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Imagine a carnival ride, some unlikely combination of spinning teacups with the intimacy of a tunnel of love, and the waves and currents of a flume. Then replace the machinery with dancing couples and the rush of water with sound waves, resonant overtones emanating from a single fiddler standing in the middle of the dance floor. The dance is a pols, a Western Swedish polska variant. The music, which goes by the same name, is intimately connected to the dance. It has to be, because consider: a single fiddler is responsible for generating waves of motion, for directing the complex three-dimensional movements of a room full of dancing couples. Any musical concerns that do not directly engage the attention of those dancers must become secondary or be dispensed with altogether.

It should come as no surprise, then, that this kinaesthetic responsibility has produced some intricate rhythms, of the kind that invariably attract the attention of music scholars. Scandinavian theorists have produced compelling arguments [43/44] about the music's 'uneven' meters, backed up with elaborate transcriptions and precise microtimings, decades before 'microtiming' was a word. Yet the production of these transcriptions and measurements is predicated on certain music-theoretical conventions in the study of rhythm that in this particular case, I will argue, sacrifice nuance for measurability. The transcriptions these theorists have produced have usually reduced the spatial to the linear, working from the conventional understanding of rhythm as a series of events in time, without direct reference to three-dimensional movement. In transcriptions that do acknowledge a spatial dimension, on the other hand, the convention has been to alter and reduce dance movements to measurable elements; curves in practice become angles in theory, in an effort to produce clearly delineated stretches of time and space.

While the present work owes a great deal to that history of theoretical writing on polska rhythm, it also represents a deliberate departure from it. I eschew quantitative measurement and transcription in order to avoid having to refract my analysis through the prisms of observability and static visual representation. I have come to agree with Luiz Naveda and Marc Leman's admission that limiting analysis to observable visual and sonic elements grants insufficient understanding of the complex relationship between music and dance (2009, 258). To better get at an understanding of how musicians actually use sounds to make dancers move, I have elected for an ethnotheoretical approach, and asked them.

This study is based on the answers I received in interviews with sixteen dance musicians – fiddlers, nyckelharpa players, a flutist, a percussionist, and several vocable singers.<sup>1</sup> My work is informed by my own experience as a dancer and musician, my year-long study of folk dance pedagogy at Sweden's Eric Sahlström Institute, and ethnography I have conducted among social dancers and dance teachers for a previous article on gender, sexuality, and flirtation on the polska dance floor (Kaminsky 2011). I have chosen here to focus my attention on musicians (several of whom are also dancers) because I am responding at least in part to established scholarship on the polska's musical rhythm, and I believe that they will be my most authoritative and knowledgeable sources on the subject.

The three-dimensional understanding of polska music and dance connections that I am advocating here is already very much a part of the pedagogical discourse for both polska musicians and dancers. Where scholars have found their reward in publishing findings on

complex rhythmic systems, teachers are motivated to find ways to explain how those systems work in practice – how to dance to the music, how to play for dancers. My goal here is to bring this latter approach into the scholarly realm, and to codify it as a new kind of theory.

## THE POLSKA DANCE

The polska dance took root in Sweden in the seventeenth century, peaking in popularity in the nineteenth. By the end of that century, however, it was already [44/45] being eclipsed by newer European partner dances like polka and schottische, and in the first half of the twentieth century even those dances were superseded by African-American forms. Swedish folk music and dance revivalists brought the polska back into use in the 1970s and 80s, and since that time it has thrived as the most commonly played and danced form within their subcultural niche.

The polska is a dance with multiple regional variants. Defined broadly in terms of its common denominators, the polska is an improvisational triple-meter lead-follow partner dance with a promenade and a turning phase. In the promenade, each partner moves with independent balance. In the turn, the couple rotates around a common axis.

The dance can further be divided into two general subtypes. In *rundpolska*, the turn is progressive, and the entire dance flows around the floor counterclockwise in the manner of a waltz. In *slängpolska*, the turn is stationary, with each dancing couple keeping to a single spot on the floor. The *slängpolska* can also be split into two narrower subtypes: *östsvensk slängpolska*, in which the promenade holds to that single spot on the floor, and *sörmländsk slängpolska*, in which the promenade follows the counterclockwise line of dance.

The improvisational elements may differ from one variant to another. In almost all variants – *östsvensk slängpolska* being a notable exception – the timing of the move from promenade to turn and back again is at the discretion of the dancers. In certain variants, the promenade phase grants dancers the option to spin independently, circle around their partners, and/or accent the music with stomps and heel slaps. Some variants of *rundpolska* also allow for a half-speed turning phase. All of these moves are generally determined by the leader within the couple, but among some dancers both partners will share the responsibility.

In its present form in Sweden's folk music and dance subculture, the polska is unusual among the world's partner dances in enjoying a relationship with live music that is ubiquitous, intimate, and to a great extent power-balanced. The relationship is ubiquitous in that recorded music is nearly unheard of, whether in workshops, lessons, social dance contexts, or public performances. It is intimate in that the musical rhythm closely follows the motion of dancing bodies, without (as I will argue) abstract meter as an intermediary. And it is power-balanced because in most social dance contexts both musicians and dancers are typically there for the social, kinaesthetic, and musical experience, and not because one group is paying the other. All of these factors add up to an extremely close and symbiotic relationship between musicians and dancers (many of whom are the same people at different times) with a lot of give and take and mutual inspiration.

## METER VS. MOVEMENT

Much of the literature on the relationship between music and dance has – whether explicitly or implicitly – constructed abstract (i.e., musical) meter as the foundational common ground that links dance to music. Given that music has been the privileged of these two realms in the scholarly world, it seems [45/46] reasonable to presume that the roots of this paradigm lie in the construction of meter as prior to rhythm in both Western music theory and the notation system

upon which it is based. It would be equally reasonable to presume that this paradigm has gone largely unchallenged in the realm of music/dance relations because it provides a serviceable analytical frame for the two broad areas within which most scholarship on those relations has been undertaken: the Western classical traditions on the one hand, and the African and African-derived on the other. In Western classical contexts, dancers in rehearsal will often measure their movements against a regular count, shouted by a dance master in both the presence and absence of synchronous music; musicians will learn their parts via staff notation, which likewise constructs meter as a prior matrix upon which rhythmic events are placed. And while some scholars of African- and African-derived dance music have suggested a move away from conceiving of divisive and/or additive meter as fundamental, for most this has remained the dominant paradigm (e.g., Kauffman 1980, 408–409; Agawu 1995, 390–393; cf. Merriam 1982 for the counterargument). Here, any idiosyncrasy in performance that violates the underlying equal pulse base can be attributed to the subtleties of groove.<sup>2</sup>

Swedish polska dance, on the other hand, renders metrical abstraction problematic. Dancer and vocable singer Kersti Ståbi expounds on the differences between Swedish and African-derived music/dance contexts:

If I'm dancing to disco, or to things where there's a lot of repetition, music that builds on rhythms, well really drums. Then when the music is great and everything's just flowing, and the dance floor is just 'wow', it's like I'm transported by the music, it hits me in different parts of my body, and you move, you're with the music in your body. But! When I'm dancing to melodic music [e.g., polska], where there's a lot of melody and very little drumming accompaniment, then when everything's flowing and the music is really good and everything is great, it's like I'm making the music. I mean I can place the melody in a completely different way which is that I'm creating it. When I walk, I put my foot down at exactly the right place, and it feels like, damn, I'm the one playing. . . . It's so much easier to relate to a melody somehow. It's like you can internalize it, because I'm only one person when I'm listening and when I'm dancing, there's just one of me. And a melody, even if two people are playing it, is also one. I can encompass a melody, but an accompaniment has to encompass me.

In African and African-derived music, meter (poly- or otherwise) functions as a theory because rhythmic events are not necessarily coterminous with the dancing body. Instead they provide an external framework, a groove, within which the dancer has space to move. But when the melody is meant to coincide with the dancing body, when the dancer herself becomes the centre of rhythm, the length and form of any rhythmic event must now be determined by her movements, and can therefore no longer be assumed a direct function of mathematical beat division or addition (cf. Kviite 2007, 80). Nor can we explain rhythmic idiosyncrasies in terms of groove, because there is no groove. There is no virtual space between music and dancer. For this particular kind of dance music, the primary referent for rhythm is not meter, but the motion of dancing bodies. [\[46/47\]](#)

Note also that every rhythmic event of a polska tune need not be associated with a corresponding body movement in order to consider its musical rhythm to be grounded in corporeal motion, any more than we need each downbeat of a piano sonata to be accented in order to consider its musical rhythm to be grounded in abstract meter. Syncopation can exist in motionally based just as well as metrically based music. This 'motional syncopation' simply operates against the body instead of against the beat.<sup>3</sup>

## TOTAL RHYTHM

The second paradigm that my study of polska has prompted me to challenge is that of what I call skeletal rhythm. Western music theory tends to construct rhythm and pitch as separable domains, and as a rule ignores other dimensions – timbre and intensity – as structurally insignificant. Rhythm is thus reduced to a skeletal frame, a simple pattern of attacks, something that can be represented entirely by clapping, for instance.<sup>4</sup> Once again, this view probably emerges from Western staff notation, which likewise reduces rhythm to this skeletal essence.<sup>5</sup> And once again, it has gone largely unchallenged in the realm of music/dance relations because the two domains in which most of the research have been done are the Western classical tradition (which is also based in staff notation) and percussion-heavy African traditions (in which attack is a reasonable locus for analysis).

On a general level, this analytical approach of separability and reduction obfuscates the fact that every sound is always constituted of pitch, timbre, intensity, and duration.<sup>6</sup> One cannot hear a rhythm without also hearing pitch, timbre, and intensity, any more than one can see a pattern of items arranged in a space without also seeing those items. A more holistic understanding of rhythm – what I will call ‘total rhythm’ – would consider the arrangement of all of those elements in time, and not just attack (cf. Large 2000, 529).

Moreover, the application of conventional atomistic theory to Swedish polska is especially impoverishing. First of all, in traditional polska dance settings there is no separation of functions between ‘rhythm’ and ‘melody’ instruments. While various twentieth-century innovations have introduced rhythm sections to the music, older dance forms do not include separate instruments dedicated to harmony or groove. The most common traditional dance setting is for one or two fiddles or other melody instruments. All responsibility for rhythmic structuring falls upon them (Johansson 2010, 80).

Secondly, while attack is certainly a consideration in that structuring, timbral shifts as well as changes in intensity (swell and decay) are also critical elements, often directly correlated to body movements. Swedish dance instruments in tradition from the eighteenth and nineteenth centuries, during which polska was at its peak popularity, all have these two features in common: they are timbrally variable, and they can generate a swell in a note after its initial attack. They are bowed or blown or played with a bellows, never plucked or [47/48] struck.<sup>7</sup> For music that requires those kinds of subtleties to work, conventional skeletal rhythm is an inadequate theoretical construct for analysis.

## POLSKA MUSIC – ESTABLISHED THEORY

The Swedish word ‘polska’ is actually a blanket term for a set of related regional dance types that have gone by a number of local names (Kaminsky 2011, 148n8). The culture area that includes these dances extends into Norway and, to a certain extent, Finland and Denmark, where the traditions go by still other designations. My work focuses on the Swedish case, but some of the important theory comes from the Norwegian side of the border, as we will see in the section that follows this one. For simplicity’s sake, I will follow Swedish tradition and use the general term ‘polska’ to refer to the whole culture area, despite the fact that other words are used in Norway and Denmark and even parts of Sweden.

The polska is subject to a great deal of regional stylistic variation, both in music and in dance. These regional music and dance variants are generally linked, having grown up in tandem and fed off of one another. Overall, however, in Sweden the music has been far better preserved than the dances. Music transcription projects began in the early nineteenth century, at a time

when polska was still popular; and recording projects began in earnest in the 1940s and '50s, when these traditions were still in living memory (Ternhag 1980; Ramsten 1979). The polska dance revival did not begin in earnest until the 1970s, however, so many regional variations are reconstructed from the faded memories of a handful of aged dancers, as well as clues from analogous musical traditions (Nilsson 2004, 202–204; Helmersson 2012, 110–115; Haugen 2012, 177). Thus, although music and dance variations are closely connected, those connections may in many cases be as much the result of reconstruction as preservation.

Scholarship on polska tends to favour the music heavily, sometimes doing little to acknowledge its connection to dance. Some might argue this approach is entirely justified, given that for much of the twentieth century this music was mostly performed in non-dance contexts (e.g., Johansson 2009, 63). This music-centric approach might also be linked to a (generally unacknowledged) project of divorcing folk music from its dance function in order to free it from its subcultural niche and so professionalize and legitimize the genre as an independent artform. I cannot argue with that impulse. All I can say is that musicians who play regularly for dancers will play differently from those who never do. I have chosen here to study the former kind of musician, rather than the latter; and to describe their approach to the music, I find the theory that ignores the dance to be inadequate.<sup>8</sup>

The music-centric literature on duration in polska draws from both of the paradigms that I have criticized to this point – the notion of a regulatory abstract meter, and the analytical reduction of rhythm to patterns of attack – and furthermore conflates them.<sup>9</sup> One recurrent approach to analysing polska [48/49] musical rhythm has been to measure relative beat lengths with extreme precision. The present global music-theoretical interest in microtimings has some precedent in the 1968 article 'Notes on Twenty Seconds of Swedish Folk Music', in which Swedish theorist Ingmar Bengtsson measured relative polska beat lengths down to the millisecond (1968, 34; cf. Bengtsson 1974, 25). Theorist Mats Johansson has published similar findings as recently as 2010 (2010, 75; 2009, 281–84). The problem with this approach is that in the service of measurability it conflates meter with skeletal rhythm. The moment of attack is designated as the beginning of the beat, a presumption to which few musicians actually ascribe, and even Mats Johansson discredits (2010, 76).<sup>10</sup>

By extension, one of the primary methods by which both practitioners and scholars distinguish between different polska variants is by comparing their various relative beat lengths. Conventionally, Swedish polska music is divided into 'even' and 'uneven' types, the latter of which have been of greatest interest to theorists of rhythm. Even polskor are in a standard 3/4 or 9/8, with three evenly spaced beats. Most uneven polskor in Sweden have what is conventionally termed an 'early two' or 'short one', meaning that the first beat is shortened, the second beat is lengthened by an equal amount, and the remaining beat takes up the expected final third of the bar. A second type of uneven polska, termed 'short three', is more common in Norway and along the Norwegian/Swedish border. Here the first two beats are either of equal length or the first is slightly longer than the second; the third beat is significantly shorter than the first two (Haugen 2012, 177; Ahlbäck 2003, 168–71).

Three factors support the continued conceptualization of the music in these terms. First, this construction describes audible differences between different types of polska, and so proves practically useful. Second, the notion of abstract meter as prior to rhythm has its foundation in Western art music theory and staff notation, historically the predominant forms of theory and notation in Sweden. And third, the quantifiability of duration has been of great use to Scandinavian music theorists, whose writing (and chart-making) tends to be highly technical and

scientific in affect.

Yet when I asked my consultants what they do as musicians to make dancers move, nobody mentioned beat proportions as a factor. The person who came closest was fiddler Jonny Soling:

In the early seventies I did an experiment with a reel to reel machine, where I recorded myself in a fairly slow bodapolska on reel to reel with that kind of studio tape where you can write on the back side, so I could thread the reels afterwards to exactly where my foot was, and I could draw a line and measure the proportions – it was kind of nuts – but you could measure the proportions between the beats. And for me at that particular time it was 33% on the three, 50% on the two, and 17% or whatever is left over on the one. And that's not some truth about how it's supposed to be, that's just how it was that time for me. I wanted to see approximately how it really is.

Even this experiment, however, suggests that beat proportions are a by-product of dance function, rather than being an essential pre-existing matrix. If Soling [49/50] were conscious of those proportions as he produced them, he would not have to conduct this experiment after the fact, 'to see approximately how it really is'.

#### THE MUSIC/DANCE ANALYSIS OF JAN-PETTER BLOM

Scholarship that examines the relationship between music and dance has challenged some of the above-mentioned paradigms, but not others. The most important work in this area has been done by Norwegian theorist Jan-Petter Blom. His ideas have been crucial for Scandinavian folk dance teaching in general, and his influence in my own scholarship can probably be traced in part to my year-long study of folk dance pedagogy at the Eric Sahlström Institute in Tobo, Sweden. Here I mean to acknowledge the significance of his contributions, while simultaneously critiquing some of their limitations.

Blom may well be the first scholar of this music to argue that the primary referent for musical rhythm is the motion of dancing couples:

In folk dancing the vertical up-down movements tend to be exaggerated beyond functional necessity. These considerations therefore justify the application of a model which depicts the structural aspect of a particular rhythm, i.e. meter (my terminology) as functions of vertical space (s) or amplitude and time (t). (Blom and Kvifte 1986, 502, italics in original).

He frames the argument slightly differently than I do, by redefining meter as spatial, rather than jettisoning it as a prior category. Effectively, though, we are arguing the same thing. One-dimensional, non-spatialised meter does not work as a theoretical frame for analysing this music.

Also of great use to dance teachers has been Blom's concept of 'libration curve', that distinctive pattern of up-and-down dance motion over the course of a musical bar that functions to distinguish one regional variant from the next (Blom and Kvifte 1986, 502–504). Beats associated with downward motion are 'heavy', while those associated with upward motion are 'light' (Blom 1981, 311). A brief comparison between how Blom charts and discusses these curves, versus how they have been adapted by dance instructors, will illustrate some of the ways that Blom's theories have been limited by the Scandinavian music theorist's orientation toward the quantifiable and graphable.

As a student at the Eric Sahlström Institute, I was taught to determine libration curves by holding up my hand to block out the lower bodies of dancing couples from my vision, and then simply chart the up-and-down motion of the dancers' heads over time. This approach generally

produces a curved line of some sort. These results stands in stark contradiction to Blom's charts, which although he refers to them as libration 'curves', inevitably manifest as a series of straight lines connecting points of directional shift. At one point he recognizes the departure from lived reality and writes: 'For our immediate purpose, it will be sufficient to present such curves as straight lines between extremes' (Blom 1981, 305). He does not elaborate on the reasons for this abstraction, but I would suggest it relates again to that impulse toward quantifiability and clean [50/51] and mathematical-looking graphs. These charts allow him to find exact beat locations, located at moments of directional shift made crisp and precise as a function of the angles produced by his straight lines (2003, 126; Blom and Kvifte 1986, 503). These locations are frequently unevenly distributed over the bar, and so they coincide with traditional constructions of the music as metrically uneven.

Ultimately, Blom's promise of a theoretical approach based on spatial meter is undercut by its conformity to established paradigms of skeletal rhythm and beat exactitude. On the musical level, the integration of Western staff notation into his charts boils rhythm down to its skeletal essence once again, reducing lightness and weight to the types of accent at the moment of attack – certainly a factor in determining relative weight, but not the only one (Blom and Kvifte 1986, 508; Johansson 2010, 72). On the choreographic level, his angular libration 'curves' do injustice to the lived experience of dancers, for whom changes in vertical direction are gradual and experientially insignificant as isolated moments (cf. Kvifte 1999, 421).<sup>11</sup>

My sense is that the limitations that Blom faces have everything to do with music-theoretical conventions of quantifiability and graphability, and I solve them for myself by making my analysis entirely qualitative, textual, and ethnographic. My primary sources are interviews with dance musicians and their descriptions of how they actually produce dance motion. I supplement this information with my own experiences as a student of folk dance pedagogy. What follows is a description of the three major mechanisms by which musicians can control the dance, followed by a discussion of four parameters that they describe being able to control.

## MECHANISMS

Upon analysing my consultants' discussions on the subject, I have isolated three mechanisms by which sound can suggest motion in polska: iteration, metaphor, and sympathy. In practice, these mechanisms are probably no more separable than are rhythm, pitch, timbre, and intensity. They do function differently, however, and so I find them useful as theoretical abstractions.

### *Iteration*

The first type of mechanism is what I call *iterative*, and is based on explicit and implicit pattern repetition. The function of this mechanism is to regulate repetitive motion in dancers, and to aid in partner synchrony. The execution of any controlled motion requires a vision of the near future for its follow-through. When two dancers need to coordinate, iterative music can provide them with a common near-future projection of sonic events to synchronize their movements (cf. Hasty 1997, 84–95). This process by which music allows people to predict [51/52] the musical future and so coordinate with it and one another is sometimes called 'entrainment' (Clayton, Sager, and Will 2005, 17–18).<sup>12</sup>

Iterative patterning can operate on two levels: as overt pattern repetition, and as submerged pattern implication. Overt pattern repetition would involve an actual repeating sound. Taking the simplest possible pattern, that of a persistent isochronous beating, disco and EDM's four-on-the-

floor bass drum kick would be the prime example. An analogous example of submerged pattern repetition would be what Alan Waterman calls metronome sense, and cognitive psychologists call beat induction (Waterman 1952; Todd, O'Boyle, and Lee 1999, 6; Large 2000). Here the regular beating is not actually heard in the music, but rather implied and understood based on socially learned cues. For instance, someone listening to the opening of Bob Marley's 'Stir It Up' would need a certain familiarity with reggae's conventions in order to correctly locate the beat, which is marked by silence and implied via the off-beat guitar skank. An unfamiliar listener would likely hear the first note of the skank as on-beat, at least until the real beat kicked in.

Obviously, overt pattern repetition can be more complicated than a four-on-the-floor thumping. Overlaid looped samples in hip-hop, 'inner parts' in Ewe drumming, and the colotomic layer in Javanese gamelan are all examples of complex overt pattern repetition. Yet when it comes to submerged pattern implication, theorization beyond simple beat induction is only in its infancy (Large and Palmer 2002; McAuley 2010, 191). On the other hand, scholars who have studied the biological mechanisms behind beat induction will generally agree that it links to locomotion and the synchronization of footsteps (McNeill 1995; Styns et al. 2007, 770). This physical factor is the first clue that submerged pattern implication may extend beyond beat induction. Anyone who teaches people to move in a new way – a dance instructor, a martial arts teacher, a running coach – knows that footwork is only one manifestation of locomotion, the easiest thing to point to but the first thing to get people to stop thinking about. Locomotion is a complex, full-body activity (Todd, O'Boyle, and Lee 1999, 7). Even footsteps themselves are segmented actions, rolling from heel to ball to toe over time. Thus, logically, music meant to inspire complex iterative locomotion would develop in such a way as to imply regular patterns that go far beyond those of simple pulsation. Otherwise, how would a dancer know which regional polska variation to dance simply from hearing a new tune for the first time? Here is the source of my argument that complex full-body motion be considered prior to abstract meter in analysing and understanding iterative dance music. Regular pulsation emerges from body movement, not vice versa, and it is only one dimension of a larger three-dimensional story.

With enculturation, regular body movements can be linked to complex submerged pattern implication. In fact, the very pattern implied by the music can be the full-body movement itself. The same mechanisms of cultural learning that would allow a reggae fan, for instance, to nod her head on the beat simply from hearing the off-beat skank in the beginning of 'Stir It Up', allows a seasoned polska dancer to hear the beginning of a tune in a given regional style and [52/53] dance the appropriate dance, whether or not the music opens with overt pattern repetition. The only difference is that the first example can be explained as simple beat induction, while the second requires understanding of a more complex implied pattern.

### *Metaphor*

The second type of mechanism, the *metaphorical*, is also enculturated. Gertrude Kurath proposes a number of examples from her cross-cultural research, relating to dynamics, pitch, lilt, quality, and harmonization (1994, 260–61). The most obvious is rising and falling pitch, which in classical Western dance is sometimes linked to rising and falling physical motion (Duerden 2007, 73). Alternatively, Eric McKee has argued that melodic arches in waltz music suggest circularity (2012, 148–49). I call this general mechanism metaphorical because, for instance, there is nothing in 'rising' pitch that actually rises in a physical sense. The 'higher' in higher frequency is simply another word for greater, or more, and is only linked to a physical rise by social convention.



These examples are less relevant in the Swedish case, however, because only occasionally is melodic contour linked to particular types of motion in the dance. In polska, the more relevant metaphor is a function of timbre rather than pitch. Overtone-rich sounds are ‘light’ and draw dancers upwards, while notes with strong fundamentals are heavy and favour downward motion.

### *Sympathy*

The third mechanism is *sympathetic*, whereby sound can be understood as a code that mediates the physical motions of musicians to those of dancers (cf. Godøy 2003). Whereas metaphor involves the simple translation of sound to motion, sympathy is a more complex translation of motion to sound and then back to motion. The principle relates to what Helmut Lachenmann has called *musique concrète instrumentale*,

in which the sound events are chosen and organized so that the manner in which they are generated is at least as important as the resultant acoustic qualities themselves. Consequently those qualities, such as timbre, volume, etc., do not produce sounds for their own sake, but describe or denote the concrete situation: listening, you hear the conditions under which a sound- or noise-action is carried out, you hear what materials and energies are involved and what resistance is encountered. (2008)

This approach opposes traditional sound production practices in Western art music by intentionally revealing, rather than concealing, their mechanics. Lachenmann’s description, while keyed to his own compositions, also applies neatly to Swedish fiddlers. Whereas a classical violinist will work hard to make down-bow and up-bow sound identical, and to conceal bowing changes, a Swedish fiddler will accentuate the differences and shifts so as to convey a sense of rise and fall that can be mirrored by dancers. [53/54]

I call the practice ‘sympathetic’ in the sense of sympathetic magic, like that of shifting your weight to right the course of a bowling ball after it has been sent on its path. My experience as a player validates this construction. If I feel a dance floor is not responding to my playing, I will often respond by exaggerating my physical movements in hopes of sympathetically moving dancers.

This sympathy principle finds support in the recent literature on mirror neurons. Mirror neurons are distinctive in that they fire not only when a given action is taken, but also when it is observed (Rizzolatti and Craighero 2004, 170). Presumably they are so named because they allow us to mirror actions. The term, however, somewhat deceptively privileges the visual realm. Experiments have shown that observations do not have to be visual for these neurons to fire. There is a subset of mirror neurons that will activate when a monkey tears a piece of paper, sees someone else tear that piece of paper, or hears a piece of paper torn without actually seeing it (Keysers et al. 2003, 628; Kohler et al. 2002, 846). Presumably, when a fiddler exaggerates the sonic differences between up-bow and down-bow, the associated mirror neurons will fire in listening dancers. Even if they cannot see the fiddler, the sound can help them synchronize their vertical motions to those of the bow.

Again, all three of these mechanisms – iterative, metaphorical, and sympathetic – will often work simultaneously. Musicians will engage in an iterative pattern of sympathetic down and upbows to coincide with dance motion. Their downbows will produce a metaphorical ‘heavy’ sound with a strong fundamental, while upbows produce that lighter, overtone-rich effect. In actual practice these mechanisms cannot be separated.

## CONTROLLABLE PARAMETERS

As I have already mentioned, common to all varieties of polska are two distinct phases: a promenade phase, in which dancers walk and/or spin independently on their own axes, and a turning phase, in which they turn on a common axis. Some variants have two different possible turning phases, one fast and the other slow.

I have already argued that certain aspects of dance movement can be controlled by musicians. However, because polska is improvisatory, at any given time some couples on the floor will be doing a promenade while others are doing a turn. Given that not everyone is doing the same things at once, it follows that not every aspect of movement is directly motivated by the music. The question then becomes, which parameters are subject to control by musicians, and which are not?

On a very basic level, any individual improvised dance movement – any ‘dance move’ – can occur without a musical cue. In most polska variants, the move from promenade to turn or vice versa can happen at any time, and on an active dance floor is less likely to be motivated by changes in the music than by crowding. Certain variants allow for improvised moves within the promenade, moves which likewise can occur independently of musical cues. [54/55]

These represent only possible disconnects, however. Especially if they are not constrained by a crowded floor, dancers may choose to shift between promenade and turn at phrase endings, and use their various improvised promenade moves to embody accents in the music. Conversely, a musician may choose to watch a specific couple and attach his or her playing to their particular movements, so generating a feedback loop of musical and kinetic impulses.

While my dance musician consultants occasionally talked about this kind of direct feedback, by and large the control they discussed having over the dance was more general, applying to the whole floor at once. From my interviews with them I have gleaned four parameters of control that operate on this general level. Each of these can apply to all moves and thus to the entire dance floor, though some are more closely tied to either the promenade or turn. *Pulsation* is the rate and consistency of tempo and its expression in locomotion. *Lean* is the degree to which dancers lean forward or back over their own axes. *Viscosity* is the level of perceived air resistance. *Libration* is the degree and timing of vertical motion (Blom and Kvifte 1986, 502–505; cf. Kvifte 2007, 76). These four parameters are essentially always controllable by musicians, and were those discussed in greatest depth by my consultants.

The main question I asked my consultants was ‘what do you do to make dancers move?’ I asked them to give their answers with examples from one or more polska variants of their own choosing. Three variants came up frequently in these discussions: slängpolska, pols, and bodapolska. While these variants are quite different both in terms of the moves they allow and in their geographical scope, in the present discussion such considerations are irrelevant. Because I am only considering parameters that are directly controllable by musicians, I find it sufficient to distinguish between slängpolska, pols, and bodapolska in terms of differences in their pulsation, lean, viscosity, and libration (figure 1). What follows is a discussion of how musicians control these four parameters in these and other polska variants.

	<b>POLS</b>	<b>SLÄNG-POLSKA</b>	<b>BODA-POLSKA</b>
<b><i>Pulsation</i></b>	fast	moderate	slow
<b><i>Viscosity</i></b>	minimal	slight	high
<b><i>Lean</i></b>	slightly forward	neutral or forward	backward
<b><i>Libration (degree)</i></b>	high	light to medium	high
<b><i>Libration (beat 1)</i></b>	down	down or down/up	down
<b><i>Libration (beat 2)</i></b>	up	up or down/up	up
<b><i>Libration (beat 3)</i></b>	down/up	down/up	down/up

**Fig. 1.** Controllable parameters in three types of polska. [56]

### *Pulsation*

When it comes to the physical connection between dancers and musicians, maintenance of a manageable and reliable pulsation can allow players to share their own embodied calm with dancers. A musician who can convincingly show enough control over the tempo to insert subtle variations in speed without leading to an overall acceleration can spread that sense of mastery to dancers as well. Says fiddler Sven Midgren:

It's important there's a calm in the whole thing. And there I think that tempo can be important, that you choose a tempo for a tune that you can manage. So you feel that calm the whole time, and let the phrases take their time. Otherwise it's a very common phenomenon, maybe mostly with less experienced musicians, that they cut off phrase endings. And start the next phrase. . . . As a musician you can contribute by showing that you're confident enough to push and pull, while at the same time being clear that 'I know what I'm doing'. There's a conviction behind those rhythmic variations and pushes and [55/56] pulls in tempo and pulse that you're doing. It's important that you signal to the dance floor the whole time that 'I'm secure in my playing', because then the dancers know that they can rest in what I'm doing. While in my experience from the dance floor, if a dance musician doesn't have that calm, only it feels more like they don't really know what they're doing, it's much harder as a dancer to relax. And feel a security in the music, if you're constantly feeling like the musician is about to slip off the track.

Conversely, musicians who feel like they're losing control can borrow the confidence of the floor's more reliable dancers. Fiddler Patrick Andersson reports:

When I feel stressed out as a musician I wind up shortening every beat a little. Instead of remembering that the swing should be there – the swing has its own space, a certain radius in which it arcs – you abandon that space and the feeling you've established. . . . But maybe you can find it in somebody else, well then you're free to, 'there, those people still want this, God that's nice, then I can grab them. Maybe they can get me to relax the tempo. Aha, they still have that subdivision, that's nice, I'll just follow them for a while'.

Pulsation is an iterative mechanism. The feeling of comfort that comes with dancing to a skilled musician is a sense of security in ceding control over your near future. And as Patrick Andersson indicates, this iterative function can work both ways – dancers can provide mastery to the musician as well.

On the most basic level, tempo determines how fast dance steps come. This aspect of pulsation also has a controlling impact on the other three parameters. A slow pulsation necessitates higher viscosity, for instance, because viscosity can counteract momentum. Conversely, a fast pulsation allows for little to no [56/57] viscosity, since air resistance slows dancers down. Libration also depends on tempo restrictions. A slängpolska contains six potential directional shifts per measure – down/up down/up down/up – and can therefore only go so fast. A backward lean generally means a slower tempo, because that position allows for greater stability.<sup>13</sup> Forward leans tend to go with faster styles.

### *Viscosity*

In discussing dance viscosity, both fiddlers and vocable singers talked about generating similar feelings of resistance in their own bodies. Fiddler and nyckelharpa player Ditte Andersson here discusses imparting this knowledge to her students:

I talk about what medium we're in. Of course we're always in air. And in air you can do this [*waves right hand*]. You can wave as fast as you can, basically. Maybe you could wave faster in outer space, I don't know. Because if you don't have a feeling for how to move from point A to point B and ration that movement out, well for example I could say, 'if you're moving in water, as you struggle forward it'll go slower. But the same resistance that meets you, you're going to have to have in your own body. Action and reaction, and if you're going to move forward, you'll need a little more force'.

Vocable singer Ida Malkolmsson locates that resistance inside her own body, where she 'creates her own friction':

It's almost like you have to work a little with and against yourself, or that you have that feeling of being on your way forward but at the same time you keep yourself a little bit back. It's like, not a struggle, but I mean people talk about that kind of rubber band feeling when you're dancing, that you have energy without being tense. That's always with you when you're singing. People talk about singing with support, which is pretty abstract, but you could describe it as a kind of readiness in your body. That you're on your way somewhere, but you hold yourself back at the same time.

That self-imposed resistance manifests as constant pressure, whether of the bow on the string or of breath on the vocal cords. Accordingly, musicians will also describe dance viscosity as a function of a lack of air in the music. Pressure on the strings is heavy and constant, and notes are held to their full value, each note and phrase connected to the next. Metaphorically speaking, there is no air between notes. As a sympathetic function, there is no air between the bow and the strings, and the resulting friction encodes resistance. Soundwaves transmit this viscosity to dancers, who can then decode that information and translate it back into physical resistance in their own movements.

### *Lean*

Vocable singer Ulrika Gunnarsson spoke to me about physically leaning forward in order to push dancers forward. But most of my consultants, when it came to this dimension, were more likely

to discuss a sonic iterative effect than a physical sympathetic one. Here there was general agreement that the way to get dancers [57/58] to lean back is to place attacks after the beat, and the way to get them to lean forward is to place them early (cf. Keil 1966, 341). Nyckelharpa player Olov Johansson reports: 'If you're a little early, if you've established a pulse, and then you push the music so it's a little early and the tempo increases a little bit all the time, people will want to lean forward' (interview). Most of my other consultants were wary of acceleration because it might suggest a lack of control to dancers. To solve this problem of how to get people to lean forward without letting the music spin out of control, several mentioned speeding up over the course of either two bars or an entire phrase, and then braking in at the end of that period, reestablishing the original tempo.

Several of my consultants also linked forward lean to upwardness. This is the final link in the chain of interconnectedness between all four domains – low viscosity is connected to higher tempo is connected to forward lean is connected to upward motion. The categories remain separable, because they are not fixed to one another. A specific tempo does not dictate an exact level of viscosity. It simply suggests a range of potential viscosities. But this final link leads me to my last category, that of libration.

### *Libration*

Here is where the musicians I interviewed had the most to say about both physical and sonic cues for dancers. An almost universal position was that upbow goes with upward dance motion and down-bow with downward motion. Even non-fiddlers would make this observation, modelling their technique on the normative fiddle. Two of the vocable singers and even the one percussionist I spoke to would talk about up-bow and down-bow in their own playing. Musicians' whole bodies often mimic this up and down pattern.

In addition to the representational physical message of this bowing pattern – the sympathetic code – there is also some specifically sonic coding that operates on a metaphorical level. The down-bow allows for greater pressure on the strings, which generates a strong fundamental, and thus weight. The up-bow means a lighter touch and a brighter, more overtone-rich sound; thus, lightness. A highly skilled fiddler can reverse these two effects, and the best players pride themselves on being able to project the right kind of sound with the 'wrong' bowing.

Musicians can also exert intimate control over the transitional moment between down and up. Fiddler and vocable singer Maria Bojlund elaborates:

You can be very clear about where your note begins, when exactly the foot falls, and sometimes it needs to fall very heavily and defined. But sometimes you're catching a body too, in that step. So they put their foot down and the weight comes after, and you have to do the same thing in your playing. . . . You can start the note, but then put the weight on the note, the dynamic weight, at the same time as the body lands. . . . [Then] you release that pressure quickly, and speed up [the bow]. So you get an upward drive.

[58/59] Several of my consultants spoke of creating that exact inner dynamic within a single note to control the valley of the motional curve – attack, dynamic weight, timbral shift. For vocable singers this series of events can manifest in a single standard vocable that is often used to begin phrases: 'i:ja:m'. The foot falls on the initial attack 'i:'; the body is then caught and launched upward on 'ja:'; and the upward arc corresponds to the closing of the mouth on 'm'.

Musicians can also control the upper peak of that curve, using a sonic metaphor to suggest

something being thrown in the air and then falling back down. Jonny Soling, describing bodapolska, explains:

If you take that [beat] two, which is meant to give an illusion of weightlessness, you place the bow to the string, often at the tip, and fairly hard so you get a strong knocking sound [*\*pop\**] where the bow switches direction. Then you release the string and almost surf on top of it. And that gives the illusion of throwing a javelin. If you look at a javelin in the act of being thrown you can already see where it's going to land, there's already a logic there. And for that reason you don't add any new logic to the bow either. After you've started it you just maintain the note, and then you land on beat three.

In a more viscous style like bodapolska the bow will never actually leave the string entirely. But in a pols it is very likely to, so for that moment of weightlessness you actually get air between notes in both a literal and metaphorical sense. This also gives the fiddler an opportunity to come crashing down on the strings on beat three, as Maria Bojlund puts it, and thus to re-establish a sense of weight for that downward motion.

### THE BEAT AND THE BODY

In the slängpolska, the vertical motion can be virtually identical on all three beats – down/up down/up down/up. Here the accompanying music is often described as a series of events in time, without reference to space. While these rhythmic events do inspire motion, they also produce an even pulsation, and so can be understood in those more disembodied terms. This one-dimensional reading is supported by the regular foot-tapping of musicians, which match the dancers' footsteps in realizing the on-beats: one, two, three, one, two, three, etc.

Yet a broader view of polska variants suggests that foot-tapping is linked primarily not to musical on-beats, but rather to specific dance movements: footsteps in the promenade, and downward energy in both the promenade and turn. In slängpolska, the on-beats, footsteps, and downward energy coincide. In bodapolska and pols, in which the promenade basic involves stepping on the first and third beats only, and the turn involves an upward motion on beat two, musicians only tap their feet on one and three.<sup>14</sup> As such, if we are to presume the existence of a 'beat two' in that upward motion, we cannot draw a direct one-to-one correlation between beats and foot-tapping.

The Norwegian valdressspringar has a similar libration curve to the pols, but is distinctive in that the musicians do typically tap their feet three times per measure, coordinated with a promenade basic of three unevenly timed footsteps. [59/60] The musicians' second tap corresponds not only to the second footstep in the promenade, but also to the initiation of upward motion in the middle of the bar. Most theorists regard that tap as the beginning of the second beat, thus reinforcing the notion of an 'early two'. Ditte Andersson, on the other hand, is sceptical:

I think that people, even people who are very high up, they're being a little messy when they say 'the two comes early'. If you say 'the two comes early', I think by definition you must mean that the pulse comes early, which I think is a myth. Because the pulse comes at the same exact place where it always has. It's just that you anticipate it.

She supports her claim by arguing for a three-dimensional conceptualization of polska rhythm, using valdressspringar as an example:

If you take a pop musician, they'll usually think about beats as something onedimensional, it's like points on a surface. But you can't apply that line of thinking to a polska. Because you have another dimension: this dimension [*she draws a sine wave in the air with her right hand*]. It's like, if you're only going to observe when the waveform passes a certain surface, you're going to get a really poor understanding of it. As if you were going to write a dissertation about an orange and you never bothered to peel it and dissect it and see what it looks like, only you just described the peel. And for example, in valdresspringar, if you just listen, you can't just take an old recording where you can't relate what the old man or woman is playing to what the man or woman is doing with their foot or body, because you won't understand. In valdres you hear this [*she knocks out two measures of an early-two foot-tapping pattern on the table with her fist*]. And of course you're going to consider that an early two. That's what they say. But I realized immediately [*\*knock\* \*knock\**] that's not two. Which I had confirmed by Thore [Bolstad]. That's not the two for him. The two is when your foot is at its high point.

Andersson has met with agreement from a number of musicians with whom she has had this conversation, but the prevailing theoretical language has not changed. I have been influenced by her argument in writing this article, obviously, though I am less concerned with finding the 'actual' location of beats than I am with subordinating their significance to that of full-body motion.

It will always be possible to project abstract one-dimensional meter onto polska rhythm because of the cyclical regularity of that rhythm. My proposal is that we instead begin to see that cycle as the literal turning of dancing bodies. This change in orientation – from the beat to the body – is the theoretical equivalent of a dance instructor's admonition to move from your core instead of your feet. The beat, like the feet, can be useful as a reference point, especially for making complex charts. But polska dancers who think from their feet tend to plod instead of floating; polska musicians who think only in terms of accenting the beat make heavy, undanceable music; and polska theorists who reduce rhythm to beat and beat to attack are, I would argue, making the same beginners' mistakes.

The same three-dimensional orientation can hold for non-dance contexts as well. Polska musicians who know how to play for dancers will still privilege that motional model for listening audiences. Jonny Soling remarks: [\[60/61\]](#)

There's no big difference between playing for dance and playing a concert. Not in my mind. Because when I play a concert I'm thinking that the music needs to have the kind of logic that allows the listening ear to dance. Which is to say that the senses that experience music can live vicariously through the illusory movement that music actually is.

Significantly, I have never heard anyone put it the other way: 'when I play for dancers it's just like I'm playing a concert'. One fiddler I interviewed, Pelle Björnlert, even mentioned explicitly telling his students not to play for dancers as if they were performing for a seated audience. What emerged most clearly from my interviews overall was that players who are dedicated to a fully functional dance music, who put dance at the centre of what it is they do, are completely consistent about visualizing their music as a map in three-dimensional space.

## CONCLUSIONS

Polska dances are, admittedly, a very specific case, the details of which may not translate exactly to other traditions. A close analogy might be the Viennese waltz, within which certain beats

point downwards and others upwards, and whose beat proportions are likewise sometimes acknowledged to be uneven (Stockmann 1977, 70). But uneven Balkan dances, for instance, are a different kind of story. Here footwork is privileged and all the beats tend to be downward-oriented, and as a result exact beat locations and proportions are less a subject for debate (Singer 1974, 391). As with Western classical and African-derived forms, conceptualizing meter as a prior abstract matrix in Balkan music may not obfuscate the connections between music and dance.

On a more general level, however, the arguments I have engaged here may be broadly applicable to any kind of dance in which substituting one kind of music for another with the same exact meter and tempo would not work. Certainly some dances are so flexible that tempo and meter alone grant sufficient impulse. Western modern stage dance, in which movements are first learned to counted eights, are the obvious example, but the phenomenon extends even to some Scandinavian (non-polska) folk traditions (Nilsson 1995; 2005). Many dances, however, demand a more complex combination of musical impulses than just tempo, meter, and even attack – lindy hop, salsa, samba, and tango are all examples. For these dances and others like them, a more holistic analysis of musical factors is in order.

In this sense the present work might be useful as a jumping-off point for scholarship on music and dance traditions that otherwise have little in common with the polska. The three mechanisms via which polska musicians exert control over dancers are likely to apply generally, the iterative and metaphorical perhaps more than the sympathetic. The practice of determining which motional parameters musicians can and cannot control in a given system should also be applicable cross-culturally, even if the four specific parameters that polska musicians control are not. Most importantly of all, however, if the present work [61/62] can demonstrate only one thing, it should be that the ethnotheoretical approach itself has the potential to add a great deal of nuance to the study of music and dance relations.

## NOTES

1. ‘Vocable singers’, or *trallare* in Swedish, sing instrumental dance tunes using non-lexical syllables.
2. The musical metaphor of ‘groove’ suggests the sonic definition of a space within which a body is channeled to move in some kind of a regular pattern. Music scholars who have used the term tend to associate it with the rhythmic technique of ‘participatory discrepancy’, whereby musicians employ subtle micro-shifts in timing in order to avoid placing note onsets exactly where they might be expected (Keil 1987, 275; Zagorski-Thomas 2007, 327).
3. For instance, a melorhythmic motif that hugs the contours of the body in one section of a polska tune can reappear later on in the same tune at a different moment in the (metrical/motional) cycle, ‘against’ the body.
4. Typically in this way of conceptualizing rhythm, non-gradual pitch changes are also considered attacks, even when slurred.
5. Western staff notation can also indicate if a note is released significantly in advance of the next attack, via the inclusion of rests. When theorists reduce music to its base rhythm, however, as often as not these considerations are ignored; a quarter note plus a quarter rest are considered equivalent to a half note.
6. Even so-called ‘unpitched’ sounds are actually marked not by their lack of a fundamental pitch, but by a superabundance of competing fundamentals.
7. There were some traditional instruments from this period that were plucked, but these were used to accompany singing rather than dancing. Certain plucked instruments (as well as revived medieval instruments like bagpipes and hurdy-gurdy) have come into the tradition since the folk music revival of the 1970s, but their players will generally acknowledge that their inability to swell is a handicap when playing certain kinds of polska music.
8. Charles Keil argues that even for musical genres that have evolved from dance-oriented to listening-oriented, adequate analysis still demands a choreographic understanding of the music (1966, 339).
9. This conflation is not the same one that Christopher Hasty argues for in *Meter as Rhythm*. For Hasty, meter does not exist prior to rhythm, but manifests from it (1997, 3–21). The polska literature generally operates on the more common conception –which Hasty rejects – that meter exists prior to rhythm, and on a second assumption –



which I reject – that this prior meter can be measured precisely via rhythm, by locating exact moments of attack on a melograph (Bengtsson 1968, 32–35).

10. Johansson argues for a conceptualization of the beat as a limited time range, rather than an instantaneous moment, yet his transcriptions operate on the implicit assumption of exact beat locations (2010, 77).
11. I am not interested in locating exact beat positions here, but were one so inclined the best clue would be the musicians' emphatic foot-tapping, which does not occur on the lowest point of the libration curve, but rather somewhat prior to it.
12. My discussion here engages iterations on the level of the beat and measure only. Principles of iterability do also function on the hypermetric and formal levels in polska, so that dancers can predict and coordinate with phrase endings, for example.
13. A notable exception to this rule is the Norwegian valdresspringar, which is fairly fast and has an exaggerated backward lean in the turns, creating a whip-around effect.
14. Some variants of bodapolska have a promenade in which the leader steps on beat two. The follower, however, still steps only on one and three. [62/63]

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