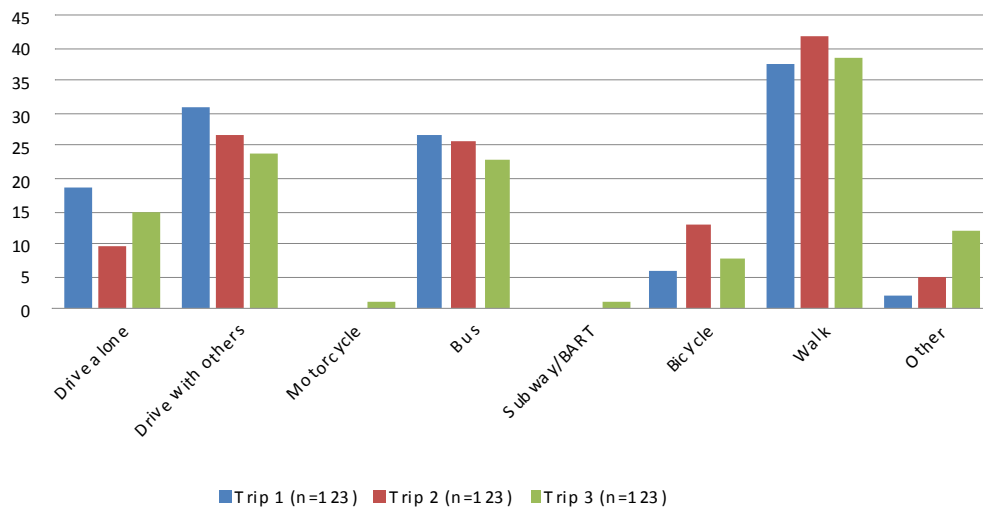


Figure 38: Phase 1 travel mode to grocery store

Mode used for last three trips to the grocery store (n=83)

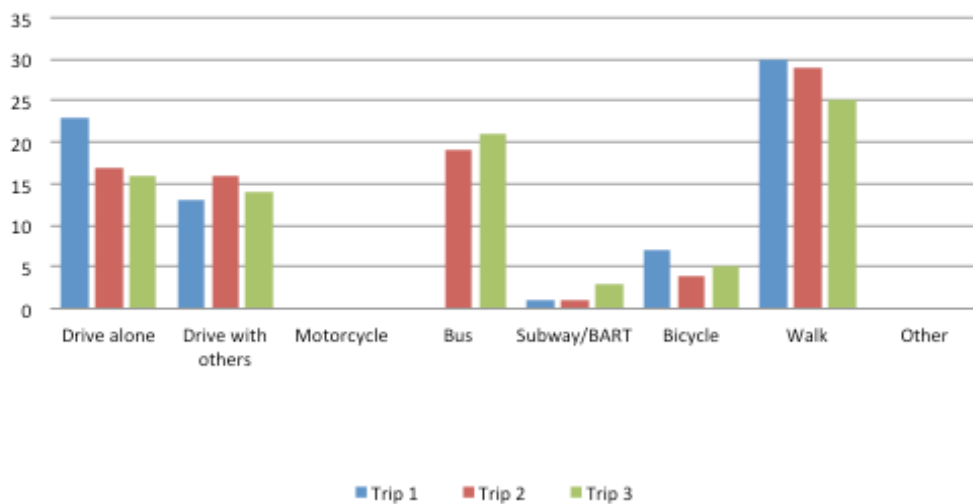


Figure 39: Phase 2 travel mode to grocery store

SOCIAL TRIPS

In Phase 2, social trips to visit family or friends were made just as frequently as in Phase 1. 38% of respondents saw family and friends on the day of taking the survey for their most recent trip. For the second most recent trip, 32% of respondents saw family or friends the same day as the survey or the prior day.

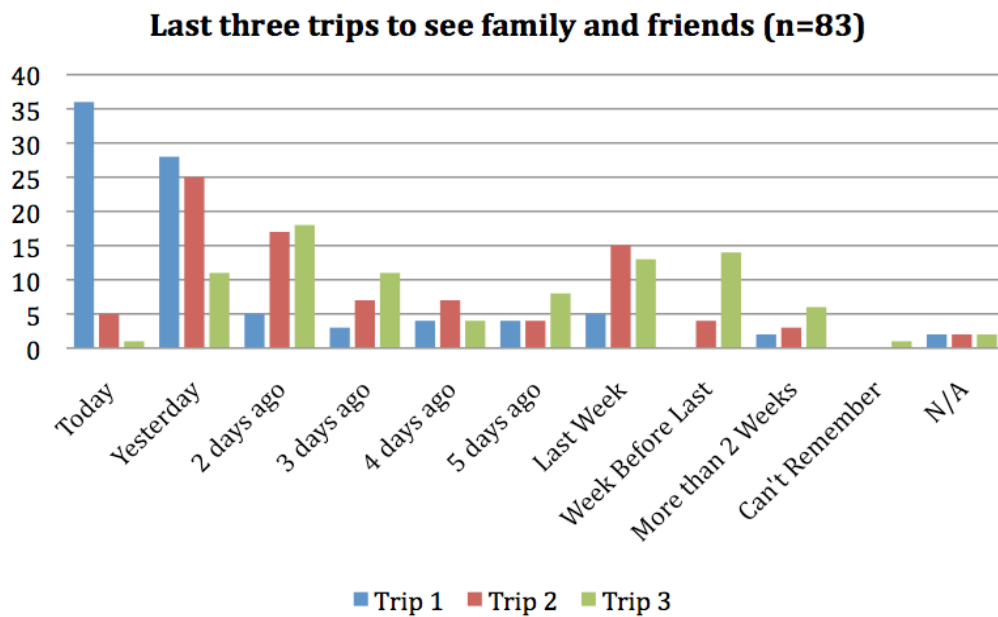


Figure 40: Phase 2 frequency of trips to see family or friends

In terms of mode, 34% to 45% of the last three trips to visit family or friends were accomplished via walking. As with changes to mode choices for trips to the grocery store, trips to see family also changed dramatically:

Table 13: Phase 1 & 2 mode share of trips to see family or friends

	Phase 1	Phase 2
Active Travel (Bicycling and Walking)	40%	54%
Public Transportation	24%	14%
Driving	26%	32%

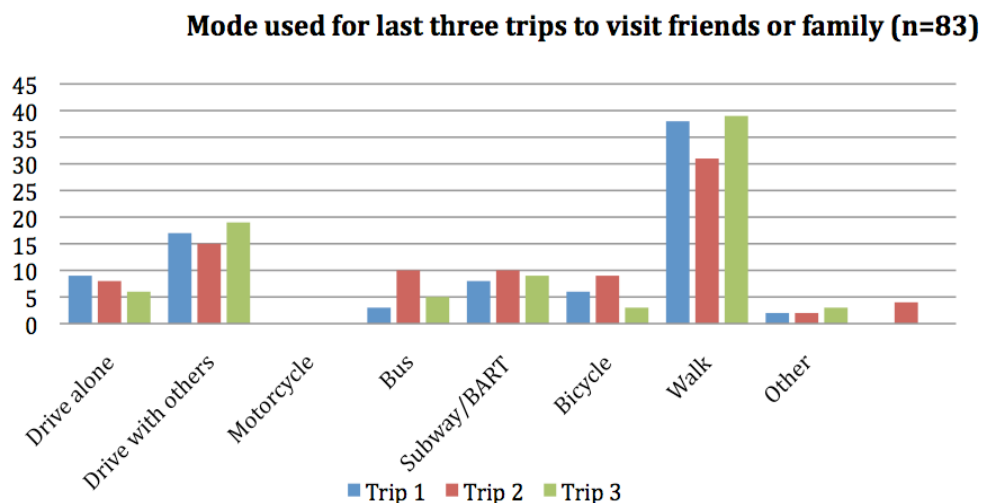


Figure 41: Phase 2 mode for last three trips to see family or friends

NUMBER OF VEHICLES

The mean number of vehicles increased from 1.012 vehicles in Phase 1 to 2.13 vehicles in Phase 2, which is not a statistically significant difference (a paired T-Test indicated a P-Value of .1659). Of the four respondents who purchased a new car, three of them recently graduated. Two of these three list in “low quality transit areas,” and all three commute via car on a typical commute day. While the sample size of this sub-group is small, it does indicate that recent graduates are likely to acquire a car and use that car for commute trips. However, given that these three respondents live in low quality transit it is easy to assume that the car purchase and auto commute may be physically necessary.

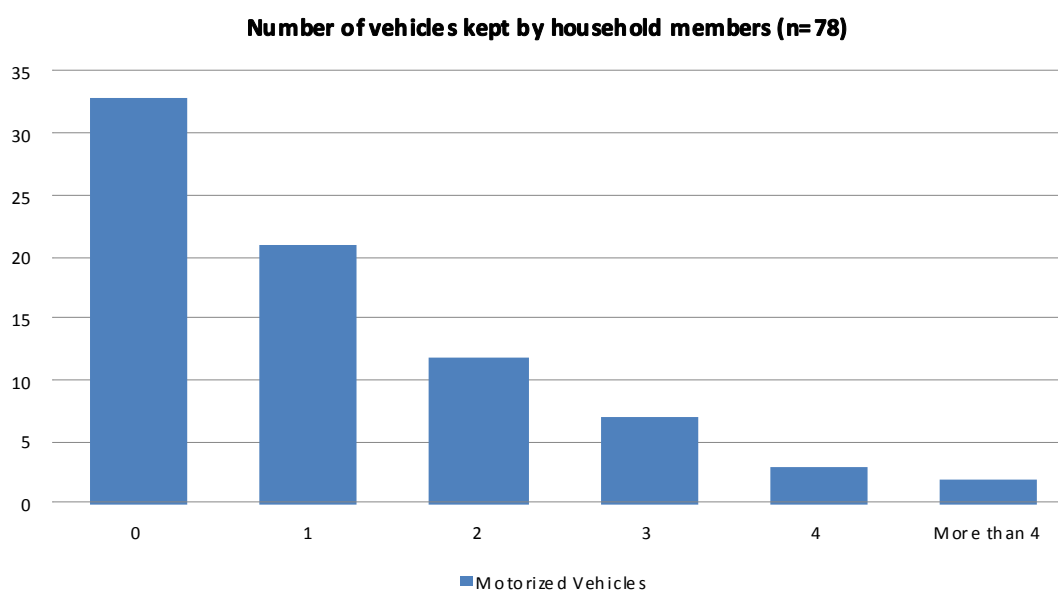


Figure 42: Phase 2 number of vehicles

To test the commute-related hypotheses only data from respondents who moved and who were commuting in Phase 2 was used, a total of 73 respondents. As found with Phase 1 survey data, commute satisfaction ratings were more closely related to travel time than to mode. In general, satisfaction ratings went down with the length of the commute. Compared to Phase 1 results, there was a decrease in walking and bicycling to work, an increase in public transit use, and an increase in driving.

Table 14 below summarizes the evidence about commuting, which shows that even though the average commute time lengthened in Phase 2, people reported a higher level of satisfaction with their commute, on average. Commute satisfaction ratings were reported on the Delighted-Terrible scale, where 1=Delighted, so a lower number indicates a higher level of satisfaction.

Table 14: Commuting evidence

	Phase 1 (n=84)	Phase 1 Commute satisfaction rating (mean)	Phase 2 (n=73)	Phase 2 Commute satisfaction rating (mean)	Change in satisfaction rating
Total time spent traveling					
Average Commute time	16.2 minutes	2.80	17.3 minutes	2.53	
Commute mode drive alone (on Wednesday)	4	3.75	11	2.36	
Commute mode bus	7	3.29	15	3.13	
Commute mode bicycle	10	2.00	13	2.23	
Commute mode walk	48	2.73	29	2.34	

SOCIAL CONNECTIONS

CLOSE FRIENDS AND FAMILY

The survey next asked several questions about social connections with close friends and family members. The survey instructed, “About how many close friends do you have these days? These are people you feel at ease with, can talk to about private matters, or call on for help.” The next question prompted, “Now think of all your close family members. These are the people you feel close to, can talk about private matters, or call on for help, who are related to you by birth or marriage. About how many close family members do you have?” As shown in Figure 44, about 68 percent of respondents reported no change in the number of close family members, but the remainder reported a higher or lower number. Presumably family relationships are fairly stable, and so it is unclear why such a large percentage reported a change; it may be due to estimation error. The mean number of close family members was 2.60 in Phase 1 and 2.58 in Phase 2.

Over half of respondents reported no change in the number of close friends. Of the remainder, slightly more had an increase in close friends (23%) than those with a decrease (20%). The mean number of close friends increased from 3.13 in Phase 1 to 3.22 in Phase 2. A higher satisfaction rating with social connections was correlated with a higher number of close friends (.37) and close family (.32). An increase in close friends or family was correlated with an increase in satisfaction from Phase 1 to 2 (.26).

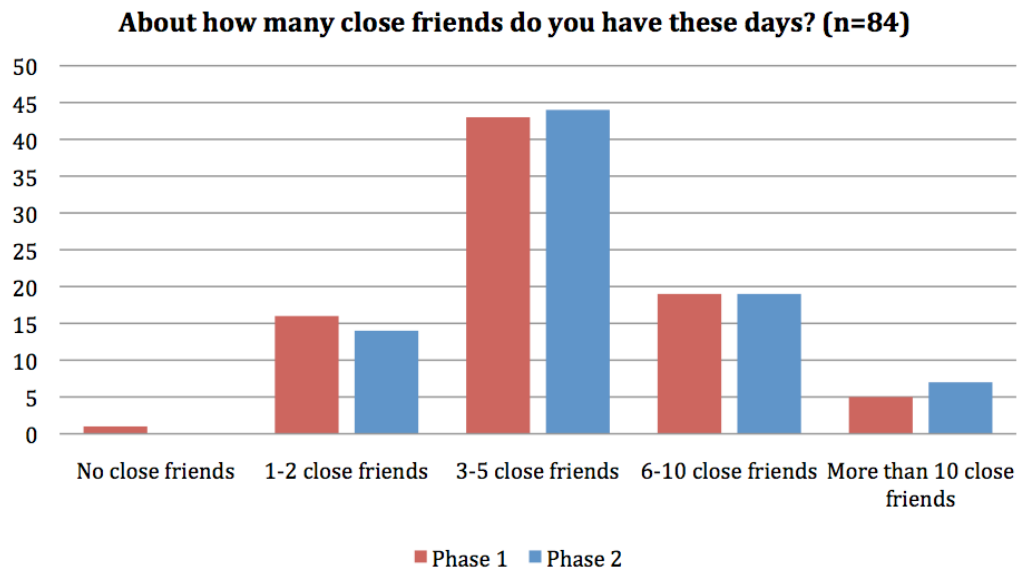


Figure 43: Phase 1 & 2 close friends

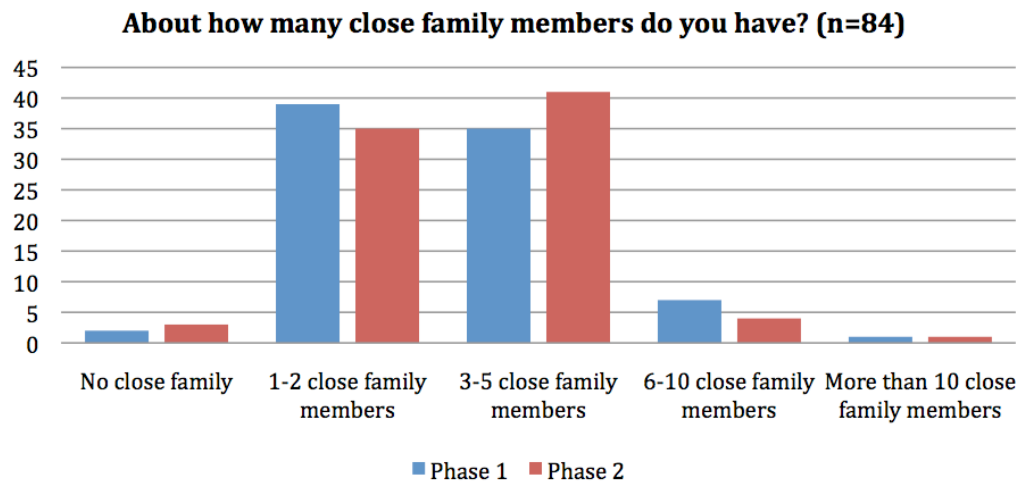


Figure 44: Phase 1 & 2 close family members

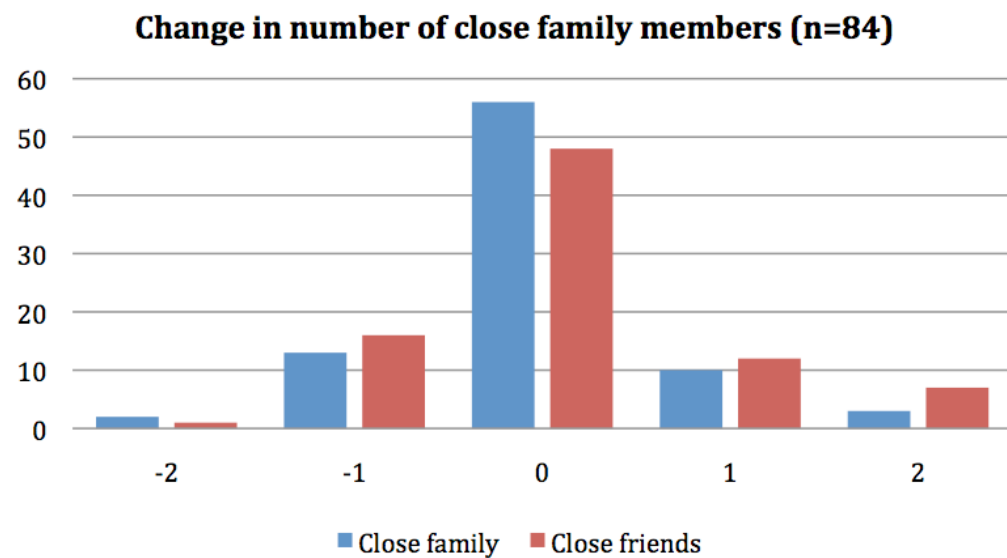


Figure 45: Phase 1 & 2 change in close family members

Before and after the move, half of respondents had best friends in the neighborhood. The distribution of known neighbors was also similar before and after a move, with most reporting that they knew “only a few” neighbors. However, after a move, more respondents reported knowing either “none” or “some” neighbors.

TIME SPENT

The survey next asked participants about how much time they spent interacting with close friends and family, and how they interacted. It asked, “During a typical weekday, how much time do you spend socializing with these close friends and family members in some way? Be sure to include visits in person, voice and video conversations, writing emails and text messages, and using media like Facebook and Twitter.” Responses are shown in Figure 46. Time spent socializing increased from an average of 2.8 hours per day in Phase 1 to an average of 3 hours per day in Phase 2.

The summary of individuals reporting an increase or decrease in time spent socializing with close friends and family is shown in Figure 47. The plurality (43%) reported an increase, while 30% reported spending less time, and the minority (27%) reported no change. The mean of the delta variable was 10.7, meaning that participants were spending about 10 minutes more time per day socializing with close friends and family in Phase 2, on average. A higher satisfaction rating with social connections was correlated with an increase in time spent interacting with close family and friends (.13).

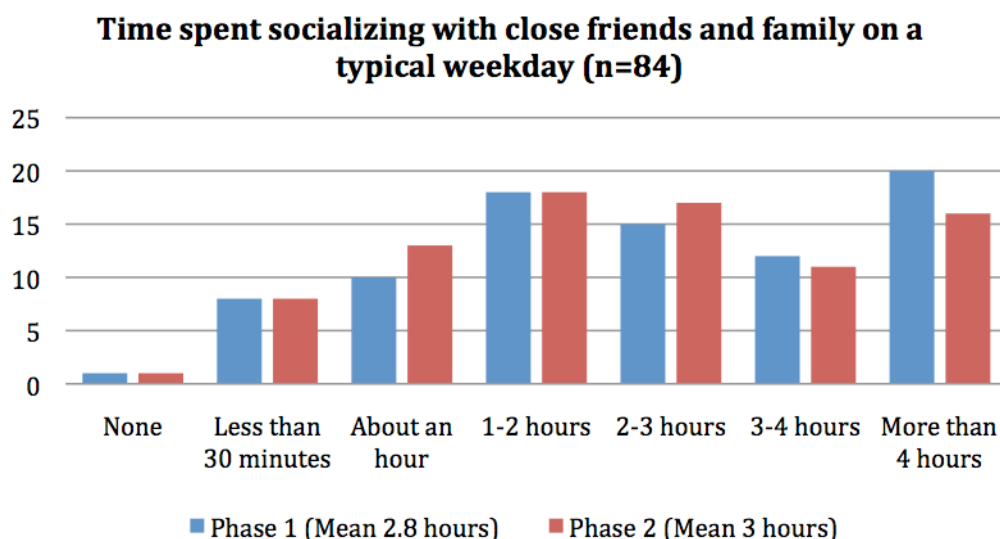


Figure 46: Phase 1 & 2 time spent socializing with close friends and family

Change in time spent socializing with close friends and family (n=84)

■ Increase ■ Decrease ■ No change

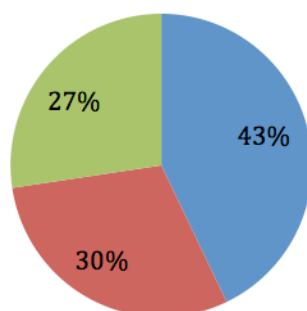


Figure 47: Individuals responses for changes in time spent socializing among those who moved

SATISFACTION RATING

Participants were asked to rate their feelings about their social connections in Phase 1 and 2 using a 7-point scale from 1=Delighted to 7=Terrible. Results are shown in Figure 48. The mean score for Phase 1 was 2.45, which dropped to 2.39 in Phase 2. This indicates that more respondents were giving ratings close to 1=Delighted, indicating that satisfaction with social connections *increased* in Phase 2, on average.

Figure 49 shows the distribution and magnitude of the individual responses. 38 respondents reported no change from Phase 1 to 2. Approximately the same number reported an increase of 1 or 2 points (24 respondents) or a decrease of 1 or 2 points (23 respondents), while more reported a decline of 3 to 5 points (3 respondents) than an increase of similar magnitude (2 respondents). Comments from these respondents indicated this magnitude of change may have been associated with studying abroad. A delta variable was calculated by subtracting the Phase 2 score from the Phase 1 score. The mean of this delta variable was -.06, meaning respondents reported a score closer to 1=Delighted in Phase 2, on average.

How do you feel about your social connections? (n=84)

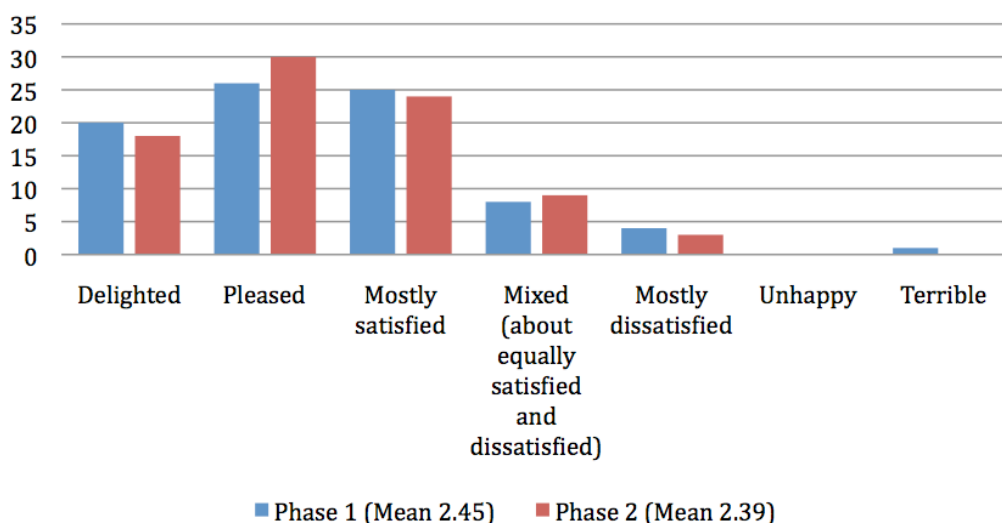


Figure 48: Summary of satisfaction with social connections ratings

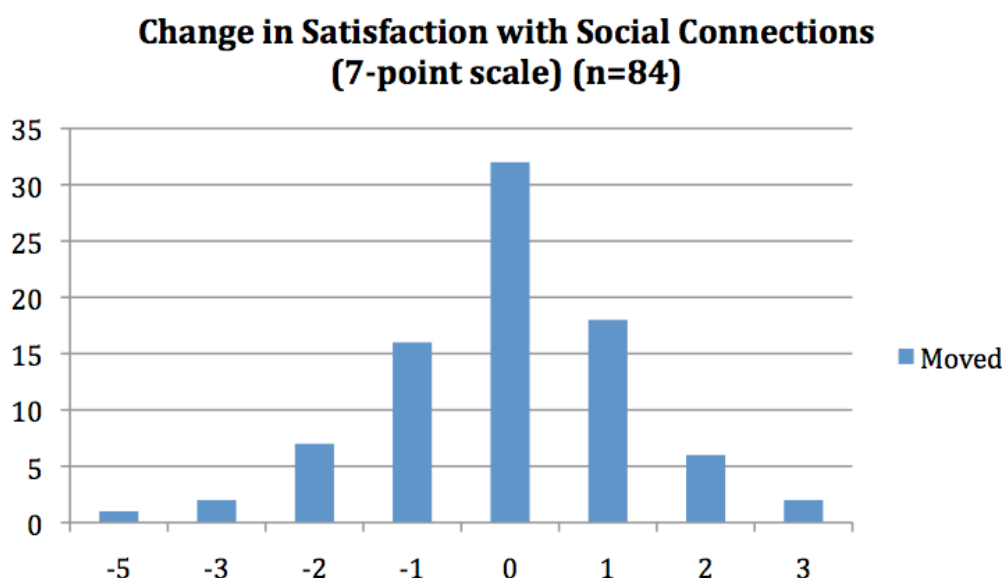


Figure 49: Changes in individual satisfaction ratings with social connections

LAST THREE SOCIAL INTERACTIONS

The survey then instructed respondents to think of their last three interactions with close friends and family. It prompted, “Now, think of the last three times you talked to close friends and family about private matters, or called on them for help.” Participants were then asked for details about these interactions. Results are shown in Figure 50.

Most respondents (62) reported they had a talk with close friends or family the day they took the survey, or the day before. A minority of respondents (13) reported that the most recent three talks had all taken place on the day of the survey. Another minority reported that their most recent talk was a few days ago, last week, or last month. A more recent talk was positively correlated with a higher satisfaction rating (.22).

For most respondents, the last interaction was either visiting in person (44) or by phone (44), and for the remainder it was a text-based communication by internet chat or email (27). For a majority (45), the last three interactions with close friends and family were all visiting in person. A minority (12) appeared to communicate mainly by email. The duration of the last three interactions was calculated to be 92, 104, and 99 minutes each, respectively.

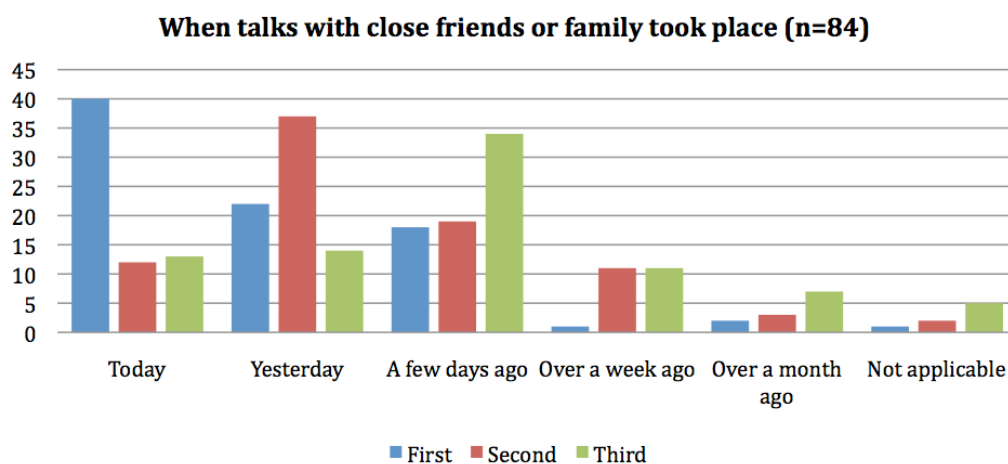


Figure 50: Last three talks with close friends and family about private matters

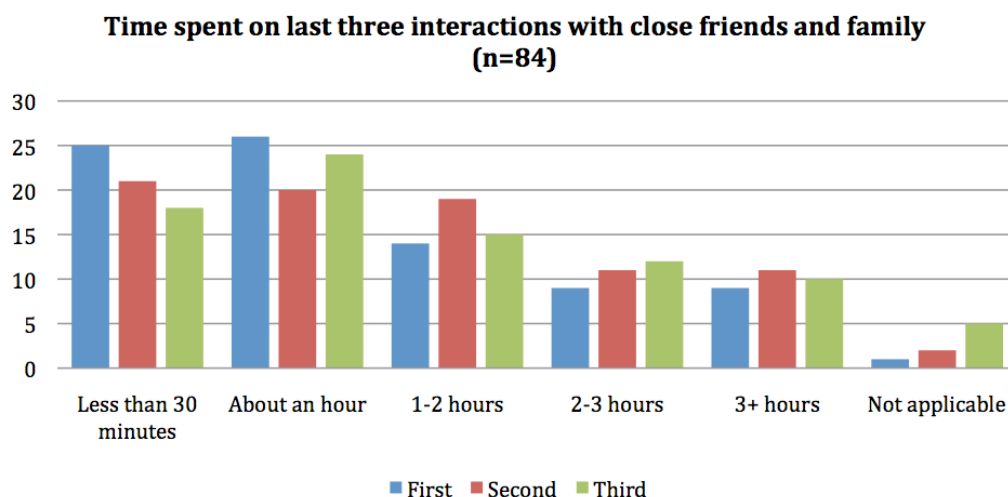


Figure 51: Time spent on last three social interactions with close friends and family

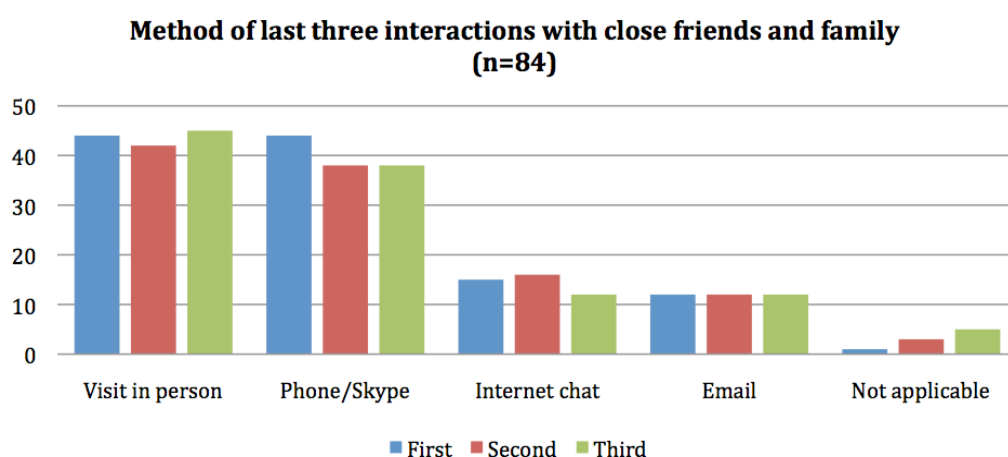


Figure 52: Method of last three interactions with close friends and family

SUMMARY

There was no significant change in satisfaction with social connections; the average score increased by .06 points on the Delighted-Terrible scale, which was not statistically significant. There was an increase in the number of close friends, with 23% of participants reporting they had gained close friends, and an increase of 11 minutes more per day spent talking with close friends and family.

DEMOGRAPHICS AND LIFE EVENTS

Almost all respondents were students when the first survey was taken; just eight of 84 were not. About half were undergraduate students, and about 40 percent were graduate students. The respondent pool was skewed female, at a 60-40 ratio. Ages ranged from 18 to 40 when first surveyed, at a mean age of 22.4 years; two-thirds of respondents were aged 22 or younger. Almost all respondents were renters; 92 percent rented in Phase 1, and 88 percent in Phase 2. Most of the non-renters lived with their parents. Only one respondent reported holding a mortgage.

A majority of respondents (54%) in Phase 2 were single, but 40% reported having a boyfriend or girlfriend. Only five indicated they were married, engaged, or in a domestic partnership. This information was collected as a control variable that could affect results in the happiness questions.

40% of Phase 2 respondents were white, 52% of Asian or Pacific Islander descent, 2% of Hispanic descent, 2% Asian Indian, and 5% answered "Other". The question was asked using the US Census format.

The proportion of employed respondents decreased slightly, from 44 to 42 percent. Respondents were also asked if they held a job, either full or part time. Of the 84 respondents, 24 reported a change in employment status: 10 participants who became employed, and 14 who became unemployed.

Not many respondents reported a change in household income (this included their parents' income if they were reported dependents), and there were some respondents who did not answer the question. Of the 72 who did report income, 21 (about 30 percent) reported an average reduction of \$40,000 per year, which is attributable largely to their reporting that they had become technically financial independent from their parents (according to the definition used for the purpose of gaining an advantage in eligibility for financial aid). There were no income reductions reported except by those who changed from dependent to independent status).

In the post-move survey, participants were asked whether they had experienced a variety of life events, which are known to have an impact on well-being. The most common responses were to have moved into their own apartment or house; to have started a new job; or to have graduated from school.

Life events between Phase 1 and Phase 2 survey (n=89)

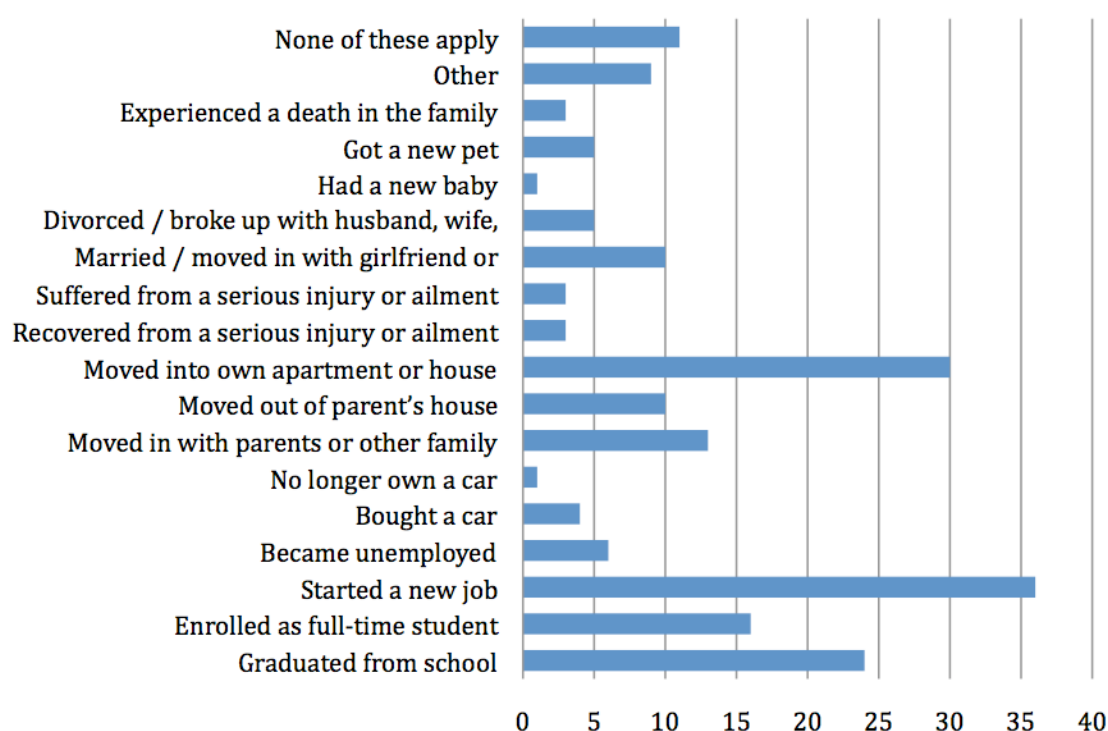


Figure 53: Life events that occurred between Phase 1 and Phase 2

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