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Mimicry as Movement Analysis

Rosa Abrahams

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I BEGIN with a problem: how does a researcher analyze live music and movement that cannot be recorded? This difficulty arose in the summer of 2015 as I began researching metrical interactions between voice and body movements during Jewish and Greek Orthodox liturgical chant. By conducting fieldwork with Reform and Conservative synagogues and Greek Orthodox parishes in the Chicago area, I aimed to learn about the types of movements people make during semi-metered ritual chant.[1] This investigation was intended to shed light on how such movements correspond to stimuli within the sonic environment, and how these embodied experiences relate to and are constitutive of prayer experiences. Ethnography involving the study of body movement typically involves videotaping participants, since recordings afford researchers the ability to slow down, pause, rewind, and re-watch the same movements hundreds of times. With such recordings, I would have ample viewings to figure out how to describe the movements and how to discuss interactions of sound and movement in prose. However, video recording is often banned in worship settings, creating a significant obstacle to research. This is especially true in Jewish communities, due to the prohibition of "work" on the Sabbath. While the Greek Orthodox sites do allow video recording, the approved recording location is in the back of the church, far from the action and with limited angles. In neither setting is the footage sufficient to describe the *experience* of moving ritually. The investigation of such an experience necessitates experiential, embodied research, and affords the acquisition of different (mainly embodied) knowledge than can be understood through video observation and analysis.

The solution for the vocal aspects of my research was clear: ask clergy participants for chant recordings outside of worship settings and then transcribe the recordings as in any other analysis project dealing with live performance. Given the oral nature of musical transmission and subsequently the ritual chant's standing as a distributed ontology (Born 2005), these transcriptions represent an approximation of what might be realized in practice as opposed to a fixed score of a determinable "work."[2] While the sonic aspect of worship is variable from individual to individual, within and between communities, it is not as varied within a given individual from day to day. This is because a sense of "this is how the prayer

1. I define semi-metered music as music that allows for varying levels of attention and entrainment to meter on the part of the listener and/or performer. While a discussion of semi-meteredness is beyond the scope of the present article, I suggest that semi-meteredness exists on a continuum, with strict-meteredness on one end and un-meteredness on the other. An experience of music as more or less metered will depend on the listener and is not only a property of "the music itself." As such, I posit that the musics discussed within the present article are all experienced as more or less metered by those engaging with them, and thus understood best as semi-metered.
2. By understanding ritual chant as ontologically distributed, I suggest that the music is chronologically, geographically, and agentially contingent; it is dynamic and varies by individual, community, tradition, and oral lineage. Therefore, instead of a fixed musical work, a given chant may have many variations, all of which are ontological components in the distribution of that chant.

goes" is developed through oral learning and regular enactment, providing a semi-stable "version" of the prayer that can be reliably re-enacted. In contrast, movement seems to vary greatly for individuals in different instances, creating an asymmetry in the oral learning aspects of embodied prayer: the music is more stable than the movement, even though both are oral traditions in nature (and thus malleable).

To address the movement conundrum, I developed a method of movement analysis using body mimicry. In short, I learned to move as my participants move. This method is but one way to analyze movement in real time, without the aid of video recording, and it requires the researcher to describe the movements that are happening without the luxury of re-watching or slowing down the sonic and visual components.[3] By doing so, the researcher gains a quasi-first-person (Cox 2012, 4) understanding of ritual movement, and develops a physically empathic reading of movement-music interaction during worship. Overall, the method necessitates a melding of music analyst and ethnographer positionalities; analytical observation is undertaken not only from some Archimedean point, but also from a vicarious and embodied experience alongside the object of study: the participant.[4]

In this article, I lay out my methodological framework in full and provide brief analytical examples to showcase the possible ends to using such embodied research as a means. First, I describe the ritual settings and types of movement, and then provide methodological grounding via theories of embodied cognition (Section I). In Section II, I lay out the fieldwork methodology in detail, describing my interview and observation procedure. I categorize movement styles and components, building the foundation for mimicry as an ethnographic and analytical tool. I describe my process for transcription and analysis in Section III, addressing issues of movement representation "on paper" and incorporating Christopher Hasty's (1997) method of projective analysis to describe movement durations.[5] Such analysis helps to distinguish between anticipated movement emphases (on the part of myself, the ethnographer/analyst) and the actual movement patterns completed by worshippers, hinting at a larger principle of asynchrony within embodied prayer experience. This section closes with two short analytical examples from the Jewish community. As my method was developed

3. While it is possible that I could have asked clergy to move with their chanting and videotaped these movements outside of the worship setting, such recordings would not make up for observations during actual worship services, since out-of-context movements are not necessarily representative of worship experience, in contrast to the semi-fixed chant I discussed above. This distinction was made apparent when video recording a cantor friend chanting prayers for me outside of a worship context. While her vocal presentation was similar to that of worship contexts, her typically active movements during the liturgy were completely absent; she "performed" the prayers in a manner akin to an art song recital, rather than praying them as she would during a service. Thus, it was more important that I observe her when she was praying than that I get video recordings of her movements (or lack thereof) outside of prayer.

4. Interest in positionalities amongst music theorists often considers physical positioning with an instrument and/or other ensemble members (e.g., the special session "Positional Listening/Positional Analysis" at the 2016 annual meeting of the Society for Music Theory). However, I use the term here to consider subject positions of music analyst, ethnographer, and in some cases even worshipper, as fruitful viewpoints for study and data collection.

5. Hasty's method involves analysis of event durations, based on the idea that a listener develops an expectation of the length of a sonic event (a "projection") based on previous/current sonic events.

primarily through the lens of the Jewish community, in Section IV, I explore its relative applicability to Greek Orthodox worship and liturgy. I describe the requisite changes I made to the methodology and observation procedure, and close with a brief analytical example from the Greek Orthodox community. Section V concludes with remarks on my own positionality as a researcher and a brief discussion as to the effectiveness of the method in the Jewish and Greek Orthodox communities, respectively.

I. Movement, Ritual, and Research

Existing ritual theory literature focuses on ecstatic ceremonies (Goodman 1986, 1988; Fachner and Ritter 2004; Csordas 1997). These texts, and others (e.g., Bell 1992; Coppett 2002), indicate that ritual is first of all a physical, spatial endeavor, wherein individual bodies help to create group cohesion. Yet this group experience does not necessarily require ecstasy or trance. My work diverges from much of this literature in that I focus on the body–voice interactions in congregational ritual settings that belong more in the realm of everyday experience, rather than those that invite moments of trance and extreme bodily experiences during prayer. It seems that ritual experience hinges on the re-experiencing of specific ritual emotions, and it is through prescribed and habitual bodily actions and synchronizations that emotions are recalled and re-felt (Schüler 2012). Further, collective experience seems to reflect individual experience, the latter being strengthened through group cohesion. Several ritual theorists foreground group cohesion, and music's role therein, as important for religious experience (see also Dissanayake 2009; Friedmann 2012). In the ritual communities that I studied, however, synchronization is not as prominent, and so it is more difficult to draw a close connection between group cohesion and musical and bodily synchronization.

Such ritual scholarship is entwined with embodied cognition, a more recent area of research positing that humans understand ideas, experiences, and the world more generally through their bodies.[6] A significant finding throughout this research is that humans are inclined to imitate and empathize with movement in the world. Marc Leman (2008, 110) terms such activities "corporeal imitation": we use multi-sensory information processing and kinesthesia (sensing of movement) to mirror external events and the movements of others. Rolf Inge Godøy (2010, 108) notes that one of the most important elements in understanding humans through embodied cognition is "our inclination to spontaneously (and largely involuntarily) mentally imitate the movements that we see other people making, as well as the movements that we assume other people are making in cases where we cannot actually see their movements."

This description is, in turn, quite similar to Arnie Cox's discussion of mimicry and movement in music perception. He notes, "part of how we comprehend music is by way of a kind of physical empathy that involves imagining making the sounds we are listening to" (2011, 3). Cox's hypothesis spans several ways of interacting with music, and although he is working

6. See Leman (2008) for an in-depth discussion of embodied music cognition.

within the realm of presentational music making, the mimicry component of his theory encourages its transfer to other musical domains, such as ritual music.

Given this background, studying movement through mimicry affords a different way of understanding fieldwork observations. This method builds on the human ability to mimic and empathically interact with other humans, and in turn to talk about these mimetic and empathic experiences after the fact. By interacting with the environment in the same manner as the participant, the researcher begins to understand the embodied experience of the participant; they make explicit that implicit process of experiencing worship within the site of one's own body.[7] While I make no assumption that everyone experiences the same movement in the same way, I also make no claim to the affective or spiritual aspects of the movements I analyze. I allow participants to describe their own experiences moving in whatever affective terms they may desire to use, and I then use mimicry as a way of physically empathizing and simulating the interaction between movement and music. Mimicry is just that—a simulation—and mine could not be an exact replica of my participants' movements, since I have a different body from my participants. However, as I discuss below, I focus on issues of entrainment: the "when" and "how" of participant movements, rather than the feelings or emotions that correlate with the creation and completion of these movements.

II. The Method, Part One: Ethnography and Mimicry

The mimicry method of movement analysis consists of an interview, observations during worship, and transcriptions of both components for examination.[8] By taking an emic approach—learning to move like my participants move—I learn not only when, but also how those movements are created. This includes discovering what muscles and postures are required and how the movement rhythms feel within the sonic environment, my own singing voice, and the rhythms of the other moving bodies. Combining this ethnographic and embodied research with metric analysis provides a deeper understanding of movement in worship contexts and of the interactions between sonic and kinesthetic parameters. Further, it allows me to address the experience of ritual movement instead of only observing ritual movement.

7. This model echoes simulation theories of analysis (Godøy and Leman 2010; Cox 2011, 2016) and situates my own bodily experience as a site of research via the development of embodied knowledge. By using mimicry as movement analysis, I follow performance studies scholar Ben Spatz's (2015) lead in engaging with embodied knowledge, striving to understand the experiences of my participants in a physically empathic manner rather than simply observing them from afar. As such, my mimetic activities produce knowledge, and yet are also themselves products of knowledge acquired through my observations of participant movements. In this manner, simulation theories and embodied research act as a replacement for the prohibited or limited video-recording technologies in worship settings, as well as providing an exploration into performance-as-research (or in this case, mimicry-as-research).

8. Interviews were transcribed and analyzed for keywords and themes. Observations of movement were experienced and transcribed in real time using a shorthand method described below. Additional field notes were created after observations as a memory aid.

Interviews

I interviewed a total of fifteen Jewish participants (a mix of clergy and congregants) from a Reform and a Conservative synagogue, and two Greek Orthodox priests from different parishes. Interviews were conducted at the place of worship, the home of the participant, or my university office. They ranged from fifty minutes to two hours long, and were both audio recorded and video recorded.[9] Working from a flexible interview framework I asked participants about their experiences moving during worship, encouraging them to answer however they saw fit. This allowed for a range of responses, bringing out issues extending well beyond the core themes of body movement and prayer.

Examples of my interview questions are shown in Figure 1. While these questions were answered with varying degrees of specificity, the responses typically gave me an idea of how I

I. ***Tell me about how you pray***
- In congregational prayer, when everyone is speaking or singing together, what are your actions and experiences like?
- In silent prayer, what are your actions and experiences like?
- What do you do with your body when you pray while sitting/kneeling/standing?
- Can you remember any times when you've done something quite different from your normal choices?
  - If so, what made you make a change?
  - If so, what kind of change was it (vocal, physical, or both)? How long did the change last? Why didn't you stay with it longer?

II. ***Tell me about your religious/ritual background***
- Do you remember learning how to pray? If so, please describe.
- Do you remember learning about what to do with your body in prayer or during services? If so, please describe.

III. ***Other Questions***
- Where in the congregational seating do you like to sit when you attend a service? Back rows/front rows/middle/side?
- If you pray with your eyes open, where is your focus? Who/what do you tend to look at?
- In your opinion, what is the point of moving or staying still when you pray? What does it help you do/achieve?
- How difficult have you found it to describe how you move and pray?

Figure 1. Sample interview questions.

9. Although this was an optional parameter for the interview, almost every participant agreed to be video recorded. Both the video and the audio recordings of the interviews have remained confidential throughout the analysis process.

might expect to see the participant moving when I observed them in worship. In this way, the interviews were pre-analytical, preparing me for specific types of physical engagements with chant and the worship space. However, participants' descriptions of their movement practices in the interviews did not always match their worshipping behaviors, and thus the reliability of this "preparation" varied widely. For many participants, being asked to explicate their worship movements in words was quite difficult, indicating the embodied nature of their knowledge and/or technique.

I also gained a contextual understanding of each participant's experience in worship settings. Many participants became quite emotional and seemed somewhat surprised by their connection to the subject matter at hand. For instance, one participant, "Judy," seemed to be reliving the physical and emotional experience of being in Jewish worship during our interview.[10] When asked about her actions and experiences during congregational prayer she teared up, momentarily inhabiting the emotional state she was describing. She said:

> [*while crying*] Sometimes they [her experiences] become like this, and I do bring Kleenex with me because I've learned I need it, because something is triggered by the music or the words. There are times when the congregation is chanting a familiar traditional piece and I will hear them in the background and focus on the English translation and the poetry that is to the left side of the page because I feel that that enhances my attachment to the experience more so. There are times where the melodies are so beautiful that I just sing them, they go all the way back to my childhood and therefore they conjure up memories, or at least memories of a way of feeling good in a sense—not having troubles—and when I'm singing, I just can, often times can just block out everything other than the experience of what worship is. And for me it's, it's a joy, it's a calmness, when I get sentimental it's an attachment to those that I miss or those that caused me to miss out on things and, prior to choir I would sing even louder because it just, I just felt it's coming from me, and that's ok. But now that I'm part of choir I don't sing as loudly as I used to. (Judy, interview, November 2015)

What did this look like in practice? For the most part Judy didn't move very much—but that doesn't mean that she wasn't thinking about moving, experiencing small movements as larger than they appeared, or imbuing the choreography of the rituals with her own deep emotions.

Judy went on to describe the effects of physical limitations on her prayer experiences, not only because of a physical handicap, but also due to the inhibitions she felt within the worship community itself. Her explanation suggested that I would observe her continually checking herself throughout the service, regulating her movements and vocal production and simultaneously giving in to any strong feelings she was experiencing. She noted:

10. All names throughout the study have been changed to maintain confidentiality. This includes the names of the congregations as well as the names of the participants.

> The other thing that I think I notice is, I, before I was having knee problems, when we would sing the *L'cha Dodi* at the end and we'd all be up singing, standing and singing, there were times when I was almost dancing around to get back to my position, but I'm tamer now because of a handicap. And I don't really think that—I think I do restrict my motions when I'm praying because I feel that I'm in an environment where it's, not really approved. You can do things that are minor such as tap your feet and make your knee go up and down, maybe if no one can see make your hand move a little bit [*demonstrates*], a little bit of swaying, but I find that I control myself for that because I don't see others participating in that way. (Judy, interview, November 2015)

Thus, through her interview, I was able to learn about what experiences were underlying the fairly conservative, stoic movement patterns I observed in worship. In this way, Judy is a good example of a participant whose complex and subtle movement tendencies were illuminated by the integration of ethnography with analysis.

Observations

Following the interview, I began observing each participant live in real time for at least one entire worship service, though often I spent three or four services observing a single participant. My methodology developed in different ways due to the differences in both fieldwork permissions and movement styles in the Greek Orthodox and Jewish communities. However, both settings involve two main categories of movement: ritual movements, encompassing ritual choreography and ritually-inflected movements, and socially-inflected movements (see Figure 2).

Ritual choreography comprises all planned movements that are requisite ritual components. This may include bows at text prompts (such as "we bow before you [God]"), prostrations in the church, and rising on one's tiptoes in the synagogue. These movements have specific timings and liturgical meanings. In contrast, ritually-inflected movements are

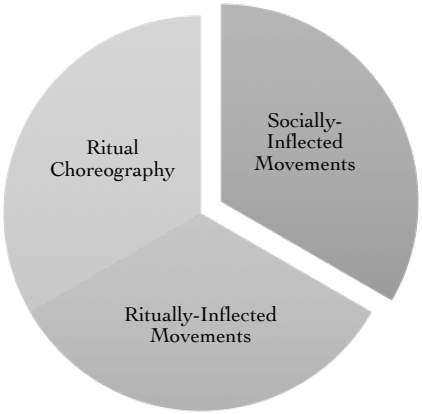


Figure 2. Types of movement in worship settings.

improvised and free; they are connected to prayer but are not prescribed or linked consistently to particular texts or moments in the service. These movements may be bows, sways, bends, or even making the sign of the cross. (Some of these types of movement can also be used in more standardized ritual choreography.) Further, ritually-inflected choices may include an absence of movement; a congregant may choose to be still or to sit instead of standing, and this affects the experience of prayer.

Separate from ritual movement (free or choreographed) is socially-inflected movement. In the category of socially-inflected movements, I include movements that respond to a given social situation and those that are due to individual inclinations, abilities, and limitations. Thus, such movements might include finding a seat by friends or away from people whose voices one doesn't like; looking at others, at the prayer book, and at the clergy; awareness of what one is wearing, how one's body—the sore back, the bad hip, the fibromyalgia pain—is on a given day; and awareness of how visible one's movements are, how loud one's voice is, how pious or how strange one may appear.[11] I do not analyze these socially-inflected movements, but it is important to note that there was a fluidity between socially-inflected and ritually-inflected movements. For instance, a clergy member might be in the midst of improvised ritually-inflected movements when a new congregant enters the sanctuary, causing the clergy to look up and smile acknowledgement.[12] Further, even simply the need to sneeze or cough disrupts either type of ritual movement.

What about changes to movement occurring with a participant's knowledge that they are being observed? While this would certainly affect participant movement patterns, I strived to counteract this confound by arriving slightly after the start of the service and by sitting out of their sight-line (although close enough to see their movements well). Further, I conducted pre-interview observations as well as post-interview observations as a reference for changes in movement resulting from our interview discussion or their knowledge of my observing their worship. My hope in taking such measures was that although participants had consented to being observed, they might forget I was there or ignore me if I were sitting out of sight, or if they didn't see me arrive at the service.

In my initial observation, I gained a sense of the types of movements made, particularly ritually-inflected movements, and the way these were realized in the service, including any observable interactions with the sonic environments and/or the other moving bodies in the room. I did this by sitting as closely as possible, either behind, or to the side of the informant, and by watching how and when they moved throughout the service. For example, one elderly participant from a Reform Jewish community, "Vera," worked with me following a recent

11. Many female participants discussed how different outfits afford different levels of freedom in movement. Heels versus flats, or a skirt versus pants, can make all the difference in how they choose to move.
12. While possible, it is unlikely that a clergy member would interrupt ritual choreography in favor of a socially-inflected movement, unless physically necessary. This is because of the prescribed nature of this choreography and the liturgical significance of such ritual movement, in contrast with the improvised ritually-inflected movements.

shoulder surgery. As such, her upper body was stiffer and stiller than she implied it would be in her interview, which was based on her normal moving habits, not those following the medical procedure. However, as I sat to the side of her, I was able to observe how her feet became quite active throughout the service. Not only would Vera tap along with the metered synagogue song, but her foot would intermittently articulate prosody within the freely-metered chant. As her shoulder healed, I saw a shift from busy, articulate movement in her right foot, to more free and relaxed movements in her shoulders and upper body. This example is an intriguing one because it seems that Vera's foot was in some sense compensating for the lack of mobility in her upper body, an observation I was only able to make at close range and through repeated mimicry of her movements over a stretch of time. Normally quite physically engaged in worship, she continued to participate despite her body's limitations, and as her body healed her movements reflected the shift in her own bodily experience.[13]

Mimicry and Movement Analysis: In the Synagogue

After I got a visual understanding of the participant's bodily habits in the Jewish communities, I tried to gain a kinesthetic sense. I began learning to move as my participants move, deliberately imitating my participants in order to try to empathize with their bodily experience.[14] Combining my physical experiences with expectations drawn from the interview, I created a movement profile for each participant, in order to break down the movements I was seeing into component parts. For example, in the Jewish communities, many of the movements seem to fall into general categories such as "sway," "bow," "rock," or "bend." The movement profile identifies three main aspects of motion and effort, the *locus*, the *ictus*, and the *trajectory*. These terms identify discrete spatial categories that allow me to better differentiate between movement styles. Further, these terms are descriptive, as opposed to some prescriptive, all-encompassing notation styles such as Laban's effort–shape movement analysis terminology.[15]

13. A while after completing my observations of Vera, I followed up, asking her if she was aware of her foot movements following the surgery. Vera told me that while she hadn't noticed herself making such movements during prayer, she could understand how she might have done so, as she had experienced compensating for her shoulder following the surgery in other aspects of her day-to-day life. This instance demonstrates the distinctions to be made between what movements participants thought they would or did make during worship and my own "real-time" observations.

14. This mimicry follows simulation theories discussed above (e.g., Godøy and Leman 2010; Cox 2011), and although the method is neither empirical nor quantitative, it provides an ecologically valid way of recording participant movements with a fair degree of specificity. An alternative, and perhaps future, direction for this type of research would be to use motion capture technology similar to that which is being used in research on performance gestures (e.g., Leman and Naveda 2010; Toiviainen, Luck, and Thompson 2010; Burger et al. 2013; Luck et al. 2014; Martens 2016). A downside to this latter type of research is the possible inhibition the technology places on the "natural" and "free" movements that participants may make. With this in mind, I consider my mimetic movement analysis to be as close as one might get to what is actually occurring in the body of the individual participant, without disrupting their worship experience and invading their space.

15. While Rudolph Laban's (1928) effort–drives are helpful in thinking about the quality of the movement, the binaries that are inherent in his system (e.g., quick/slow, sustained/un-sustained, and heavy/light) are restrictive. Moreover, his movement notation system is quite complex, and ultimately has the possibility of coming across as

The *locus* is the term I assign for the point from which a movement originates (that may or may not be the part of the body articulating the movement). Examples of this can be seen in Figure 3. These loci are based on descriptive observation; they are not natural resting points but rather active centers of energy that provide internal physical starting points for movement. Each of the loci shown in the figure was observed as a primary energy center in one or more participants.[16]

The *ictus* is where a participant's movement reaches its outermost point before reversing or ceasing, and may be more effortful—an upward ictus requiring a shift from down to up—or less effortful—a downward ictus, requiring a shift from up to down (of course, up/down could be replaced by forward/backward, or even side/side where one parameter is strong and requires more physical work than the other). The ictus and locus determine the arc of the movement, or the movement *trajectory* (Figure 4). The trajectory may also span between two opposing ictus points (side-to-side movements, or even a front and back ictus). However, considering these points on a generalized, or flat, continuum, one end of the continuum often appears weaker than the other. In other words, I observed individuals' movements as typically focused either through inertia toward an end point (an ictus) or on a well of generative energy (a locus), but rarely, if ever, with both of these locations simultaneously and/or at equal levels

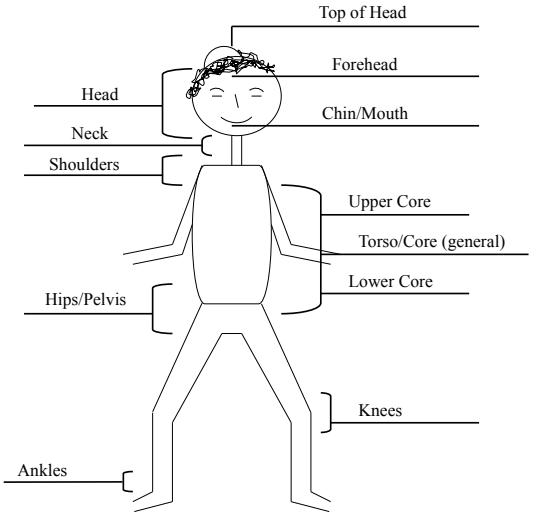


Figure 3. Locus points observed in participants in Jewish communities.

prescriptive (like other choreographic notation) rather than purely descriptive, as my own notation aims to be.

16. It is worth noting that some of these loci are more autonomous (e.g., the head) than others (e.g., the hips/pelvis). In other words, movement stemming from one's forehead is qualitatively different from movement stemming from one's hips or pelvis, in that a forehead locus may or may not indicate full body movement (see *trajectory* discussion below), while a hips/pelvis locus is likely to include overall torso movement, unless one is studying Elvis.

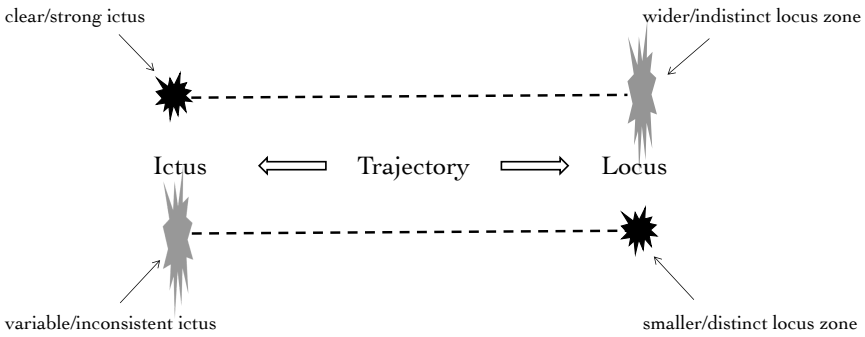


Figure 4. Movement continuum. Shown are possibilities for any isolated locus-to-ictus traversal. Note that the darker starburst represents a stronger component of the movement.

of intensity.[17] As such, the trajectory allows not only for oscillation between the ictus emphasis and locus energy-center, but also for oscillation and nuance in the clarity of these points as related to one another. The trajectory is always a two-directional path, which either disperses focused movement energy from the locus or focuses dispersed movement energy toward the ictus. Of course, the trajectory varies within each individual's movement habits as well as across individuals.

While two worshippers may both be ostensibly "swaying," one may be bent over slightly, swaying forward and back and using their feet to propel them, while the other may sway side to side, propelled from their body's core with head held high. Although at first glance these movements are of the same type, further observation shows that they differ not only by degree, but by kind as well. The first "sway" perhaps is more of a "rock," except that since the worshipper's head is bent it may be better described as a bow. The language for such broad categories needs to be made more specific in order to better distinguish between these two, similar yet different, movements. By identifying the icti, loci, and resultant trajectories, I am afforded such distinctions.

I identified five common movement profiles seen in the Reform and Conservative Jewish communities where I conducted research. These are diagrammed in Figure 5. The starbursts represent icti and the lines movement trajectories. While these stem from loci, I do not represent loci, nor other embodied physical nuances in my analyses, for ease of reading within the diagram. In the profiles in Figure 5, and my analyses (where applicable), the bent

17. For example, in a bowing gesture, a weaker ictus appears more variable, in that the goal of the motion is not a consistent point in space when repeated—it may appear near the belly on the first bow, near the shoulder on the next, and so on—and a stronger ictus is highly consistent as the same point is returned to regularly. In the case of two strong icti—perhaps a mid-torso point and a point just behind the shoulders—a weaker point will appear in the middle of the ictus-to-ictus trajectory that may be tied to the locus. A weaker locus propels less focused movement from a wider locus zone, the origin of the bowing energy appears harder to pinpoint. In contrast, a stronger locus is a more narrow zone, with clearer boundaries and more focused motion toward the ictus.

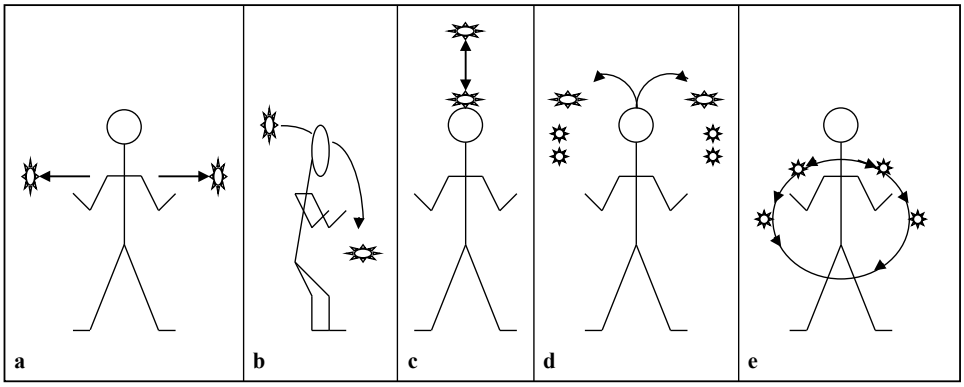


Figure 5. Examples of movement profiles. Icti are shown as starbursts, lines and arrows denote movement between stars. See also the video demonstration.

shaping of the arms is to denote how worshippers hold a prayer book during such movement. Of course, these are only a few of the many possible movement profiles.

All arrows show an outward direction of the locus–ictus trajectory, but should be assumed to incorporate the opposing direction for the "resetting" of the movement (ictus–locus). The different sizes of starbursts shown in Figure 5d indicate stronger, more consistent icti (larger starbursts), and weaker, less frequently articulated icti (smaller starbursts). While loci are not pictured, due to the high variability of loci placement in my participants, the trajectories (arrows) and icti (starbursts) shown in the figure were all fairly common throughout my observations. While 5b, 5c, and 5d all seem to imply a locus in the head, this is not necessarily the case. Recall that the movement trajectory may be completed with a body part(s) that is not the location of the locus but rather is driven by the locus. For instance, a movement profile like 5b could have a locus in the head or neck while the movement trajectory is completed by the head and neck, *or* the locus could be in the belly, with the movement trajectory completed by the entire upper torso, head, and neck. Similarly, 5c could involve a locus in the tiptoes or one in the upper chest, implying quite different movements trajectories but similar icti. The circular motion in 5e implies a turning movement coupled with a slight bow, which meets icti at varying degrees of closeness and distance.

Identifying the movement profile is the first step. The notation I use in Figure 5 is mnemonic and allows me to categorize participants for ease of transcription; this system provides me with a way to recall the general form and mode of a movement detected via mimicry. In trying to emulate another's movements I must shift my own locus, my energy center, to theirs (which makes identifying the locus a core step in the movement analysis process). Using their energy center to move I can inhabit their physical experience, if only in a "quasi-first-person" way (Cox 2012, 4).

Once I have a sense of how the worshipper I'm observing moves, I can begin to understand the metricity of their movement. Advancing my focus from *how* my participant is

moving to *when* they are moving during my worship observations, I look and listen to see if my participant is singing, speaking, or staying silent within the liturgy, and I do as they are (as permitted within the construct of the worship service). Then I begin to move with them, in time, trying to identify any metrical patterns that may be driving their movements and marking areas of physical emphasis—icti—on photocopies of the prayers. This is done either with a pencil or with stickers (the latter to accommodate the prohibition of writing on Shabbat), as shown in Figure 6. The image on the left shows icti occurring in some of the same places on different observations, indicating some stability in individual movement patterns. In contrast, the image on the right shows icti occurring in almost all discrete locations in a single prayer (across different observations). Both flexibility and stability of movement habits appeared throughout my participant pool and suggest a distinct status of free, improvised ritual movement within Jewish prayer. These "field notes" are then combined with transcriptions of the melody, gained either from clergy performances during interviews or via audio recording of the service at sites where permissible.

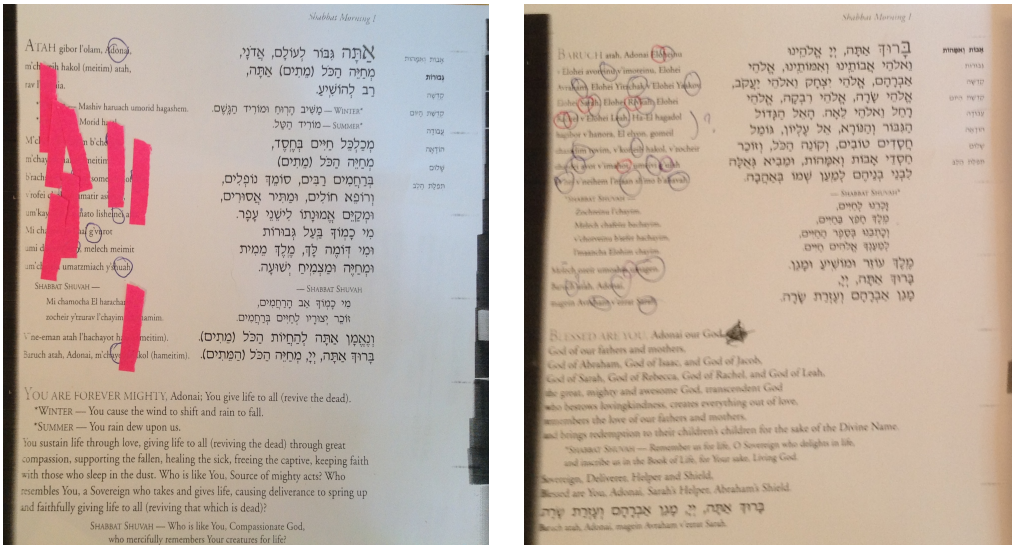


Figure 6. Example of field notes from Jewish community. The left image shows the first step of data collection, wherein sticky-note strips are placed over text at icti in real-time observations. The right image shows the second step of the data collection, following observations, wherein the sticky notes have been removed and replaced by circles around the syllables corresponding to the icti. The different colors of circles indicate different observations conducted for the same prayer/worshipper.

III. The Method, Part Two: Transcription, Notation, and Analysis

After learning to move as my participants do, I return to my position as a music theorist, transcribing these movements for transmission and dissemination via traditional academic channels such as print and online texts and conference presentations. Methods for notating specific types of movements have been developed in music theoretical research on gesture

(Godøy and Leman 2010), quantitative gestural analysis in dance using motion capture technologies (Leman and Naveda 2010; Toivianien, Luck, and Thompson 2010; Burger et al. 2013; Luck et al. 2014; Martens 2016), and even auto-ethnography of performer gestures (e.g., Le Guin 2005). Other methods of physical notation come from dance and performance studies literature (e.g., Guest 1998), including prescriptive dance notation methods such as Laban's, and from more descriptive analysis of dance and music stemming from music theory (e.g., Roeder and Tenzer 2012; Leaman 2017).[18]

While the above authors all suggest useful ways of showing movement on paper, the context of these analyses is quite different from worship settings. Generally, this research focuses on situations and performers that are presentational—musical or dance performances wherein the performers are meant to be looked at and listened to. Often concerned with musical coordination, these notation systems might show choreography of a specific dance, either prescriptively or descriptively, and thus sidestep the variability of the free ritual movements I examine. While such aesthetic–presentational contexts do have ritualistic or semi-ritualistic aspects, the nature of these environments is distinct from those in liturgical–participatory contexts.[19] Even in improvisational social dance settings, where participants may be more focused on interactions with a partner than with presentation (or the consciousness of being "watched"), the dance is still negotiated as moving *to* or *with* the music. Based on my interviews with worshippers, moving *to* the music is not a relevant frame with which to understand movement practices during Jewish and Greek Orthodox ritual.

Therefore, the goals of my notational system are to communicate the metrical interactions between body and voice, demonstrating the complex and varied aspects of alignment within and between individuals that I observed in fieldwork. My analyses match specific instances of movement with the chant melody. Given the wealth of individual variability, the most meaningful of these movement patterns are those that I observed as (mis)aligning in exactly or almost exactly the same way for a given individual upon multiple occasions. Note that it is the movements of specific individuals that are represented in these transcriptions, which is not always the case for both choreomusical analysis and choreographic notation. I am not representing what "someone" *might* do, but rather what a specific person *does* do in a given social and liturgical context. Thus, I aim for a method that is

18. Scholarly interest around choreomusical analysis has increased greatly in recent years, stemming from outside of music theory (e.g., Ann Hutchinson Guest's 1998 book on choreography), as well as within music theory (e.g., Kara Yoo Leaman's literature review and application of choreomusical analysis in her 2017 dissertation). Yet, aside from Rebecca Simpson-Litke and Chris Stover's 2019 article on salsa in *Music Theory Spectrum*, few publications have emerged from the field of music theory. The field's interest in movement and dance analysis is evident, however, in numerous paper presentations and special sessions, such as can be found increasingly at the annual meetings for the Society for Music Theory (including a keynote address on ballet from Gretchen Horlacher in 2017). These occur both in the context of the main conference as well as in the Dance and Music Interest Group (founded in 2015). Such paper presentations can also be readily found at the Analytical Approaches to World Music conferences.

19. While not discussed in the present article, there are other types of participatory contexts that are both non-presentational and non-liturgical, such as sing-alongs. Such settings constitute another context for movement–music analysis.

on the one hand flexible and able to adjust to differing participant situations, and on the other hand has some continuity of style and detail across all analyses.

I represent music and movement together by aligning pictures with musical transcription.[20] This choice aligns most closely with my embodied ethnographer viewpoint, instead of other possible vantage points, such as the bird's eye view. To understand the metrical interactions between the movement and music "on paper," I draw from Christopher Hasty's (1997) theory of meter as projection, building projective analyses into each of my analytical examples. Hasty's theory is based on the listener's evolving experience of event durations.

Figure 7 reproduces Hasty's introductory presentation of the process. Hasty asserts that a listener will, after hearing a sound event from its onset to the onset of the following event (shown by a solid line with arrow), project that this subsequent event will be of a similar duration (shown by a dotted line). This projection is then either supported or denied, based on what actually occurs in the following sound event. In adapting Hasty's theory to my own work, I substitute the sonic event-level unit of projective genesis for physical emphases, or icti. Thus, my metrical analysis is *not* concerned with the chant alone, but rather with the interactions of the body with the chant melody. In other words, I analyze the durations of physical movements and compare whether/how they align with the semi-meteredness of the vocal chant.

One of the principal benefits of this theory and its application to movement is that it sidesteps the moving/not moving binary in favor of examination of the *process* of movement as realized in musical worship experience. Further, it gives analytical power to body cues that create structure within ambiguous chant. These organizational body cues could be as large as the ritual choreography of turning, bowing, kneeling, or crossing oneself, or as small as a clergy member shifting focus from the text to the congregants' faces, inviting them to respond.

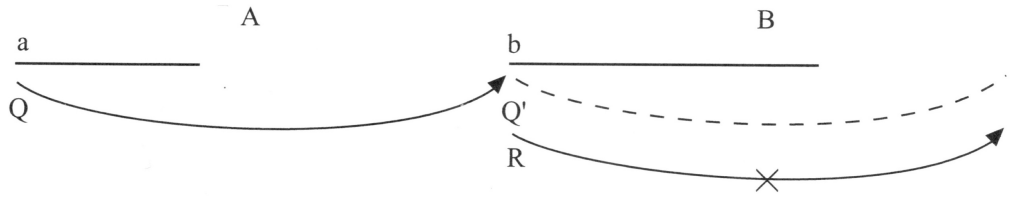


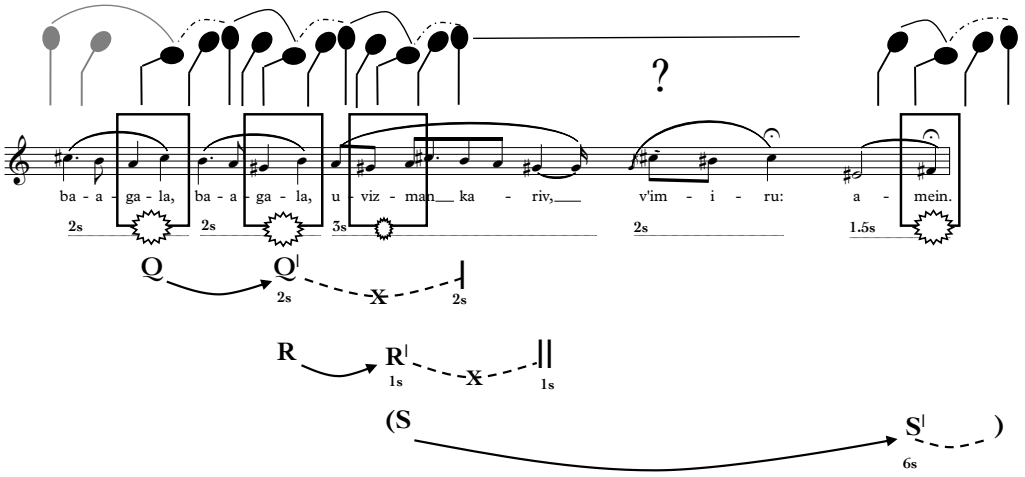
Figure 7. Example of projection, reproduced from Hasty's (1997, 84) Example 7.2. As shown, potential Q|, while projected (via the dotted line), is not actualized, as there is no third event (C).

20. A similar technique can be seen in John Roeder and Michael Tenzer's 2012 article on Balinese gamelan and dance.

Analytical Example: Jewish Setting

Example 1 shows the results of the transcription process with annotation, combining recording and movement representation from my observations of "Shira," a cantorial soloist and music director in a Reform Ashkenazi Jewish Congregation.[21] The moment shown below is from the *Chatzi Kaddish*, a prayer typically chanted by the leader during daily, Shabbat, and festival worship. Shira uses movement profile B, diagrammed in Figure 5 (above) and shown here in profile. The projective analysis also relates to the physical movements, but as a way of projecting an expectation for a movement from the point of view of the observer/analyst.[22] The accompanying video clarifies points of physical and musical alignment, as well as nonalignment at the cadential, "v'imru," where one may expect a physical bowing motion that does not arrive.

Movement meter (a term here used to indicate the alignment potential between body and sound, rather than strict metric patterning) is shown in and above the staff. At the top of the diagram is a stick-figure series, showing Shira's movement profile in action, similar to a flip-book. The solid and dashed lines above the stick figures show the downward- and upward-directed trajectories of the physical movements, respectively. Since I focused my data collection on the strongest ictus (in this instance the downward, or forward ictus), the dotted line is used to give a sense of a likely trajectory/span of time to the upward, or backward ictus, without a measured data set. Within the staff, boxes and starbursts indicate moments when



Example 1. Jewish worship analysis excerpt. *Chazti Kaddish* excerpt from Shira, movement profile B. Accidentals carry through. See also the video animation.

21. As discussed above, all the examples chosen for analysis were drawn from instances where participants demonstrated movements in almost exactly the same way on multiple occasions, indicating that they had developed personal movement habits for specific liturgical moments.

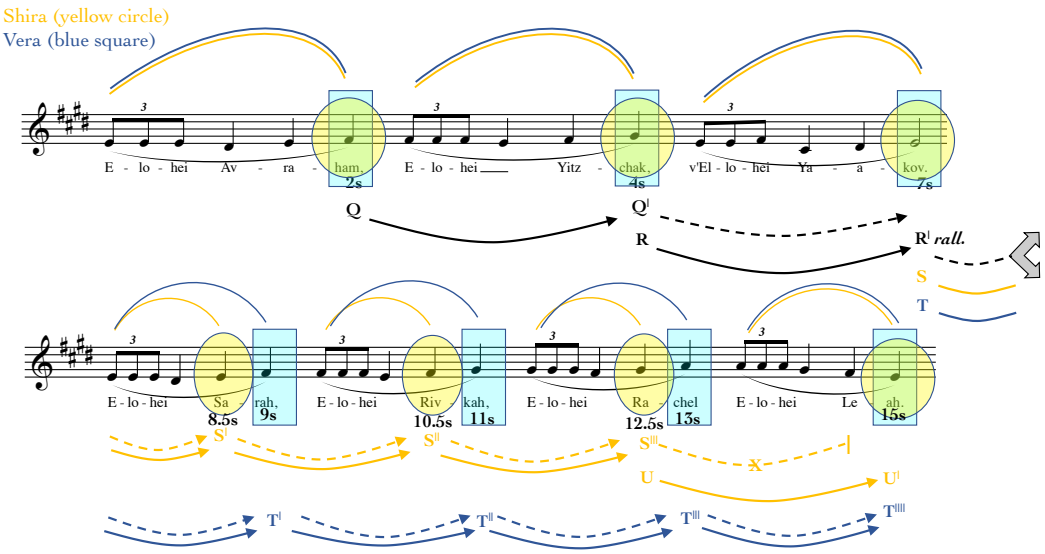
22. These projections may or may not be conscious for the worshipper, but they reflect my conscious experience as I watched and imitated the movements. In his theory, Hasty's projections similarly stem from a listener's perspective.

Shira reaches the icti that correspond with the deepest part of her bow. Here, the size of the starbursts and arcs correspond to the relative size of the movement, illustrating, for instance, that the bow on "uvizman" is smaller than the preceding motions. This *movement meter* is reiterated in the projective analysis below the staff. Based on Hasty's theory, as described above, this analysis shows a projected two-second duration, Q-Q|, that is denied with a one-second duration, R-R|. The R-R| pattern is also discontinued, and suggesting the experience of a third, much longer six-second duration, S-S|.

Despite its brevity, a lot of information can be gleaned from this example. For instance, Shira thwarts a regular two-second movement meter by not bending at the end of "kariv," nor at the beginning of "v'imru." The regularity of the sequenced vocal motive of "baagala" is broken as the phrase closes, and her movement reflects this shift. Although this prosodic shift in itself is not an earth-shattering observation—it simply mirrors the vocal shift from a sequential scheme to a cadential one—the bodily adjustment *is* surprising. A quick and distinct modification of bodily meter is required as Shira changes her movement emphases (icti) from the ends of the "baagala" phrases, to the beginning of the "uvizman kariv" phrase. In mimicking Shira during services, as well as in attempting to physically reproduce these movements away from the synagogue, I constantly found this shift difficult. Yet, Shira's "performance" of the movements appears natural and comfortable during worship. How can one understand this intersection of vocal and bodily meter? By comparing this diagram to several other moments for this participant, and for other participants in the same community, the complexity of the vocal and movement metrical interactions occurring in real-time can be brought to the fore.

Example 2 shows two worshippers, the same cantorial soloist, Shira, and an elderly congregant, Vera, moving at the same time. In watching these two women move during one of the central prayers of the service, the *Avot v'Imahot*, I noticed an interesting interaction: both worshippers were ostensibly using the same movement profile B as seen in the previous excerpt, but at different times. As the transcription shows, both women start out emphasizing the end of the Hebrew phrases, but then Shira (the yellow circle) shifts, showing a strict two-second movement frequency, while Vera (the blue square) continues in the previous pattern with the Hebrew text.

Both the projective analysis and the circle-square markers show that what begins as synchronized movement mirroring the lengths of the phrases is thrown off following (or perhaps because of) the slight sonic rallentando at the end of the first system on "Yaakov." In the second system, both participants' body movements maintain internal (~2 second) regularity but become asynchronous when observed together. Because of this split, the rallentando projection from the first line is reinterpreted into both the yellow and blue streams, as shown in the Example 2 diagram. Shira's movement stream then realigns with Vera's at the end of the sequential passage through a physical rallentando on "Leah."



Example 2. Shira (yellow circle) and Vera (blue square) moving during the opening of the *Avot v'Imahot*. While stick figures have been omitted for clarity of reading, the reader should assume the same movement profile as shown in Example 1 above. See also the video animation.

The displacement dissonance that regularly occurs between Shira and Vera in the second system is an excellent example of the asynchronous nature of movement and music in Jewish worship and the relatively low-stakes experience of such dissonance for specific worshippers. While a music analyst may see such displacement dissonance as exceptional or significant, as it well would be if discovered in a Beethoven sonata or Brahms symphony, by exploring this moment through an ethnographic lens, its relative normalcy is illuminated. In this vein, I offer some possible "readings" of this moment of dissonance below.

First, one important consideration in this instance is the accent structure of the Hebrew text for the names of the patriarchs and matriarchs, as they are pronounced by Shira and Vera. Since the women not only have differing prayer backgrounds, but also different experiences when it comes to learning, speaking, and praying in Hebrew, it is quite possible that they are accenting the text differently and tying their physical movements to the textual accent pattern. If this is the case, Vera maintains an end-accented pronunciation throughout both groups of ancestors, while Shira uses an end-accent on the patriarchs and Leah, but a beginning-accent on Sarah, Rivkah, and Rachel. If they are indeed (consciously or unconsciously) associating their strong icti with word accents, this difference clearly explains the asynchrony which appears in the beginning of the second system.

Another avenue, and perhaps a complementary one, is to connect this example to the participant interviews. Shira was explicit that at a moment of liturgical chant (known as *nusach*) such as the *Avot v'Imahot*, she is aware of moving differently than she does during congregational song or spoken text. She described this movement as follows:

> And it's this, conscious yet unconscious movement. . . . Conscious meaning, I know I'm doing it, I'm doing it because *I want* to do it, but unconscious in the sense that I allow my body to move back and forth and occasionally side to side as I may. I'm not regulating my movement. . . . (Shira, interview, June 2015)

Thus, the shift of movement meter can be understood as an unconscious shift precipitated by the extra second at the end of the first line (on text, "v'Elohei Yaakov"). Shira is simply moving in a regular rhythmic pattern, which negates the need for physical adjustment based on semantic change.[23]

> In contrast, Vera noted the following about movement in her interview:
>
> I'm not as knowledgeable as I would be had I had I suppose a different background, about what some of the movements are that you do at different times, but I just look and see what other people are doing and decide if I want to do that or not. And quite a few of the movements I do do, because I feel comfortable doing them. . . . I've seen people all my life davening in the old-fashioned way, ["Shira"] does, not extremely but she does, but I don't know when you do that one way or another way and I understand from her that it's all quite spelled out at least in some traditions, but I don't have the background, so I just sort of copy and do a little of this and a little of that.[24] (Vera, interview, November 2015)

This statement indicates that Vera is tying her movements to patterns that she observes in others. Thus, of course Vera is using the same movement profile as the cantor (Shira), and she begins moving in sync with Shira, who is the easiest to see from Vera's regular seat in the front of the congregation. However, Vera continues to tie her movement frequency with the Hebrew phrase and the sequential melody, reaching her ictus at the end of each phrase—similar to a marker of prosody, as noted above—and therefore she falls out of sync with Shira, whom she is mimicking.

This second analysis from the Jewish setting has multiple levels of mimicry: Vera mimicking Shira, and me mimicking them both. As such, it provides much more information than can be gleaned from my mimicry of a single participant—not just about worship synchronization, but also about interactions of participants with prayer across expanses of time. By incorporating Vera's real-time learning and experimentation, this analysis highlights the dynamism of this embodied "oral" tradition, in addition to suggesting asynchrony as a prominent movement style in Jewish worship settings.

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23. Of course, as Example 1 shows, Shira also moves in a manner that reflects textual prosody and the sequence within the chant melody. As such, it is clear that her movement includes that connection to text and melody as well as "conscious yet unconscious," asynchronous movements.

24. The term "davening" can have different meanings in different Jewish contexts. Here, Vera uses the term to mean improvised, free ritual movements made during liturgical chant (*nusach*).

IV. Mimicry and Movement Analysis: In the Church

This method was developed within the realm of the synagogue to solve the problem of video prohibition. The next step was to extend it into other religious communities, and the Greek Orthodox community proves a complementary site for research. On the practical side, while videotaping in general was permitted, issues of access in the Greek Orthodox community prohibited me, as a female, non-Orthodox visitor, from videotaping the spaces where the bulk of the ritual movement was occurring (primarily behind the iconostasis within the altar). Further, the musical aspects of ritual have many similarities: both Greek Orthodox and Jewish chant are semi-metered, in a language that is spoken fluently by some members of the congregation and only phonetically by others, while some of the service is also conducted in English. Both communities can be understood as diaspora communities, and both involve choreographed movement as requisite in certain moments of their liturgy. On the theoretical side, I was interested in attaining the type of knowledge gained from my embodied research in the Jewish settings, for which mimicry is much better suited than video. While my findings in the Greek Orthodox sites differed from those in the Jewish sites, embodied research in this setting proved to be useful in its own right, as I will discuss below.

I had to adapt the methodology for the Greek Orthodox communities due to differences in prevalence of movement types: in Greek Orthodox communities, prescribed ritual choreography is foregrounded, each movement holding a unique and purposeful place in the worship. The frequencies and alignments of these movements between participants require detailed descriptions of the movements themselves. For instance, no two priests articulate the incense censer in the same manner, even if the style of censer is the same.[25] Similarly, no two congregants make the sign of the cross in quite the same style.

Moreover, Greek Orthodox worship necessitates directing attention both to what is happening around oneself, and to one's own ritual choreography. This dual attentiveness is also the case with large physical movements, which involve proprioception (the sense of one's body in space and in relation to other objects/bodies) and the sense of equilibrium. The gross motor movements of ritual choreography are more frequent in Greek Orthodox worship than in the Jewish worship contexts, while the free, ritually-inflected movements that are recurrent throughout the Jewish worship contexts are fairly infrequent in the Greek Orthodox context. Thus, my mimetic analysis centered around ritual choreography in Greek Orthodox worship.

The main movements I examined were prostrations occurring during weekly Sunday services (small prostration, Figure 8a) as well as in the Holy Week and Easter services (great prostration, Figure 8b), making the sign of the cross (Figure 9), and the censing of the church. Each of these movements has specific ictus points that can be identified as the goal and the reversal point of a given movement, and both are variable across participants. As such, while I maintained the movement profile system in this worship space, it was adapted for the ritual

25. The censer is an ornate ritual object typically made of gold or silver and is used by the priest or deacon to disperse incense around the church during the liturgy.

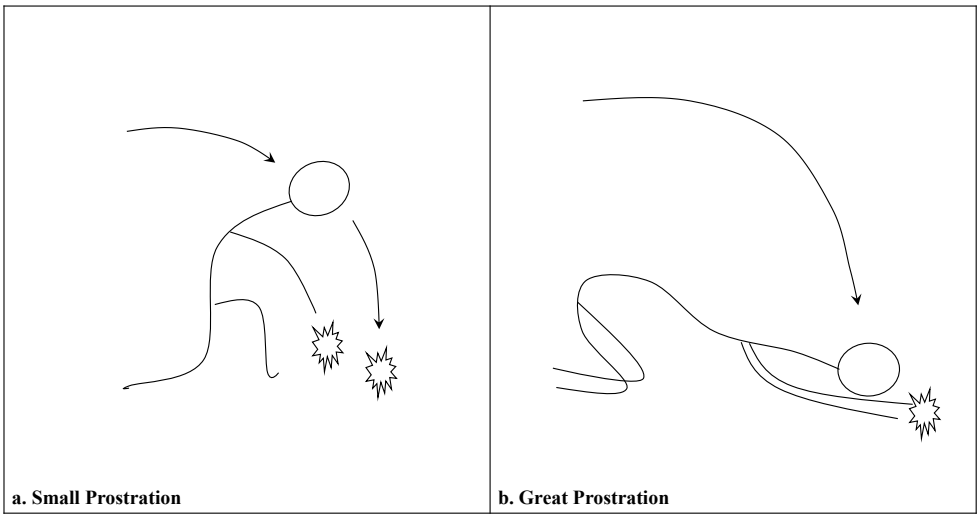


Figure 8. Types of prostrations. Ictus points are represented with starbursts. The small prostration is more of a kneeling gesture, while the great prostration (reserved for the holiest of days) involves the whole body coming all the way to the floor.

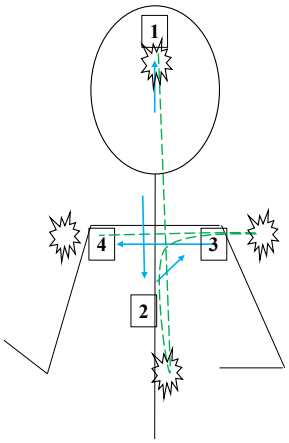


Figure 9. Sign of the cross (forehead-chest-right shoulder-left shoulder). Ictus points are represented with starbursts.

choreography, and incorporated the added consideration of worshipper focus in each situation.

The senses are employed to differing degrees of intensity throughout worship. For instance, sonic experience is continuous throughout the two-to-three-hour service, while taste is experienced only at the pinnacle of the worship service: during communion.[26] Sound occurs

26. While one who has been preparing to receive communion by fasting for 24 hours prior may find taste a significant factor throughout worship (given the dryness of the mouth and information from one's stomach anticipating taste), the actual act of tasting something from outside one's body is reserved for the Eucharist.

mainly in the form of constant chanting of Byzantine music by one or more chanters, or by a choir. The former are specially trained service leaders (but not ordained clergy) and often take turns chanting in addition to singing together in unison or harmony.[27] The only breaks from this musical continuity occur during readings of biblical texts, the sermon, and announcements. Yet even these moments involve sound, requiring continual and elevated auditory attention from individuals in the worship space.

As such, the experience of being *in* worship, and my use of mimicry as an analytical device, brought out the importance of attention in Greek Orthodox ritual. Directing focus toward one or more senses seems to guide movement–sonic metrical interactions; Greek Orthodox worshippers must often "tune out" certain sensory information (e.g., the tolling of bells during the singing of a hymn, despite the tonal and metrical misalignment of these two musical elements) in favor of a particular liturgical task. By empathically emulating my participants' behaviors, my awareness of this phenomenon was heightened, as were my own difficulties in performing the same task. However, here I was able to record my observations via field notes and videotape and review them later at my leisure. This created a very different type of analytical process, challenging me to stay with the experience of worship as mediated through the site of the body, and to attempt mimesis of my Greek Orthodox participants rather than falling into a purely observational role. I will discuss these issues at length in the conclusions section below. First though, a brief analytical example.

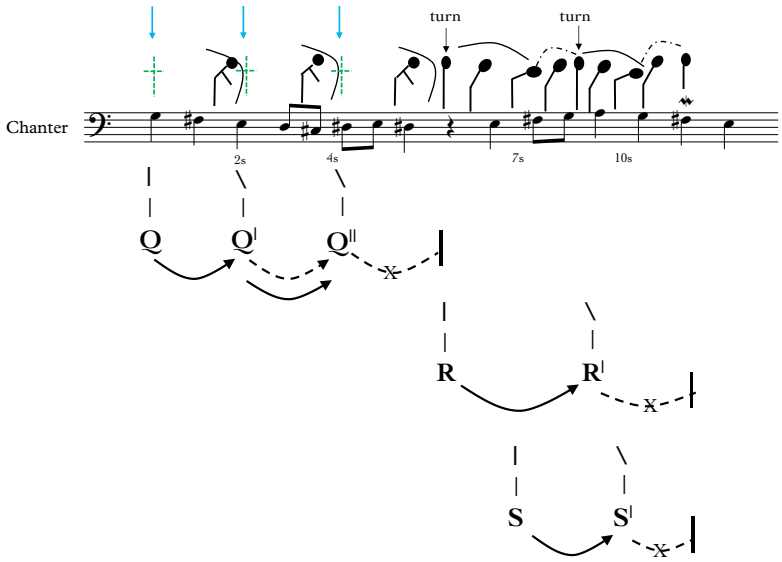
Analytical Example: Greek Orthodox Setting

The following example is drawn from a pre-sanctified liturgy during Lent.[28] I observed a priest, "Fr. Nikolaos," completing small prostrations at the altar (preceded by the sign of the cross), followed by a turn to bow to the congregation, and another turn to bow inside the altar. Prostrations are aerobic, involving fast-paced full body movements: each is begun with a sign of the cross—forehead-chest-left shoulder-right shoulder—and then made by a bend in the knees down to touch the ground with the fingers. All of this is done while the priest faces the altar table, his back to the congregation. Fr. Nikolaos, because of back problems, must hold on to the edge of the altar table with his left hand while his right reaches for the ground. This multi-step process is then repeated twice more. The prostrations are followed by a 180-degree turn to face the congregation and bow, and then another turn back into the altar to bow again (see Example 3).

While Fr. Nikolaos's movements are not aligned in precise metric synchrony with the chant melody, they do suggest a higher level of meter, with each crossing and prostration taking about a half-note's duration to complete, rather than the shorter quarter- and eighth-

27. Both clergy and chanters have microphones to amplify their voices. Speakers are placed near the ceiling throughout the worship space, as well as outside the worship space (so that parents with fussy children may listen as well).

28. The pre-sanctified liturgy follows the structure of the Divine Liturgy, but the Eucharist has already been blessed and sanctified. These services are held on weekdays during Lent.



Example 3. Fr. Nikolaos making three small prostrations, shown as figures with outstretched arms, and then two bows, shown as the bowing profile (no arms depicted). The blue arrows show the directionality of the crossing gesture, amplified by the green dotted pathway diagram. Accidentals do not carry through. See also the video animation.

note durations heard in the chant. This is echoed in the projective analysis, where duration Q-Q| is repeated immediately (Q|-Q||). The regularity of his movement creates groupings within the chant's flow of quarter and eighth notes that are not regularly accented throughout. Thus, while the music alone resists a strict metrical reading (despite accents of duration or contour that might hint at such a reading), Fr. Nikolaos's movements suggest such a reading because of their longer durations, regularity, and recurrence. This is illuminated through Hasty's (1997) event beginning (|) and event continuation (\) symbols as indicated in the diagram. Further combinations of these symbols show hierarchical levels that group the three crossings into a set distinct from the later two turns, both metrically as well as in movement type. In understanding this tension between seemingly metered movements and the absence of clear metrical hierarchy in the chant, the question of asynchronous vs. synchronous alignment arises again, and is only further complicated by the series of movements that follow.

During the musical rest midway through the excerpt, Fr. Nikolaos turns around and completes a bow at the waist, arms crossed over his chest. (The turn is quite swift, especially in comparison to the bow, and thus I do not indicate substantial duration in my diagram.) Then, just after the melody begins again, he repeats this sequence of turning and bowing. While the bow seems more important liturgically than the turn which facilitates it, the two movements can be read as creating distinct forms of emphasis and projection, based on their repetition and placement against the chant. While only the bow might qualify as having an ictus point in a movement profile, as described above, I suggest that the turn is equally ictus-laden. To complete the half-turn, Fr. Nikolaos must have a sense of where to stop and change

movements—similar to an ictus point which implies a reversal or change of the movement. Moreover, the turn, like the bow, changes the body's spatial orientation. With a bow one's visual field is altered, one's torso bent (and sometimes squished together), and one's balance shifted. In the case of the turn, the visual field is similarly changed, balance must shift in a different way, and the sonic, olfactory, and proprioceptive senses are re-directed as well. As such, either the turn or the bow could be read as the movement focal point in this example.

In one interpretation, the turn (R) is the stronger movement with the bow as an intermediary point in the duration of R-R$^{|}$, wherein R$^{|}$ is the continuation (\) of the projected series of events. Since the turn comes first in the movement sequence, this reading seems logical, and demonstrates an asynchronous, un-aligned movement pattern in relation to the chant (since it begins before the chant, during the rest). In the second interpretation, the bow is the focal point of the movement trajectory, resulting in duration S-S$^{|}$. Although the overall projective analysis is the same here as with the turns, it aligns differently with the chant, which may imply that by starting on the rest, the turn merely enables the bow to occur, as opposed to endowing it with greater liturgical weight. These are both possibilities because of their strength with regard to movement orientation in space, but one requires reading the movement sequence as aligned with the chant, while the other (or even the possibility of either reading) indicates asynchronous interaction between body and voice. Since neither option is repeated, I present both in my analysis, allowing for different ways of reading the movement pattern.

While I do not share quotes from my clergy participants in this section because this particular liturgical moment was not discussed at length in interviews, I will say that an interesting tension arose regarding focal attention and the relationship between movement and sound. Clergy are trained to conduct their movements in "extremely reverent, prayerful status" (interview with "Fr. Theodoros" in February 2017). As my interviews revealed, this often necessitates the blocking out of the chant, in order to focus on the priestly tasks at hand. At the same time, in the example I discuss above, Fr. Nikolaos is singing along with the chant, problematizing my embodied researcher's understanding of the position of asynchrony in this moment of ritual movement and music.

V. Conclusion

Researcher positionality, traditionally a formative component in ethnography more so than music analysis (though the latter benefits from exploration of individual viewpoint), affected my work in both positive and negative ways. I developed my mimicry method of movement analysis first in the Jewish communities. As a Jew myself, I was already familiar with the liturgy, music, and movements I was studying. I was thus able to participate fully as an insider. My relation to the worship changed, however, through this process of analytical mimicry; the ethnography led me to approach aspects of the worship that had previously felt habitual and rote in new ways.

By contrast, my "outsider" status with respect to the Greek Orthodox community created a roadblock as a mimetic researcher. I was unable to participate fully in the service in the ways that the congregants and clergy I was observing were able to participate. Aside from being unable to take communion, I decided not to make the sign of the cross while mimicking my participants, nor did I go into a great prostration. In acknowledging the sign of the cross as an integral movement within the service, and an especially important one for most congregants, I found a middle ground: I chose to mimic my participants doing this choreographed "move" by moving my hand in front of my body in a three-part cross. I never completed the full movement, but I also was able to mimic the speed and physical location of the crossing movement, while still maintaining respect for a tradition that is not my own.

For better or worse, the differences in my researcher positionality in relation to my field environment is embedded, as in all ethnography, into the fabric of my methods and findings. It is perhaps clear from the brief examples given above that the mimicry method is better suited to the kinds of movements made in Jewish worship. Those bodily experiences defy the pinning down of rigidly choreographed and planned movements in conjunction with semi-metered chant. Further, aside from the personal theological constraints of my religious identity as distinct from that of my participants, the way movement, and the senses in general, figure in Greek Orthodox worship lends itself quite differently to mimetic analysis. Because so many of the movements are choreographed, there is not as strong an ideology of being "moved to move" as there is in the Jewish context. Moreover, so much of the ritual "work" is conducted by the clergy (priests and deacons), choir, and chanters, that congregants tend to participate more passively. While not entirely still or silent, those sitting in the pews have fewer physical liturgical responsibilities than congregants have in Jewish worship. This changes the musical and physical interactions, as well as the level of idiosyncrasy among individual worshippers. Still, my research indicates the presence of immense embodied knowledge in the participants, shown both in alternations of sensory focus and in the practiced choreography throughout the services. As such, my findings within this community suggest an opportunity for further research, particularly in the relationship between theology and action within priest and chanter experience as they navigate enacting the liturgy.

Altogether, my method takes an embodied approach to movement, music, and meter analysis, and this embodiment is then translated into my transcriptions and analyses. By mimicking participants during worship, I am able to examine the experience of worship within the site of the body, as opposed to examining the body itself, as Crossley (2007) suggests. In this way, mimicry as movement analysis shows itself to be more than just a solution to a problem with technology use in ritual settings: the strength of such embodied research lies in the rigor and nuance that comes in relating individual movement to sound through a *combination* of experience and observation, rather than privileging the latter. This is not to preclude quantitative movement analysis, such as motion-capture technologies and micro-timing in video analysis, which can also contribute greatly to our understanding of the relationship between music and movement in worship settings. But by using ethnographic and

embodied research, the exploration of individual experiences is brought to the fore, and the awareness of one's own body (and bodily biases) in relation to others' is enhanced. As such, not only does this method demonstrate another step toward integrating music analysis with embodied research, but it also incorporates aspects of experiential research that expand and enrich music analytical understanding.

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