Aesthetic Preference in Dance Movement: Motor Fluency and the Mere Exposure Effect

Michelle Kathleen G. Villavicencio

Submitted to the Faculty of Graduate Studies of

Brooklyn College: The City University of New York

In partial fulfillment of the requirements for the degree of

MASTER OF ARTS

Department of Psychology

Brooklyn College: The City University of New York

Brooklyn, NY

Abstract

With a focus on embodied cognition, past research has suggested that motor fluency is the mechanism that drives preference judgements due to the mere exposure effect. This study explores the role of motor fluency in determining preferences in dance movement and whether preference is directly or indirectly influenced by multiple stimulus presentations. In Experiment 1A, college students were given different instructions (to passively watch or imagine performing the movements) aimed at controlling the level of motor fluency felt in each condition. They were presented with dance movement sequences 0, 1, or 5 times and asked to provide a liking and ease rating for each sequence. Separate 3X2 ANOVAs revealed no significant main or interaction effects but did produce a significant planned contrast between 0 and 5 presentations for ease ratings. In Experiment 1B, to increase levels of motor fluency further, gesturing instructions were provided. Separate repeated measures ANOVAs found no effects for liking ratings but yielded a significant main effect for ease ratings. In Experiment 2, ease ratings were dropped to investigate whether their presence blocked a possible misattribution to liking judgements. The repeated measures ANOVA revealed no significant effect for liking ratings. Results from this study argues against a direct link between fluency and preference due to repetitive exposures.

Keywords: mere exposure effect, embodied cognition, motor fluency, dance, aesthetic preference

Table of Contents

List of Tables

Aesthetic Preference in Dance Movement: Motor Fluency and the Mere Exposure Effect

Human movement usually occurs as a means to an end goal. We walk to arrive at a destination or lift weights to increase our strength. In a performance setting, however, the purpose of dance movement is to simply provide aesthetically pleasing movement to an audience. How we decide which movements are pleasing is not an easy question to answer. Research in aesthetic judgement has shown that the simple repetition of experiences (i.e., the mere exposure effect Zajonc, 1968) can influence preference; however, most of these past studies have used static stimuli. As dance movement is defined by motor information enacted by our bodies, it is important for mere exposure research to include dance movement stimuli. Motor fluency has emerged as a process through which mere exposure effects occur, giving the body a central role in determining preference judgements in response to prior exposure to a stimulus (Topolinski & Strack, 2009; Topolinski, 2010). Preferences are guided by the automatic simulation of motor information associated with the exposed stimulus. Studies depending solely on static stimuli limit our understanding of the role that motor fluency has in preference judgements. Mere exposure effect studies using dance would more clearly demonstrate how motor fluency affects aesthetic preferences.

The mere exposure effect refers to the link between familiarity and preference. Ratings of an initially neutral stimulus become more positive following multiple exposures of the stimulus. Mere exposure effects have been shown for a wide variety of stimuli including: foreign words (Stang, 1978; Zajonc, 1968), letter strings (Gordon & Holyoak, 1983) abstract symbols and characters (Zajonc, 1968), music (Brentar, Neuendorf & Armstrong, 1994; Peretz, Gaudreau & Bonnel, 1998), paintings (Cutting, 2003), geometric figures (Bornstein, Leone & Galley, 1987;

Seamon et al., 1995), people and faces (Mita, Dermer & Knight, 1977; Moreland & Beach, 2004), and food (Pliner, 1982).

Theories of Mere Exposure Effects

Competing accounts of mere-exposure effects differ in their assertions of whether stimulus exposure has an intrinsic link to its hedonic value. Major theories of mere exposure are each outlined; special focus was given to explanations of the intrinsic relationship between exposure and preference. The purpose of the study described in this paper is to explore the hypothesis that repeated exposures are intrinsically linked to changes in hedonic value.

Dual-Memory System Accounts

Mere exposure effects can be understood through consideration of separate memory systems. Explicit memory requires intentional and conscious retrieval of past events, whereas implicit memory processes represent experiences that may not be explicitly recollected at a later time. This view holds that changes in preference due to repeated stimulus exposure might be driven by the implicit memory system. Evidence of this view is derived from experiments using a rapid-serial-visual presentation technique (Kunst-Wilson & Zajonc, 1980; Seamon et al., 1995; Seamon et al., 1997; Bornstein, Leone, & Galley, 1987). Very brief presentations of visual stimuli are shown to participants during an encoding phase, after which OLD and NEW stimuli are shown at test. In these experiments, items are presented too quickly to be encoded and led to poor recognition memory. However, participants continued to give higher preference ratings for OLD over NEW items despite lacking correct recognition.

Studies with findings supporting increased preference without recognition has been replicated across various stimulus exposure durations. Using a forced-choice experimental task,

Bornstein, Leone, & Galley (1987) found that at 48ms, recognition based questions were more accurate in the selection of a previously seen stimulus. When exposure duration decreased to 4ms, affect judgments were significantly more accurate than recognition in identifying previously seen stimuli. Similarly, Seamon, Marsh & Brody (1984) varied stimulus exposure duration between 0 - 48ms. As expected, in the previously mentioned studies, longer exposure duration increased accuracy rates due to recognition. Shorter exposure duration, in which stimulus processing cannot activate the processes of explicit memory, increased accuracy rates due to affect. Varying exposure rates were seen to affect the accuracy of selecting old stimuli. At longer exposure durations, successful encoding of the stimulus occurs through explicit memory. Shorter exposure durations provide little time for explicit memory to process the stimulus but give enough time for implicit memory to encode emotional information. This is enough to provide a representation of the stimulus for the preference judgment.

More generally, RSVP-based mere exposure designs satisfy the same test conditions used to differentiate implicit and explicit memories, so the systems governing these memories have been borrowed to explain the dissociation found between recognition and affect (Seamon et al., 1995, 1997, 1999; Ye, 1997; Jacoby, 1991). For example, Seamon and colleagues assert that mere exposure designs are equivalent with implicit memory tests and therefore can be seen as an example of implicit memory processes in action. Preferences due to mere exposure would depend on an affect-driven implicit memory system as opposed to an explicit recognition based memory system.

Following this logic, manipulations used to dissociate implicit from explicit memory phenomena have also been used in a parallel fashion to dissociate affect and recognition. For

example, manipulations to encoding context, stimulus type, physical transformations of the stimulus, and parameters of exposure can have selective influences on measures of explicit memory (e.g., recognition) and implicit memory (e.g., priming) (Seamon et al., 1995, 1997; Schacter & Cooper, 1992; Schacter, 1990, 1991). In general, manipulations that influence implicit memory have similar influences on measures of preference, suggesting that mere-exposure effects are driven by the same implicit memory processes that drive phenomena like priming (Seamon et al., 1995, 1997).

Although the dual-memory approach to mere-exposure has been replaced by other theories in recent years of research, it highlights that there is a possible intrinsic link between stimulus exposure and preference. Choices of preference depend on available information on the stimuli and the ability of the different memory systems to process this information. Recognition judgments will be possible if explicit memory successfully encodes the stimulus. If stimulus representation depends on implicit memory, however, recognition will not be possible and preference judgments will depend on the affective value of the stimulus.

Fluency Accounts

Alternative accounts of mere-exposure draw on the concept of processing fluency, which refers to the finding that previous exposure to a stimulus allows that stimulus to be perceived, encoded, and processed more easily than unfamiliar stimuli (Bornstein & D'Agostino, 1994; Reber et al., 2004). Processing fluency can explain the increases in positive ratings following multiple exposures seen in the mere exposure effect (Reber, Schwarz & Winkielman, 2004). As stimuli become more familiar, and subsequently more fluent by successive exposures, they are perceived, encoded, and processed more easily (Bornstein & D'Agostino, 1994; Reber et al.,

2004). Fang, Singh & Ahluwali (2007) identified two major fluency theories that describe the different ways in which fluency can influence preference judgments in mere exposure.

Misattribution account. The Perceptual Fluency/Misattribution model represents a cognitive view of mere exposure. Repeated stimuli are assumed to be processed more fluently than nonrepeated stimuli, however, the source of fluency may remain unknown to an individual. When making decisions about preference, a participant may misattribute their feeling of processing fluency to an increase in preference for the repeated stimulus. If the individual is made aware of the effect repetition had on the judgement made, a correction process will occur and the original judgement will be discounted. Bornstein & D'Agostino's (1994) study demonstrates this correction effect. Participants were exposed to black and white photos of women from a college yearbook. Those in the new condition were told that all the photographs were of unfamiliar women, those in the old condition were told that all the photographs were previously seen and those in the standard condition simply had standard instructions with no information about the photographs. Ratings were collected of 20 photographs, 10 familiar and 10 unfamiliar photographs. Liking ratings of photographs were significantly less liked when participants were told that they had been previously exposed to them. This finding shows that awareness of the source of fluency can determine whether the subjective experience of fluency is attributed to a feeling of liking for a stimulus.

Whittlesea and Price's (2001) study, brings up an issue for misattribution theories of mere exposure. Previous stimulus exposures are able to affect preference judgments only if the right conditions are met and research was undertaken to determine the specific situations in which misattributions occur. According to Whittlesea and Price, the occurrence of misattribution

of fluency to preference without recognition is largely due to the different strategies individuals adopt to deal with the parameters of mere exposure experiments. In mere exposure studies, stimuli are usually shown to participants in rapid-serial-visual presentation (RSVP), with many images quickly presented one after the other. Individuals depend on either analytic strategies that focus on discriminating details or nonanalytic strategies that process the stimulus as a whole. When presented with multiple perceptually similar stimuli in RSVP, Whittlesea and Price found that individuals normally processed the images analytically in recognition tasks and nonanalytically in preference tasks. When the experiment was altered to motivate a specific strategy to employ, old items were selected more frequently when a nonanalytic holistic process was promoted, regardless of the type of task being asked of the participants. Participants, however, could not distinguish old from new items in a preference or recognition task if analytical processing was encouraged.

Whittlesea and Price's 2001 study showed that non-analytical processing leads to the ability to identify previously seen stimuli from new stimuli, hinting at a direct link between stimulus exposure and preference. According to the Perceptual Fluency Misattribution mode, fluency is seen to cause an incorrect misattribution of feelings for liking rather than directly causing liking itself. This view assumes an indirect link between exposure and preference. Previous exposure of a stimulus is considered to directly cause fluency but fluency itself does not directly lead to liking. Contrary to this, Whittlesea and Price demonstrate that the misattribution of fluency to liking does not always occur and mere exposure effects can appear by encouraging holistic processing of the stimulus as opposed to focusing on detail. Since mere exposure effects

result in the absence of misattribution, preference judgments must then be directly influenced by fluency.

Hedonic fluency account. The Hedonic Fluency account provides an alternative to misattribution theories of fluency in mere-exposure. According to this account, fluency itself is intrinsically related to hedonic value, and thus the experience of processing fluency directly modulates levels of preference for a stimulus. Fluency generates positive feelings, whether due to promoting a safe situation in its familiarity (Harmon-Jones & Allen, 2001; Lee, 2001) or due to a rewarding experience as a result of learning and/or goal attainment (Winkielman & Cacioppo, 2001; Gordon & Holyoak, 1983) and this positive affect leads to positive ratings.

Winkielman & Cacioppo found support for the Hedonic Fluency account in their study (2001). The researchers used electromyography (EMG) to provide a psychophysical measure of positive and negative affect. Facial activity detected in the cheek muscles denote positive affect while activity in the brow muscles reflect negative affective reactions. Self reports of positive and negative affect was also measured. Winkielman & Cacioppo argued that models such as the misattribution account would only show effects of fluency in self reporting measures and would predict more reports of positive affect if the participants were focused on positive reactions than negative reactions and vice versa. Both EMG results and self reports showed that more fluent stimuli produced more positive affective reactions, indicating that feelings resulting from fluency is inherently positive. The use of EMG measures also point to a direct link between fluency and positive feelings, that misattribution theories do not account for.

Kinds of Fluency

The concept of processing fluency is broad and has been applied in several senses. Reber et al. (2004) describes two types of fluency that can contribute to the mere exposure effect. Perceptual fluency involves the processes in identifying a familiar stimulus. Conceptual fluency refers to the ease in mental processing in ascribing meaning to the stimulus.

Stimuli have different characteristics that allow them to be processed more or less fluently, ranging from objective features to the perceiver's past experiences with the stimulus. Physical attributes of the stimulus can affect fluency experiences. Reber et al. identifies the amount of information available, symmetry, and figure-ground contrast as contributing to the ease of processing. Prior exposure of a particular stimulus enables the perceiver to identify the stimulus more quickly and more easily (Jacoby & Dallas, 1981, Moreland & Topolinski, 2010). Past experiences with the stimulus can also increase fluency. Repetition, implicit learning of stimulus structure and prototypicality have all been seen to affect fluency (Hekkert, Snelders, & van Wieringen, 2003; Lee, 2001; Seamon et al., 1995, 1997).

Motor fluency, however, adds another component to processing fluency. Considering motor fluency responsible for mere exposure, viewing an object automatically triggers its associated motor simulation. It is not the processing of the physical characteristics of the stimulus that becomes fluent but the motor information that we have associated to the object (Beilock & Holt, 2007; Leder, Bär & Topolinski, 2012; Topolinski, 2010). Embodiment, the covert simulation activated in our mind, is what brings forth the feeling of fluency that drives preferences after exposure (Topolinski & Strack, 2009).

Differentiating between Misattribution and Hedonic Fluency Accounts

The present work follows recent work attempting to discriminate between fluency accounts of mere exposure effects that do or do not assume an intrinsic link between fluency and feelings of liking. Fang, Singh & Ahluwalia (2007) provide evidence that it may be a combination of both. Following the usual mere exposure paradigm, the researchers exposed participants to banner advertisements during an article reading task while having them listen to background music. The background music provided a way to control fluency and/or affect misattributions by referring to it as a potential influence in the participants' judgements. The Perceptual Fluency/ Misattribution model would expect correction effects to occur when participants were told to ignore any feelings of fluency due to the music contributing to processing ease. The Hedonic Fluency model would predict correction effects when participants were told to ignore the feelings that the music may invoke. Results indicate that the correction process occurred according to both models predictions. No significant differences were found between 0 and 5 exposures for ratings of attitudes towards the banner advertisement and for subjective fluency ratings (processing ease) for both fluency and affect misattributions. Increased fluency due to repetitive exposure contributes to positive feelings that influence the interpretations of the fluency experience.

Trying to differentiate the contributions of perceptual versus motor fluency, Topolinski & Strack (2009) conducted an experiment to determine which kind of fluency plays a greater role in mere exposure. Chinese characters and nonsense Greek words were used as stimuli. The Greek words either remained the same for both the presentation and the testing phase of the experiment or visually altered so that the word was spelled with alternating lowercase and uppercase letters were switched. Altering the visual appearance of the words would interfere

with any feelings of ease resulting from perceptual fluency. To interfere with the motor information associated with words, the participants were asked to chew gum or voicelessly whisper a word. The researchers expected mere exposure effects due to perceptual fluency to be blocked when the words changed appearance between exposure and testing since the participants could no longer rely on visual aspects of the word. Instead, suppressing oral articulation blocked mere exposure effects for both altered and unaltered appearances. Topolinski and Strack concluded that switching dependence from perceptual fluency to motor fluency does not occur and mere exposure for words is entirely dependent on motor fluency.

Present Aims

A major aim of the present experiment was to determine whether the experience of perceptual and motor fluency is intrinsically linked to hedonic value. Participants were exposed to unfamiliar dance movement stimuli from an ethnic based fusion dance style. We assumed that the participants would have little to no experience with this dance style and would lack the ability to engage in automatic motor simulation in response to these movements.

In general, participants were presented with videos of dance movements in an initial encoding phase, and then made judgments about new and old dance movements in a following test phase. Across experiments, perceptual fluency was manipulated by varying the number of exposures to each dance video in the encoding phase. Motor fluency was also varied across experiments by changing encoding instructions, sometimes having participants passively view, imagine performing the actions while viewing, or perform arm-movements while watching each video. During the test phase, liking ratings and ease-of-production ratings were measured to separately measure affective preference, and motor fluency, respectively. According to the

hedonic fluency account, preference ratings should positively correlate with motor fluency ratings, as the experience of motor fluency should directly modulate feelings of liking. On the other hand, the misattribution account would assume that feelings of liking would only be observed when task-demands guide participants to misattribute feelings of fluency for liking.

General Method

Stimuli

Fifteen different movement sequences were constructed from the repertoire of the tribal fusion bellydance style. The movement sequences were recorded with a metronome set to 115 BPM at a time signature of 8/4 to aid the dancer to keep time during performance to standardize the timing between movement sequences, however the final video the participants watched did not include sound. Each movement sequence ran the length of two 8/4 measures and the duration of the final video clips were roughly 10 seconds each. The same dancer was used in all video recordings. The stimuli used consisted of a playlist of 10 out of the 15 different video clips. The playlist was generated at random, assigning 5 videos to be repeated 5 times and 5 videos to be repeated just once. The video playlist shown was different for each participant.

Apparatus

All videos and questionnaires were presented to subjects using in-house software written in livecode. The program was run on an iMac computer with a 21.5 inch display.

Experiment 1A

In this experiment, we tested the effect of repetition on preference, measured through liking ratings, and perceived motor fluency, measured through ease ratings. Perceptual fluency was

manipulated by presenting each movement sequence 0, 1, or 5 times. Participants were placed in either a control condition or an imagination condition that encouraged motor fluency through visualization of the presented movements. We expected that a mere exposure effect would occur with a greater number of presentations leading to a higher liking rating. We also predicted that encouraging motor fluency through imagination would produce higher liking ratings than if the participant merely watched the movements. Finally, interaction effects are expected to occur. Higher liking ratings and the number of presentations should increase with each other, however, a larger rate of increase should be seen in the imagination condition than in the control condition.

Method

Participants. 40 undergraduate students enrolled at Brooklyn College participated in the Experiment 1A. They were recruited via the SONA online system and received course credit for their participation.

Procedure. Participants were assigned to either a control or imagination condition. In the control condition, participants were simply told that they were about to view a sequence of multiple video clips of dance movement. In the imagination condition, participants were asked to imagine themselves performing the movement shown on the screen while watching the stimuli playlist. After viewing the stimuli playlist, they then rated 5 new video clips in addition to the video clips they had already seen. They were asked to rate the movement based on their liking and on the movement's ease. Participants rated their liking and the ease of each movement clip on a 100 point scale, with 0 corresponding to "Least" and 100 corresponding to "Most." The order in which the videos were presented and the frequency of presentation of each were randomized for each participant.

Results

Experiment 1A was analyzed with two separate 3x2 mixed design ANOVAs. No between-subjects effects $F(1,38)=.66$, $p=.42$ and no within subjects effects $F(2, 76)=.22$, $p=.80$ were found for Liking. Interaction effects were also not found $F(2,76)=.30$, $p=.74$. There were no between-subjects effect for Ease $F(1,38)=1.62$, $p=.21$. Overall ease ratings did not differ between conditions. Within-subjects tests for repetition approached significance $F(2,76)=2.35$, $p=.10$. No interaction effects were found $F(2,76)=.32$, $p=.72$. Planned contrasts revealed a significant effect for overall ease when comparing new movements ($M=52.14$, $SD=23.23$) to movements repeated 5 times ($M=56.71$, $SD=21.17$), $F(1,38)=4.69$, $p<.05$.

Discussion

The results of Experiment 1A show us that the mere exposure effect failed to occur for movement stimuli. The number of times a movement sequence was presented did not contribute to a significant change of preference for movement sequences. The condition in which study participants were placed also did not affect ratings of preference. Effects of condition on ease ratings showed that passive watching or imagination did not differ from each other in contributing to significant changes in motor fluency; however, repetition seemed to have some influence on motor fluency as the results of that test approached significance. Planned contrasts revealing a significant effect of ease ratings between 0 and 5 repetitions suggest that participants did experience motor fluency. Motor simulation through imagination may not have been enough to adequately promote motor fluency in the previous study. Gesturing could solve this problem by providing more applicable motor information to the movement sequences they view, coaxing the mere exposure effect to occur.

Experiment 1B

Motor fluency promotes mere exposure even in the absence of a plan to act (Yang, 2009). This idea assumes that action on the stimulus has already been enacted in the past. A study found that dancers and nondancers generally do not differ in the general ability to engage in visual or kinesthetic imagery , however, nondancers expressed more difficulty than dancers when imagining themselves performing or visualizing an image of themselves performing a dance movement (Foley, Bouffard, Raag & Disanto-Rose, 1991). Neuper et al.(2005) suggests that the two kinds of imaging techniques are functionally different and each can be appropriated to specific activities. Since motor execution and kinesthetic imagery are closely tied to each other with respect to brain activation, novices cannot use kinesthetic imaging strategies in learning dance until execution of movement occurs. The participants in the previous study might have exhibited this difficulty and might not have been able to use kinesthetic imagery in imagining themselves moving. As the participants in this study are unlikely to have the appropriate motor simulations associated with our stimuli, imagination alone may not be enough.

Creating gestures to represent unfamiliar movements may be enough for participants to perceive the movements more fluently. Marking in dance is a way to rehearse choreography by conserving physical energy and cognitive concentration (Warburton, Wilson, Lynch, & Cuykendall, 2013) and can help circumvent the difficult task of teaching the novices proper dance technique. The choreographed dance movements are reduced into smaller movements or hand gestures. Warburton et al. (2013) found that dancers have better performances if, when rehearsing, instead of dancing full-out, they used marking techniques. Although the participants

in the study they conducted were expert ballet dancers, gesturing techniques could be beneficial to dance novices as well.

In this experiment, instead of merely asking the participants to imagine copying the exact movements they see, they will be asked to use their hands to mirror the movements and positions of the dancer as the video progresses. In essence, in the task given to them, participants are forced into learning about the movement stimuli, unintentionally creating their own gestures to represent each movement video clip in the process. These gestures are able to provide some motor information on which they can base their embodiment.

Method

Participants. 42 undergraduate students from Brooklyn College were recruited via the SONA system.

Procedure. Instead of simply imagining the movement, all participants in Experiment 1B were encouraged to physically mirror the dancer's movements and positions with their own hands as they were watching the stimuli playlist. They were told to pay attention to the dancer's hand in space: if the hands are moving, they should use their hand to follow the path of movement. The participants were also told to pay attention to the position of one hand relative to the other: if one hand is above the other hand in the video, the participant's hands should also reflect that. To make the task easier, they were reassured that left-right orientation would not matter. Their position would be correct as long as one hand was above the other. After viewing the stimuli, the participants rated new and old video clips as in the previous experiments.

Results

Two one-way repeated measure ANOVAs were conducted to compare the effect of repetition on Liking and on Ease with movement sequences presented 0, 1, and 5 times. The one-way ANOVA of repetition produced no effect for Liking, $F(2,82)=1.49$, $p=.23$. The one-way ANOVA for Ease, however, resulted in a significant effect, $F(2,82)= 3.79$, $p<.05$. Planned comparisons for Ease revealed a significant effect for new movement sequences ($M=47.57$, $SD=21.38$) versus movement sequences repeated 5 times ($M=52.21$, $SD=23.19$), $F(1,41)=4.63$, $p<.05$.

Discussion

As in the previous study, mere exposure effects again failed to appear. More exposure to the movement stimuli did not result in higher liking ratings. Increasing the amount of motor information associated with the movement sequences did, however, result in significant effects of repetition on Ease ratings. This shows that increasing presentations of movement stimuli has a significant influence on motor fluency. Gestures provided enough motor simulation information to increase feelings of motor fluency as presentations increased. This does not provide support for the Hedonic Fluency account of mere exposure as repetition should directly contribute to preference ratings. This result may provide support for the Perceptual Fluency Misattribution model of mere exposure. Instead of misattributing feelings of fluency to preference judgements, participants in this study may have directed them to feelings of motor fluency due to the presence of the Ease rating task. If the Misattribution model is responsible for mere exposure effects, the removal of the Ease rating task should produce higher liking ratings for more presented movements.

Experiment 2

Although mere exposure effects for liking were not found in the previous experiments, the significant effects for repetition on ease ratings in Experiment 1B provided evidence that an increase in motor fluency had occurred. Since a key element in the mere exposure effect is the misattribution of feelings of fluency, repetitive exposure may also lead to other kinds of judgements as well. Topolinski (as cited in Topolinski & Strack, 2010) presented the names of Bollywood actors while participants were engaged in an oral or motor task. For the group undertaking the motor task, when asked to judge the each actor's fame, the names that were repeatedly exposed were the ones that were deemed more famous. The group assigned to the oral task did not show this effect. The researchers also presented names of Asian stocks and names of drugs to participants with similar results. The significant increase of ratings for ease found in Experiment 1 may explain the lack of a mere exposure effect for liking ratings. The Misattribution account of mere exposure explains that increased liking results from a misattribution of fluency to preference. With the inclusion of the ease ratings, the participants in our study may not have engaged in this misattribution, viewing ease as the source of fluency. Removal of this task should enable participants to misattribute fluency to preference instead.

Method

Participants. An additional 40 participants were recruited from the Brooklyn college SONA online system in exchange for course credit.

Procedure. Ease measures were dropped from the ratings and each video was rated for Liking only. All other aspects of the procedure for this experiment was identical to Experiment 1B.

Results

A one-way repeated measures ANOVA was conducted for repetition on Liking. Results revealed no significant effects for liking, $F(2,78)=1.19$, $p=.48$. Planned contrasts revealed a nonsignificant trend of increased liking for 0 repetitions ($M=52.35$, $SD=20.59$) versus 5 repetitions($M=55.17$, $SD=18.58$), $F(1,39)=1.3$, $p=.26$.

Discussion

No mere exposure effect on preference was found despite dropping Ease ratings from the study. There was no significant relationship between the number of presentations of the movement stimuli and the liking ratings of each movement. The significant effect of repetition on Ease ratings previously seen in Experiment 1B was not transferred to Liking ratings as the misattribution explanation of mere exposure would predict. This finding suggests that the misattribution model of mere exposure alone cannot account for the appearance of preference effects due to repetition.

General Discussion

In summary, Experiment 1A showed no effect of repetition on preference ratings. Experiment 1B involved participants using hand gestures to mimic the movements during movement presentations. No effect of repetition on preference was found but repetition did produce a significant effect on ease ratings. Experiment 2 was identical to Experiment 1B except that ease ratings were removed from the experiment. This was done to allow participants to misattribute feelings of ease for feelings of preference; however, there was still no effect of repetition found for preference even after the removal of ease ratings.

The experiments in this study were conducted to test if fluency and hedonic value are intrinsically linked. If an intrinsic link exists, changes in fluency, seen in ease judgments of movement stimuli, would contribute to a corresponding change in preference. However, if fluency and hedonic value are independent from each other, any effect of repetition on fluency would not influence preference judgments. Results of this study show that repetition was able to produce mere exposure effects in fluency without analogous changes in preference, highlighting the absence of an intrinsic link between fluency and the hedonic value of the stimulus.

Despite an absence of evidence for a direct intrinsic link suggested by the Hedonic Fluency account, we do not have ample support for the Misattribution account. Although repetition was found to have a significant effect on fluency, this study was unable to find a mere exposure effect for preference. Several explanations could account for the inability to find a significant effect of preference in the current study. The number of presentations may not have been sufficient to produce the desired effect. The departure from using static visual stimuli may have also prevented a significant effect from occurring. In particular, dance movement stimuli might have been too complex for the participants to process easily and this might have interfered with the processes of mere exposure.

One major barrier for the Misattribution account are the strategies we employ in mere exposure experiments. These strategies affect whether or not we see a preference for repeated stimuli. Researchers can encourage different strategies for participants to engage in, focusing the attention of the participants into a specific way of thinking. This is evident in Whittlesea and Price's 2001 study, in which analytic and nonanalytic processing are identified as the key to explaining preferences for previously exposed stimuli. When encountering an unfamiliar

stimulus, people tend to depend on processing fluency and employ a nonanalytical processing approach for liking judgements. If faced with a recognition judgement, attention is placed on analytic processing and participants are concerned with recalling specific details about the stimulus. This detail-focused approach prevents the feeling of fluency and mere exposure preferences do not appear.

Specifically in the current study, dropping ease ratings may not have lead to significant preference effects because the participants were concerned with learning the details of the movement to be able to gesture and encode them analytically. They were not able to engage in nonanalytic processing because of the task demands and instead used an analytic processing strategy. Since a nonanalytic approach is essential in determining whether or not a preference judgement occurs, the misattribution processes may have been blocked by the task demands and repetition was unable to produce the mere exposure effect for liking.

Conclusions

Evidence found against a direct link between fluency and preference impacts our understanding of how we make preference based judgements regarding dance movements. The results of this study suggest that mere repetition of dance movement sequences is not sufficient to increase positive perceptions of the movements. The way the movements are processed may play a role. Having a specialized knowledge base, expert dancers would have no need to process dance movements analytically. If nonanalytic processing is indeed central to the occurrence of mere exposure effects for dance, experienced dancers should display greater preference for the same dance movements than those without dance backgrounds. Experience in dance should contribute to judging repetitive dance movements as more likeable.

References

Bornstein, R. F. (1989). Exposure and affect: Overview and Meta-Analysis of Research, 1968-1987. *Psychological Bulletin, 106(2),* 265-289.

Bornstein, R. F., & D'Agostino, P. R. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology, 63(4)*, 545-552.

Bornstein, R. F., & D'Agostino, P. R. (1994). The attribution and discounting of perceptual fluency: Preliminary tests of a perceptual fluency/attributional model of the mere exposure effect. *Social Cognition, 12(2),* 103-128.

Bornstein, R. F., Kale, A. R., & Cornell, K. R. (1990). Boredom as a limiting condition on the mere exposure effect. *Journal of Personality and Social Psychology, 58(5)*, 791-800.

Bornstein, R. F., Leone, D. R., & Gallery, D. J. (1987). The generalizability of subliminal mere exposure effects: Influence of stimuli perceived without awareness on social behavior. *Journal of Personality and Social Psychology, 53(6)*, 1070-1079.

Brentar, J. E., Neuendorf, K. A., & Armstrong, G. B. (1994). Exposure effects and affective responses to music. *Communication Monographs, 61(2)*, 161-181.

Cutting, J. E. (2003). Gustave Caillebotte, French Impressionism and mere exposure. *Psychonomic Bulletin & Review, 10(2)*, 319-343.

Duckworth, K. L., Bargh, J. A., Garcia, M., & Chaiken, S. (2002) The automatic evaluation of novel stimuli. *Psychological Science, 13*, 513-519.

Fang, X., Singh, S., & Ahluwalia, R. (2007). An examination of different explanations for the mere exposure effect. *Journal of Consumer Research, 34(1)*, 97-103.

Gordon, P. C., & Holyoak, K. J. (1983). Implicit learning and generalization of the "mere

exposure" effect. *Journal of Personality and Social Psychology, 45(3)*, 492-500.

Harmon-Jones, E., & Allen, J. J. B. (2001). The role of affect in the mere exposure effect: Evidence from psychophysiological and individual differences approaches. *Personality and Social Psychology Bulletin, 27*, 889-898.

Hekkert, P., Snelders, D., & van Wieringen, P. C. W. (2003). 'Most advanced yet acceptable': Typicality and novelty as joint predictors of aesthetic preference in industrial design. *British Journal of Psychology, 94*, 111-124.

Hunter, P. G., & Schellenberg, E. G. (2011). Interactive effects of personality and frequency of exposure on liking for music. *Personality and Individual Differences, 50,* 175-179.

Jacoby, L. L., Lindsay, S., & Toth, J. P. (1992). Unconscious influences revealed: Attention, awareness, control. *American Psychologist, 47(6)*, 802-809.

Leder, H., Belke, B., Oeberst, A., & Augustin, D. (2004). A model of aesthetic appreciation and aesthetic judgements. *The British Psychological Society, 95*, 489-508.

Lee, A. (2001). The mere exposure effect: An uncertainty reduction explanation revisited. *Personality and Social Psychology Bulletin, 27(10),* 1255-1266.

Matthes, J., Wirth, W., Schemer, C., & Pachoud, N. (2012). Tiptoe or tackle? The role of product placement prominence and program involvement for the mere exposure effect. *Journal of Current Issues & Research in Advertising, 33(2),* 129-145.

Mita, T. H., Dermer, M., & Knight, J. (1977). Reversed facial images and the mere-exposure hypothesis. *Journal of Personality and Social Psychology, 35(8)*, 597-601.

Monahan, J. L., Murphy, S. T., & Zajonc, R. B. (2000). Subliminal mere exposure: Specific, general and diffuse effects. *Psychological Science, 11(6)*, 462-466.

Moreland, R. L., & Beach, S. R. (2004). Exposure effects in the classroom: The development of affinity among students. In H. Reis & C. E. Rusbult (Eds.), *Close Relationships* (89-97). New York, NY: Psychology Press.

Neuper, C., Scherer, R., Reiner, M., & Pfurtscheller, G. (2005). Imagery of motor actions: Differential effects of kinesthetic and visual-motor mode of imagery in single-trial EEG. *Cognitive Brain Research, 25,* 668-677.

Newell, B. R., & Shanks, D. R. (2006). Recognising what you like: Examining the relation between the mere exposure effect and recognition. *European Journal of Cognitive Psychology, 19(1),* 103-118.

Peretz, I., & Gaudreau, D. (1998). Exposure effects on music preference and recognition. *Memory & Cognition, 26(5)*, 884-902.

Pliner, P. (1982). The effects of mere exposure on liking for edible substances. *Appetite: Journal for Intake Research, 3*, 283-290.

Saegert, S., Swap, W., & Zajonc, R. B. (1973). Exposure, context and interpersonal attraction. *Journal of Personality and Social Psychology, 25(2)*, 234-242.

Seamon, J. G. & Delgado, M. R. (1999). Recognition memory and affective preference for depth-rotated solid objects: Part-based structural descriptions may underlie the mere exposure effect. *Visual Cognition, 6(20)*, 145-164.

Seamon, J. G., Ganor-Stern, D., Crowley, M. J. Wilson, S. M., Weber, W. J., O'Rourke, C. M., & Mahoney, J. K. (1997). A mere exposure effect for transformed three-dimensional objects: Effects of reflection, size, or color changes on affect and recognition. *Memory & Cognition, 25(3),* 367-374.

Seamon, J. G., McKenna, P. A., & Binder, N. (1998). The mere exposure effect is differentially sensitive to different judgement tasks. *Consciousness and Cognition, 7,* 85-102.

Seamon, J. G., Williams, P. C., Crowley, M. J., Kim, I. J., Langer, S. A., Orne, P. J., & Wishengrad, D. L. (1995). The Mere Exposure Effect Is Based on Implicit Memory: Effects of Stimulus Type, Encoding Conditions, and Number of Exposures on Recognition and Affect Judgements. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 21(3)*, 711-721.

Topolinski, S. (2010). Moving the eye of the beholder: Motor components in vision determine aesthetic preference. *Psychological Science, 21(9)*, 1220-1224.

Topolinski, S., & Strack, F. (2009). Motormouth: Mere Exposure Depends on Stimulus-Specific Motor Simulations. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35(2)*, 425-433.

Warburton, E. C., Wilson, M., Lynch, M., & Cuykendall, S. (2013). The cognitive benefits of movement reduction: Evidence from dance marking. *Psychological Science, 24(9)*, 1732-1739.

Whitfield, T. W. A., & Slatter, P. E. (1979). The effects of categorization and prototypicality on aesthetic choice in a furniture selection task. *British Journal of Psychology, 70*, 65-75.

Whittlesea, B. W. A., & Price, J. R. (2001). Implicit/explicit memory versus analytic/nonanalytic processing: Rethinking the mere exposure effect. *Memory & Cognition*, 29(2), 234-246.

Ye, G., & van Raaij, W. F. (1997). What inhibits the mere exposure effect: Recollection or familiarity? *Journal of Economic Psychology, 18*, 629-648.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social*

Psychology Monograph Supplement, 9(2), 1-24.

Zajonc, R. B. (2001). Mere exposure: A gateway to the subliminal. *Current Directions in Psychological Science, 10(6)*, 224-228.

Zizak, D. M., & Reber, A. S. (2004). Implicit preferences: The role(s) of familiarity in the structural mere exposure effect. *Consciousness and Cognition, 13*, 336-362.

Table 1

Repetition x Condition Factorial Analysis of Variance for Liking and Ease (Experiment 1A)

Source	Df	F	η^2	*p*
Liking				
Repetition	2	0.22	0.006	0.8
Condition	1	0.66	0.017	0.42
Repetition x Condition	2	0.3	0.008	0.74
Error (within groups)	76			
Ease				
Repetition	2	2.35	0.06	0.1
Condition	1	1.62	0.04	0.21
Repetition x Condition	2	0.32	0.008	0.72
Error (within groups)	76			

Table 2

Means and Standard Deviations of Liking and Ease Scores by Repetition (Experiment 1A)

	Repetition					
	0 presentations		1 presentation		5 presentations	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Liking						
Control (n=20)	56.92	26.55	56.35	23.41	60.99	18.97
Imagine (n=20)	47.35	18.84	50.22	17.61	52.44	21.17
Overall Total (n=40)	53.47	20.04	53.61	18.71	54.93	17.3
Ease						
Control (n=20)	56.92	26.55	56.35	23.41	60.99	22.85
Imagine (n=20)	47.35	18.84	50.22	17.61	52.44	18.97
Overall Total (n=40)	52.14[a*]	23.23	53.29	20.68	56.71[a*]	21.17

Note. M=Mean, SD=Standard Deviation, n=number of participants.
[a] Means are significantly different.
* $p<.05$

Table 3

Separate One-way Repeated Measures Analysis of Variance for Liking and Ease (Experiment 1B) and Liking Alone (Experiment 2)

	Repetition								
	0 presentations		1 presentation		5 presentations				
Ratings	*M*	*SD*	*M*	*SD*	*M*	*SD*	F (df)	η^2	*p*
				Experiment 1B (n=42)					
Liking	53.56	19.17	53.46	20.87	57.46	20.65	1.49 (2,82)	0.04	0.23
Ease	47.57[a]*	21.38	47.66	22.04	52.21[a]*	23.19	3.79 (2,82)	0.09	<.05
				Experiment 2 (n=40)					
Liking	52.35	20.59	53.17	18.67	55.17	18.58	1.3 (2,78)	0.02	0.48

Note. M=Mean, SD=Standard Deviation, n=number of participants.

[a] Means are significantly different.

* p<.05