Attention! Mere Exposure Effects Exposed

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Abstract. In this paper, we sought to reveal what exactly explains the mere exposure effect. Our hypothesis predicates on attention. Since both attention and repeated exposure to the stimulus increase an individual's positive affective rating, it is crucial to understand how attention contributes to mere exposure effects. The present findings suggest that an individual who attended to a melody gave a significantly higher affective rating than one who ignored the same melody. In addition, when an individual did not attend to the melody fully, his affective rating was comparable to an individual who ignored the melody; without full attention, an individual's affective rating was close to neutral. Taken together, these novel findings reveal, for the first time, that attention solves the mere exposure effect puzzle.

Keywords: mere exposure effects; affective rating; attention

1. Introduction

Mere exposure effects have been defined as an increased affect towards a novel stimulus after being repeatedly exposed to that stimulus (Zajonc, 1968). In a typical experiment which investigated the mere exposure effects, participants were asked to attend to a set of stimuli presented at varying frequencies (i.e. the number of times the stimuli appeared). After which, they had to rate their liking for these stimuli. In general, participants were more likely to rate stimuli which they were exposed to more frequently with higher affective rating (Gordon & Holyoak, 1983).

Although the mere exposure effects seemed to dispute some famous quotes such as "absence makes the heart grows fonder", this phenomenon was found to be robust and had been observed across cultures. Ishii (2005) exposed a series of Tagalog words repeatedly to a group of Japanese and American participants. They then rated their liking towards each utterance and indeed, mere exposure effects were evident across both cultures. Furthermore, mere exposure effects successfully emerged using diverse stimulus types, such as auditory (Bradley, 1971) and polygon (Kunst-Wilson & Zajonc, 1980) ones.

In the last century, there had been many published studies investigating the mere exposure effects using auditory stimuli especially in the area of music. Meyer (1903) first reported mere exposure effects in oriental-like music. The mere exposure effects appeared to be persistent across all the genres of music (e.g., Hargreaves, 1984). The interpretation is that because we become more *familiar* with the music, we *increasingly* develop positive affect for it. Fechner (1876) postulated that the more familiar an object was, the more liking would be toward the object as opposed to an unfamiliar one (as cited in Crozier & Chapman, 1984). This hypothesis was illustrated by Maslow (1937), who found a preference for a more familiar painting even when all the paintings were painted by the same artist. Besides that, an increase in liking was also found when individuals were familiarized with music they heard often (Meyers, 1903). Studies had demonstrated that familiarity could also account for an increase in positive affect toward the stimuli. In other words, when familiarity increases, positive affect increases correspondingly.

As mentioned above, repeated exposure resulted in the facilitation of encoding process as well as elevation in the subjective feeling of processing frequency. Liking ascended due to fluency, where participants tended to prefer old to new items when the stimulus was re-represented at test. Similarly, familiarity might be the underling factor of mere exposure effect when the same stimulus was re-encountered (Wang & Chang, 2004). Since the increment in affective rating could be associated with either the frequency of exposure or familiarity, a group of researchers claimed that the mere exposure effects actually represented a closer view of a perplexing relationship between familiarity and liking (Harrison, 1977). Research (i.e. Zajonc, 1968) suggests that when an individual was repeatedly exposed to a set of stimulus, he experienced cognitive and affective changes toward that set of stimulus. Therefore, after repeatedly exposed to the stimulus, (1) an individual's ability to recognize the stimulus increased for the cognitive aspect, and (2) his attitude toward the stimulus became increasingly positive for the affective component. Hence, it was possible for an individual to experience both familiarity (cognitive aspect) and greater positive affect (emotional aspect). Here, familiarity in fact might not *lead* to positive affect. When stimuli were deemed to be familiar for an individual, mere exposure effects became attenuated or even eliminated, when compared to novel stimuli (Harrison, 1977). Hence, stimuli to which one is already (very) familiarized exert little impact to influence one's affective ratings. Familiarity per se might not be useful, nor adequate, to predict one's liking for novel stimuli. The present study intended to use a more holistic approach to investigate mere exposure effects more fully in terms of that which might predict these effects. The question we asked was: while we *seem to* like what we hear as we become familiarized to it, what *exactly* determines this increase in affect?

Some previous research had hinted that attention might influence affective evaluation of the stimuli. A group of researchers investigated how selective attention could affect subsequent affective evaluation of visual stimuli (Raymond, Fenske, & Tavassoli, 2003). The data showed that previously ignored images were judged more negatively than previously attended images, suggesting that attention could powerfully modulate the affective evaluation of innocent stimuli. While these findings suggest that attention could affect affective evaluation, it is of interest whether attention is influential in helping us understand the nature of mere exposure effects and the factor(s) that undergird(s) them.

Zajonc (2004) "argued that exposure effect can occur without the present of cognitive appraisal or higher level of cognitive abilities" (p. 359). In contrast, numerous studies revealed that higher cognitive abilities were actually involved in mere exposure effect. According to Yagi, Ikoma & Kikuchi (2009), they found that selective attention actually modulated the mere exposure effects for visual stimuli. There was a decline in positive affect due to the attentional selection for ignored stimulus and an increase in positive affect for the attended stimulus. Thus far, attention seems to play a role in the mere exposure effects. Of particular interest is whether attention is influential to govern mere exposure effects in an auditory context. This represents an important extension of the current literature, because auditory stimuli, such as music, had yet to be studied in light of attention as a critical factor in inducing mere exposure effects. Our broad goal is to provide a better understanding on how attention might influence the occurrence, or lack thereof, of mere exposure effects.

In the present study, we used three conditions. In condition 1, participants would listen (attend) to the target melody only, so that full attention is presumably deployed at the target melody. In condition 2, participants would attend to the target melody while explicitly counting the number of percussion sounds embedded within the melody at the same time. The intention is to reduce the number of attentional resources deployed to the target melody by allocating a portion of attention to the counting task. In condition 3, participants would solely count the number of percussion shakes in the target melody (without attending to the melody per se). The intention is to devoid the target melody of attention. The critical hypothesis is that to the extent that the mere exposure effect is a function of attention, rather than familiarity per se, one can then imagine that given repeated exposures, across all three conditions, participants would have reported *equal amounts of familiarity* towards the target melody. However, because the target is devoid of attention in condition 3, participants ought to report *low levels of liking* for the melody, as compared with levels of liking in condition 1 (full attention deployed) and condition 2 (at least partial attention was received). The idea is that attention, rather than familiarity per se, ought to lead to positive affect in a musical task. This would in turn help us understand, more fully and for the first time, antecedents involved in the mere exposure effect in an auditory (musical) context.

2. Method

2.1. Participants

156 undergraduates (115 female and 41 male) who enrolled in an introductory psychology course participated in this study. They received partial course credit for their participation. The mean age of male undergraduates was 21.07 (*SD* = 1.127) and that of female undergraduates was 19.27 (*SD* = 1.111). All participants reported no history of any hearing disorders. Out of all the participants, 69 participants reported with no experience in music. The remaining participants had experience ranging from one years to twenty years in music (*M* = 8.07, *SD* = 4.639).

Table 1B. “list B"

Composer (Year)	Composition
Englund (1980/1979)	1A: Arioso Interrotto
Reger (1940/1909)	2A: Pradulium und Fuge in a-moll
Badings (1984/1951)	3A: Sonate III
Eniem (1994/1993)	4A: Five-Four-Twelve
Wuorinen (1972/1969)	5A: The Long and Short

Table 1A. "list A"- tempo above 100bpm

Composer	Composition
Harbison (1994/1985)	1B: 4 Songs of Solitude
Farkas (1992/1987)	2B: Sonata
Henze (1981)	3B: Etude Philharmonique
Rivier (1983)	4B: En Revani A Elle
Maw (1999)	5B: III Tombeau

2.2. Stimuli

10 melodies were selected and used in this experiment. Each melody lasted a duration of 30 seconds, and was presented for six times. Participants were presented only with melodies from either list A or list B (Table 1A and Table 1B) during the phase one of the experiment. The melodies were randomized in a principled way to prevent any music excerpt from appearing twice or more in succession.

In phase one, participants were randomly selected for each condition. The experimental conditions are as follows (see also Table 2):

Listen-only condition. The sole task that participants need to do was to listen to the melodies when they were played and answer some questions pertaining to those melodies at the end of the experiment

Listen-and-count condition. Participants had to listen to the melody and at the same time count the number of shakes embedded in each melody. They have to write down the number of shakes they had counted on an answer sheet.

Count-only condition. Participants only had to count the number of shakes embedded in the melody and write them down on an answer sheet. The accuracy of their counts was deemed to be important.

In phase two, participants would listen to the 10 melodies and rate whether they found the melodies familiar and whether they liked the melodies. These ratings were based on the 7-points likert scale (1= strongly disagree, 4 = neutral and 7 = strongly agree).

Table 2. Experimental conditions for main experiment

Condition	Tasks for participant to accomplish	
	Listen to the melody	Count the number of shakes embedded in the melody
1	✓	
2	✓	✓
3		✓

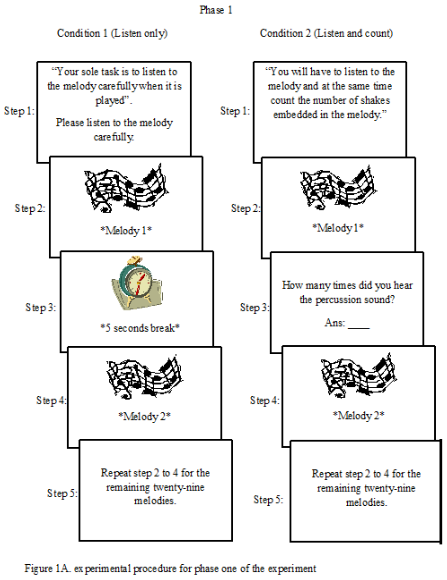
2.3. Apparatus

The music stimuli were all created and exported using the Musescore software. Upon exporting the music stimuli, Audacity software was used to record the triangle shakes and convert them into a single audio .wav file. The presentation of the experiment was done using ePrime 1.2 software. A questionnaire was designed to collect the demographic information of the participants, which includes age, gender, experience in music as well as any history of hearing disorder. An answer sheet was also provided for the rating task.

2.4. Design

A one way between-subject ANOVA design was used, with instructions (i.e., manipulating the allocation of attention) as the between-subject variables (IV)s. The IV had 3 levels: (a) listen to the melody (i.e. full attention on the melody) vs. (b) listen to the melody and count the number of shakes embedded in the melody (i.e. split attention between the melody and counting) vs. (c) count the number of shakes embedded in the melody (i.e. full attention on counting). The dependent variables were how familiar the participants found the melody to be and how much the participants liked each melody.

In phase one, participants were randomly selected for one of the conditions (listen-only, listen and count and count-only). During phase two, participants had to listen to all melodies and rate their familiarity and affective level. They would then fill up their demographic information and be debriefed on the nature of the experiment. An illustration of the procedures used in this study was outlined in Figure 1A and 1B.



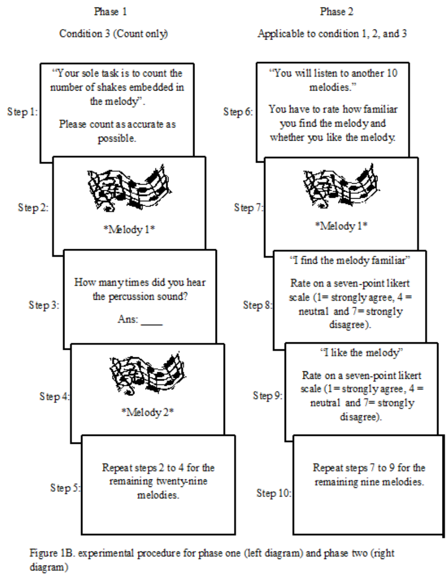


Figure 1A. Experimental procedure for phase one of the experiment Figure 1B. Experimental procedure for phase one (left diagram) and phase two (right diagram)

3. Result and Discussion

A one-way between-subject analysis of variance (ANOVA) was run to compare the effects of attention through the manipulation of instruction (i.e., full attention on melody vs. split attention between melody and counting vs. full attention on counting) on the familiarity rating and affective rating.

Out of the 85 participants from the listen-only condition, 7 participants were eliminated because the mean for familiarity rating of the new melody was above the neutral point on the Likert-scale (neutral = 4). This implied that participants might not have been paying attention to the melodies and thus failed to distinguish the old melodies (heard in phase one) from the new one (never heard in phase one). In addition, 9 participants from the listen-only condition and 12 participants from the listen-and-count condition were eliminated as they failed to meet the 90% accuracy benchmark (i.e., four or more questions answered incorrectly).

Familiarity rating. The main effect for familiarity rating was not significant, F (2, 153) = .845, p >.1. Separate independent t-tests were run to investigate whether there was any effect of the different levels of attention allocated to the melody on the familiarity rating. The differences between the listen only condition (M = 6.05, SD = .623) and the listen and count condition (M = 5.95, SD = .719), t (97) = .763, p > .1, the listen only condition (M = 6.05, SD = .623) and the count only condition (M = 5.88, SD = .699), t (106) = 1.329, p > .1 and the listen and count condition (M = 5.95, SD = .719) and the count only condition (M = 5.88, SD = .699), t (103) = .484, p > .1 ,were not significant.

Familiarity rating did not differ substantively from one another as a function of attention across all conditions. Regardless of whether the participants listened to the melody (full attention on the melody), listened to the melody and counted the shakes embedded in the melody (partial attention on the melody) or counted the shakes embedded in the melody (no attention on the melody), they rated the melodies as equally familiar after having been exposed to them six times repeatedly in phase one of the experiment. Thus, with or without attention, familiarity rating did not differ significantly from each other, suggesting that the amount of attention deployed to the target melody does not modulate degrees of familiarity.

Affective rating. The main effect for affective rating was marginally significant, F (2, 153) = 2.926, p = .057. Planned comparisons were conducted to investigate whether affective rating was influenced by the level of attention allocated to the melody. The difference between the listen-only condition (M = 4.62, SD = .736) and the listen-and-count only condition (M = 4.177, SD = 1.272), t (97) = 2.116, $p < .05$, and the listen-only condition (M = 4.62, SD = .736) and the count-only condition (M = 4.182, SD = 1.096), t (106) = 2.382, $p < .05$, were significant. Participants from the listen-only condition gave a higher affective rating compared to participants from the count-only condition as well as the listen and count condition. There was no significant difference between listen-and-count condition (M = 4.177, SD = 1.272) and count-only condition (M = 4.182, SD = 1.096), t (103) = -.023, $p > .1$.

There was a significant difference in the affective rating as a function of attention. Participants in the listen only condition gave significantly higher affective rating than participants in the count only condition and participants in the listen and count condition. On the other hand, participants in the count only condition and participants in the listen and count condition did not differ significantly in their affective rating. This suggested that full attention allocated to the listening of melody was required to ensure a higher affective rating after an individual has been repeatedly exposed to the melody. However, when there was no attention allocated to the listening of melody or when attention was divided between listening of melody and counting of the number of shakes, the affective rating did not differ between the old and new stimuli.

The data also demonstrated that affective rating for the listen and count condition only differed significantly from the listen only condition but not the count only condition. This suggested that when an individual attended to the melody without paying full attention, it would still greatly (reliably) reduce his or her positive affect toward the melody. Hence, the affective rating for the listen and count condition was similar to the rating in the count only condition. Summarizing, when an individual attended to the melody only partially, his or her liking for the melody was only comparable to an individual who fully ignored the melody. Based on our data, it would appear that our processing system demands that we devoted *full attention* to a melody before we would perceive it as pleasurable.

4. Conclusion

The present study revealed, for the first time, the critical role of attention in mere exposure effects. Despite common knowledge concerning what the mere exposure effects supposedly are, the current study shows, for the first time, that attention underlies this exposure-affect relationship. Specifically, the present data are novel and suggest that familiarity is not yet adequate to determine positive affect for a melody; rather, attention ought to have been deployed to a target melody before we would grow to like it.

5. References

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