

## ABSTRACT

### THE BEHAVIORAL EFFECTS OF MERE EXPOSURE IN RESPONSE TO AFFECTIVELY NEUTRAL AND NEGATIVELY VALENCED STIMULI

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Past research within the mere-exposure paradigm has found that objects made familiar are preferred relative to novel, but otherwise evaluatively-equal, objects. However, little research has been conducted to explore how this phenomenon affects behavior. Additionally, few prior investigations have examined the effect of mere exposure on negatively-valenced stimuli. The current research investigated both of these issues. In this work, participants were asked to approach and avoid novel and familiar stimuli; some that humans perceive as neutral in valence, some that humans innately find negative or threatening (e.g., predatory animals), and some that humans have learned are negative or threatening (e.g., weapons). Results showed that approach behavior was facilitated by stimulus familiarity and that novel stimuli trended toward evoking avoidance behaviors. The type of stimulus did not moderate these effects. The theoretical implications of these findings are discussed.

THE BEHAVIORAL EFFECTS OF MERE EXPOSURE IN RESPONSE TO AFFECTIVELY  
NEUTRAL AND NEGATIVELY VALENCED STIMULI

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Throughout any given day, a great number of stimuli are encountered in the environment. Of these stimuli, both social and non-social, some are intrinsically valenced and bring about obvious and automatic evaluations (Barrett, 2005). For example, heights, snakes, and predatory animals are all perceived as innately negative by humans and non-human primates, the fear of which developed as an adaptation to selection pressures posed by such stimuli (Mineka & Ohman, 2002; Nelson, Shelton, & Kalin, 2003; Ohman & Mineka, 2001). Additionally, objects that suggest disease or threats to health, such as blood, feces, rotting meat, and sickly individuals, are also innately aversive (Curtis, Aunger, & Rabie, 2004). Importantly, the evaluation of these objects dictates subsequent approach and avoidant behavior directed toward them (e.g., Faulkner, Schaller, Park, & Duncan, 2004), and the adaptive value of such a system of appraisal is undeniable, particularly when sizing up and directing behavior toward beneficial and harmful stimuli.

Empirical demonstrations have indeed found that innately aversive stimuli inspire avoidant and defensive behaviors. For instance, looming shadows, loud noises, and snakes prompt startle reflexes in humans (for a review see Ohman & Mineka, 2001). Additional research with non-human populations has found ducking, flinching, and distress calls in rhesus monkeys when looming shadows are presented (Barrett, 2005). Within more social domains, broad cross-cultural samples of participants rate faces possessing physical characteristics of disease as eliciting disgust (Curtis et al, 2004), an adaptive emotion meant to cue disease avoidant strategies (Rozin, Haidt, & MaCauley, 2001; Rozin, Lowery, & Ebert, 1994). Additionally, facial displays of anger, which is a universally recognized emotion of evolutionary significance that signals threat (Ekman & Friesen, 1971), also trigger avoidant behavior (Marsh, Ambady, & Kleck, 2005).

Conversely, empirical work suggests that other evolutionarily-relevant cues can motivate approach tendencies. For example, highly symmetrical faces, a marker of genetic quality and health, are typically rated as more attractive across cultures, and are considered to be more desirable as mates (for a review see Sugiyama, 2005). Moreover, facial displays of fear have been shown to facilitate approach responses, perhaps because such an expression serves “as an appeasement cue, intended to ameliorate conflict or elicit conciliatory or affiliative behavior, much like the submission cues of other species” (Marsh, Ambady, & Kleck, 2005, p. 122). Together, this evidence indicates that innately negative stimuli, such as snakes, prepotentiate avoidant behaviors, whereas as positive features, such as facial symmetry and affiliative emotions, tend to motivate approach-related behaviors.

Other stimuli encountered in the environment, though, lack an obvious, innate valance. Unlike the objects just described, many other classes of objects (e.g., weapons) may be perceived as threatening and elicit avoidant reactions, but such responses were probably learned via experience and are not the product of evolutionary pressures. That is, infants likely would not feel fear upon seeing someone with a gun, but adults would. This is because, over time, humans have learned that weapons can pose danger and, once this association has been formed, likely fear such objects and seek to avoid them.

Such associations may be formed via conditioning or a slow-learning process (see Rydell & McConnell, 2006; Sloman, 1996; Zajonc, 2001), whereby an originally neutral stimulus is repeatedly paired with valenced information and eventually takes on the associated evaluation. Such a process has been offered as an explanation for how negative and positive attitudes are formed for a variety of objects. For example, in the area of intergroup relations, Devine (1989) argued that because of common socialization practices within a culture, most individuals living

in it have knowledge of the negative stereotypes of particular groups. Furthermore, by adulthood, this stereotype knowledge and the group label have had a long history of co-activation, and thus, most individuals form a strong association in memory between the group and the associated stereotype. Evidence of such associations has been demonstrated numerous times. For example, participants are quicker to identify positive words when preceded by pictures of ingroup faces than outgroup faces and faster to identify negative words preceded by pictures of outgroup faces than ingroup faces (Fazio, Jackson, Dunton, & Williams, 1995). Such a finding demonstrates a learned negative association with an outgroup that manifests itself implicitly.

Importantly, there is a great deal of work suggesting that stimuli that we have learned (implicitly or explicitly) are positive or negative drive our approach and avoidant behaviors toward them. For example, McConnell and Leibold (2001) reported that the magnitude of participants' implicit anti-black bias predicted the quality of their social interactions with a Black experimenter as measured by both the experimenter and trained observers. Most relevant to approach and avoidance, they also measured participant seating distance from the experimenter, and found that the experimenter's ratings of the interaction were correlated with how far the participant sat from the Black experimenter, with more perceived anti-black bias expressed in further seating distance. Similarly, Macrae, Bodenhausen, Milne, and Jetten (1994) found that participants with activated stereotypes about skinheads, a negatively viewed group, sat farther away from an ostensible skinhead interaction partner. Moreover, when participants believe an opposite-sex confederate has similar attitudes as their own, they rate this person as more attractive and choose seats closer to this person than an opposite-sex confederate with ostensibly different attitudes (Allgeier & Byrne, 1973). And finally, adjectives that have evaluative connotations can also influence basic approach and avoidance tendencies, such that positive words facilitate approach behaviors and negative words facilitate avoidance tendencies (Chen & Bargh, 1999). Together, such findings demonstrate that stimuli with a learned valence influence approach and avoidant behavior.

### *Mere Exposure and Stimulus Evaluation*

Besides conditioning via a slow-learning process, evaluations of objects can be forged through unreinforced exposure to a stimulus. This is referred to as the mere-exposure effect, first demonstrated by Zajonc in 1968. This work showed that exposing participants repeatedly to a previously novel stimulus, for which participants had no prior learned associations, increased their liking for it compared to their ratings of non-repeated (e.g., novel), but otherwise equivalent, stimuli. This effect has since been replicated reliably (see Bornstein, 1989, for a meta-analytic review), while generating enough theoretical and applied interest to still be a relevant avenue of research.

Examples of increased liking resulting from mere exposure beyond Zajonc's (1968) initial demonstration of the phenomenon are plentiful, and have been found with a variety of stimuli: Chinese ideographs (Zajonc, 1968), nonsense letter strings and line drawings (Berryman, 1984; Lee, 2001; Stang, 1974), and social stimuli such as faces and names of people (e.g., Harmon-Jones & Allen, 2001; Kramer & Parkinson, 2005; Moreland & Beach, 1992; Moreland & Zajonc, 1982). Increased positive evaluations resulting from familiarity have since been found subliminally (Bornstein, 1989; Monahan, Murphy, & Zajonc, 2000), demonstrating that the effect can occur without conscious recognition of the stimuli.

A variety of explanations have been postulated to explain why such mere-exposure effects occur. Early theories posited that a preference for familiar stimuli is an artifact of

experimental design (Mandler, Nakamura, & Van Sandt, 1987), whereas others suggested it occurs because of a misattribution of perceptual fluency to the stimulus (Bornstein & D'Agostino, 1992, 1994). However, recent research has converged on a different explanation of why perceivers show a greater preference for familiar relative to novel stimuli; namely, that the experience of familiarity itself generates positive affect, which is then attributed to the associated stimulus (e.g., Bornstein, 1989; Harmon-Jones & Allen, 2001; Reber, Schwarz, & Winkielman, 2004; Zajonc, 1968).

Bornstein (1989) conducted a meta-analysis of the mere exposure literature and concluded that repeated exposure to stimuli generates positive affect for evolutionary reasons. According to Bornstein (1989), an unreinforced stimulus, be it human, animal, or any other object in the environment, may initially evoke an avoidance behavior, as its potential danger is unclear. However, upon repeated exposures, this avoidance tendency will be replaced by a preference for the stimulus, provided it has proven harmless after the initial exposure. Supporting an evolutionary basis for the mere-exposure effect is the number of studies demonstrating animal subjects prefer stimuli they have been exposed to previously, suggesting an adaptive benefit that extends to species beyond humans (Rajecki, 1974; also see Zajonc, 2001 for a review). Furthermore, in his seminal paper on the subject, Zajonc (1968) also postulated a similar evolutionary hypothesis to that later articulated by Bornstein (1989), specifically that humans and other animals have an instinctual response to avoid an unfamiliar stimulus in their environment, but that with repeated exposures, this response is diminished through an affective processes whereby the stimulus comes to be considered more likable and approachable.

Another theory that does not rest on evolutionary psychology, termed the affective/perceptual fluency model, has recently been developed to explain mere-exposure effects. Though its focus on social-cognitive mechanisms is different than the evolutionary, functional theories of mere exposure, it is similar in that it argues that mere-exposure effects occur because familiarity triggers positive affect and that this affect is attributed to the associated stimulus.

According to this model, familiarity increases the fluent processing of a stimulus, or the ease with which the stimulus is perceived and identified (Jacoby & Dallas, 1981). Initial processing of a previously-unknown object is rather effortful, as one must encode all its features and create a new mental representation of the object. But all subsequent encounters with the now familiar object proceed more smoothly and easily as one simply “matches” the currently viewed object with the associated mental representation, and all its relevant features become accessible. Importantly, many have argued that the phenomenological experience of this fluency (perceptual ease) is a positive one (e.g., Garcia-Marques & Mackie, 2000; Reber et al. 2004; Reber, Winkielman, & Schwarz, 1998). This positive feeling, however, is rather diffuse and its origin is likely unknown to the perceiver (Reber et al., 2004). Therefore, the positive affect that ensues from the processing of fluent (familiar) stimuli is often misattributed to the stimulus itself, which results in it being evaluated more positively.

The most direct and compelling evidence showing that fluency generates positive affect was provided by Winkielman and Cacioppo (2001). Across two studies, participants viewed neutral pictures that varied only in their processing ease. Results showed increased zygomatic muscle activity (the muscles used when smiling) revealed by EMG data for the fluent compared to the less fluent targets, suggesting that processing ease leads directly to increased positive affect. Thus not surprisingly, since familiarity increases fluency, it too has been shown to increase positive affect. Specifically, Harmon-Jones and Allen (2001), using both explicit ratings



of female faces and implicit physiological measures, found that familiar faces were rated more likable and also induced more zygomatic muscle movement than unfamiliar faces, suggesting that positive affect results from repeated exposures to a stimulus. Moreover, Monahan et al. (2001) found that repeated exposure to neutral Chinese ideographs led to increased self-reported positive affect in participants, compared to those who only viewed the ideographs once. Overall, these findings strongly suggest that familiarity (fluency) triggers positive affect in the perceiver.

Further indicating a relationship between positive affect and familiarity is research revealing what could be considered a reverse mere-exposure effect. For example, when novel, neutrally-valenced stimuli were subliminally preceded by a smiley face, those stimuli were more likely to be mistakenly judged as having been seen before compared to stimuli primed by a neutral symbol. This effect suggests that the positive affect associated with stimuli (via the subliminally-primed smiley face) is misattributed to familiarity (Garcia-Marques, Mackie, Claypool, & Garcia-Marques, 2004). Similarly, faces which are considered more attractive are also incorrectly rated as being familiar to participants (Monin, 2003). Moreover, research shows that perceivers in positive mood states mistakenly rate stimuli as more familiar compared to those in neutral moods (Claypool, Hall, Mackie, Garcia-Marques, in press; Phaf & Rotteveel, 2005). Together, such findings suggest that feelings of positive affect can cue perceptions of familiarity.

### *Effects of Mere Exposure on Behavior: Literature Review and Hypotheses*

Given that stimuli with evaluative connotations influence approach behavior and that familiarity seems to engender positive evaluative responses to a variety of stimuli, one might logically expect those positive evaluations to guide approach behaviors to familiar stimuli. Yet surprisingly, the effect, if any, mere exposure has on behavior, particularly approach/avoid behavior, is largely untested.

The existent literature does provide some evidence that mere exposure has the ability to produce changes on responses other than just global (good-bad) attitudes. For example, Bornstein, Leone, and Galley (1987) subliminally exposed participants to photographs of research confederates, after which they then engaged in a triadic interaction with the previously exposed (familiar) confederate and an additional unfamiliar confederate. During this interaction, the group (i.e., the one participant and two confederates) read ten pieces of poetry and tried to determine the author's gender. On seven trials, the familiar and unfamiliar confederates disagreed about the author's likely gender, leaving the participant to break the deadlock. Results showed that participants were more likely to agree with the judgment of the familiar confederate.

Similar research using exposure to confederates has found participants are also more willing to comply with requests made by familiar rather than novel individuals (Burger, Soroka, Gonzago, Murphy, & Somervell, 2001). To elaborate, Burger et al. (2001) found that participants exposed to a confederate, by being made to wait in the same room with him or her, were later more likely to agree to read and offer comments on an essay ostensibly written by the confederate than were participants not originally exposed to the confederate.

Given the ability of familiarity to create positive attitudes to associated stimuli and its ability to direct behaviors (increased agreement with others and pro-social tendencies), I hypothesize that mere familiarity with a stimulus should also affect perceivers' proclivity to physically approach and avoid such stimuli. As detailed above, the evaluative connotation of a stimulus can influence approach and avoidance tendencies (Chen & Bargh, 1999; Macrae et al.,

1994; Marsh et al., 2005) with negative stimuli more eagerly avoided and positive stimuli more readily approached. As such, I predict that familiar stimuli will be approached more readily and avoided more hesitantly than will unfamiliar stimuli, as familiar stimuli are imbued with positivity and therefore should be approachable. This prediction also follows from Zajonc's (1968) assertion that the mere-exposure effect may have an evolutionarily adaptive function. To reiterate Zajonc's thesis, organisms should have an innate bias to avoid a novel stimulus, as it poses a potential threat. However, as the stimulus becomes familiar through repeated exposures, this tendency should be reduced provided the stimulus has not proven harmful.

As sensible and logical as this prediction seems, there may be an adaptively vital moderator of the hypothesized effect, namely, stimulus threat. If an object is relatively neutral in valence and non-threatening, then familiarity might well facilitate approach and slow avoidant reactions as just described. But, imagine a negative stimulus, one that humans are hard-wired to find threatening. For such a stimulus, the positivity associated with its fluent (familiar) processing may not facilitate approach behavior. From an evolutionary perspective, a threatening stimulus (e.g., a predatory animal) is inherently dangerous and should be avoided. Thus, one might hypothesize that making such a stimulus familiar would not slow such avoidance and certainly would not facilitate approach.

On the other hand, an innately negative/threatening stimulus that is familiar is, by definition, a stimulus one has seen before and survived. Thus, perhaps making such stimuli familiar would lead to faster approach and slower avoidant behavior. Though such a prediction might seem implausible at first, consider that exposure therapy is quite effective for the treatment of phobias to such objects (snakes, spiders). Such therapy essentially makes phobics more familiar with the feared/threatening stimulus, either through in vivo exposure or with the use of virtual environment technology (see Krijn, Emmelkamp, Olafsson, & Biemond, 2004, for a review) until the individual feels comfortable enough to approach it and not as eager to avoid it (Emmelkamp, 2003).

Let us next consider negative stimuli that connote threat, but are objects that humans must learn are dangerous (e.g., weapons). Might mere exposure impact such stimuli in ways different from those that humans are hard-wired to fear? Past research suggests that considering such a distinction may be quite important, as there is evidence suggesting that humans do respond differently, as measured by reduced skin conductance, when viewing learned threatening stimuli compared to innately threatening stimuli (Flykt, Esteves, & Ohman, 2007). As such, whatever effect mere exposure has on behavioral reactions to innately feared stimuli may not be the same as its effect on responses to learned negative stimuli. Conversely, some research indicates that individuals are equally fast to notice learned threatening stimuli hidden in an array of images as they are innately threatening objects (Blanchette, 2006) suggesting that both are of relatively equal status and therefore may respond the same to mere exposure. Thus, as was the case when considering innately threatening objects, two plausible predictions could be offered. One might argue that because learned, threatening stimuli are so dangerous that making them familiar might not speed approach or slow avoidant reactions to them. On the other hand, because humans are not "hard-wired" to fear such stimuli, reactions to them might be mutable. These hypotheses will be investigated in the following studies.

The speculative nature of these hypotheses rests partly on the fact that the mere-exposure literature itself has rarely investigated the effect of familiarity on evaluations of negative stimuli. Compounding this problem, the work that has been conducted in this area is characterized by mixed findings. For example, two studies suggest that increased exposure to negative stimuli

may increase negative ratings. Brickman, Redfield, Harrison, and Crandall (Experiment 3, 1972) had participants rate the likeability of abstract paintings. They then exposed each participant to the four he or she liked least, liked most, and evaluated neutrally. For paintings that were initially seen as positive or neutral, increased stimulus exposure increased liking. For paintings initially disliked, increased exposure led to more negative ratings, but only marginally so. In a separate study, Grush (1976) varied exposures to differently-valenced nouns and adjectives, and found, counter to most of the mere-exposure literature, that positive words (e.g., bluejay, decorum, gardenia) were not evaluated more positively with increased exposure. Of most relevance here, he found that negatively-valenced words (e.g., corrosive, ogre) were evaluated more negatively with increased exposure.

Some work that employs social targets suggests that repeated exposure to negatively-valenced stimuli increases positivity. Zajonc, Markus, and Wilson (1974) exposed White participants to photos of Chinese men. Some were described as “scholars and scientists,” whereas others were described as “men who have committed serious crimes.” Repeated exposure to both types of men increased positive evaluations of them. Additionally, Bornstein (1993) conducted a meta-analysis of mere exposure effects on outgroup stimuli, and found that participants’ evaluations of specific outgroup members were more favorable after repeated exposures to an outgroup exemplar. Whether these data truly test the notion that familiarity increases positive evaluations of negative stimuli is questionable, however, as work in the intergroup relations literature shows that though ingroup members are viewed quite favorably, outgroup members are not necessarily viewed negatively (e.g., Brewer, 1979; Gaertner, Iuzzini, Witt, & Orina, 2006).

Given this work, it appears that familiarity sometimes improves evaluation of negative stimuli and sometimes has no effect or even a deleterious effect on associated attitudes. As such, the question of how familiarity with stimuli that have an initially negative valence will influence behavior is particularly interesting, and the current research aims to shed light on this relationship. The current research then, has two principle goals: to establish the effect of mere exposure on approach and avoidant behavior toward to neutral stimuli, and to investigate the possible moderating role of initial stimulus threat on such relations.

### *Current Research: Overview and Summary of Predictions*

In this research, participants will be exposed to a series of objects in an initial task. Depending on condition, these objects will be either neutral in valence, ones that humans innately find negative or threatening (e.g., predatory animals), or ones that humans have learned are negative or threatening (e.g., weapons). Later, participants will see these same (now familiar) objects again along with new objects of the same type. Upon seeing these objects, participants will be asked to make a pushing or pulling motion with a joystick to simulate avoidant and approach behavior, respectively.

The predictions for neutral stimuli, as stated earlier, are straightforward: familiarity should facilitate approach (pulling) behavior and slow avoidant (pushing) behavior relative to novel stimuli. For negatively valenced, threatening stimuli however, several predictions are plausible. The first prediction, based on the findings for neutral stimuli (Bornstein, 1989) and the research pointing to the effectiveness of in vivo therapy for phobics (Emmelkamp, 2003), is that familiarity will have the same effects on the negative, threatening stimuli (regardless of their innate or learned negativity status) as predicted for neutral stimuli; specifically that approach

behavior will be facilitated and avoidant behavior will be slowed for familiar stimuli compared to novel stimuli.

A second prediction suggests that responses to negative, threatening stimuli may vary based on their relevance to evolutionary adaptiveness. From this perspective, stimuli that we are “hard-wired” to fear and flee may be immune to effects of mere exposure. That is, the adaptive advantage of avoiding *innately* aversive stimuli may be relatively immutable, and therefore familiarity should have no effect on behavioral responses to such stimuli. Specifically, perceivers should show no facilitation of approach or slowing of avoidant behavior for familiar innately negative stimuli compared to novel stimuli. However, for stimuli that have a *learned* negative association, ones that human have no evolutionary basis to fear, perhaps it is possible that repeated exposure will engender these stimuli with some measure of positivity, and therefore facilitate approach behaviors. A final prediction for the negative, threatening stimuli is that because of their danger posed, familiarity with any negative, harmful object, be it innate or learned, will not facilitate approach or slow avoidant reactions.

## Study 1

### *Participants*

Participants were 70 students from the Miami University introductory psychology subject pool who participated in exchange for partial course credit.

### *Apparatus and Materials*

To test the above hypotheses regarding behavioral effects of mere exposure, approach and avoidance tendencies were captured via the motions of a joystick. Such a method has been used by Chen and Bargh (1999, see also Marsh et al., 2005), who argued that pulling a joystick lever toward the self is an action mirroring an approach behavior, whereas pushing a joystick lever away from the self is an action mirroring an avoidant behavior. Their rationale was supported by the findings of two experiments. In their “congruent” condition of Experiment 1, Chen and Bargh (1999) asked participants to push a joystick lever away from themselves if a presented attitude object was negative and pull the joystick lever toward themselves if a presented attitude object was positive. In the “incongruent” condition, participants received the opposite instructions. Results showed faster reaction times for congruent trials (faster pulling to positive and pushing to negative objects) compared to incongruent trials. In their second study, participants were not asked explicitly to evaluate the attitude objects. Rather, they were asked simply to pull (or push) in response to the presentation of attitude objects on a number of trials. Replicating the finding from the first experiment, participants were faster to pull (approach) when attitude objects were positive and faster to push (avoid) when attitude objects were negative. Based on these findings and their reasoning, participants in this study were asked to push/pull a joystick lever in response to presentation of different stimulus photos. The joystick was a Logitech Extreme 3-D Pro model. During the push/pull task, the joystick was positioned directly in front of the computer screen, where participants were asked to manipulate it with their dominant hand.

Stimulus type was manipulated on a between-subjects basis, requiring three sets of stimulus photos: those depicting neutral objects (neutral condition), those depicting objects

humans have learned are negative or threatening (learned negative condition), and those humans innately find negative or threatening (innate negative condition). To identify such photos, I first searched the International Affective Picture System (IAPS) database (Lang, Bradley, & Cuthbert, 1999) for photos that I felt would fit the three stimulus types. Committee members examined the selected photos, and a consensus was reached about which photos belonged in which category. In total, 16 photos were assigned to each category. Stimuli in the neutral condition included photos of a bowl, pieces of furniture, cups, etc. Stimuli in the learned negative condition contained photos of stimuli that humans learn over their lifetimes are negative because of their purpose or outcomes, such as guns, knives, and car crashes. Lastly, stimuli in the innately negative condition featured stimuli that are naturally negative based on their evolutionary significance and threat, such as predatory mammals, spiders, and snakes. These photos were pre-tested to ensure that the photos in the negative sets (innate and learned) and the neutral set conveyed the desired valence.

Eleven students enrolled in Psychological Methods participated in this pre-test. Respondents examined each photo, one at a time, and rated each on a 9-point scale, ranging from -4 (very negative) to +4 (very positive) with 0 (neutral) as the mid-point. A one-way, within-subjects ANOVA on the evaluative scores of the photos revealed a significant effect of stimulus type,  $F(2, 9) = 78.94, p < .001$ . Post-hoc tests revealed that the mean evaluative scores of the photos in the learned negative condition ( $M = -2.06, SD = 0.75$ ) and the innately negative condition ( $M = -1.84, SD = 0.58$ ) were equally negative,  $t(10) = -1.5, p = .14$ , and both were significantly more negative than photos in the neutral condition ( $M = 0.14, SD = 0.30$ ): learned versus neutral,  $t(10) = -10.25, p < .001$ , and innate versus neutral,  $t(10) = -9.65, p < .001$ . Further, the perceived valence of the neutral stimuli did not differ from the mid-point of the scale,  $t(10) = 1.49, p = .16$ .

### *Procedure*

Participants arrived at the laboratory and were seated in front of a computer in a cubicle room. The opening instructions informed participants that they were taking part in a study designed to investigate basic motor responses to various stimuli. After reading the instructions, participants advanced the screen to complete the initial exposure phase of the experiment. In this phase, participants viewed eight stimulus photographs. Depending on condition, all photos depicted either neutral objects, learned negative objects, or innately negative objects. Participants viewed each image one time for one second, and images were presented in a different random order for each participant. The inter-stimulus interval was 500ms. After this initial exposure phase, participants engaged in a brief filler task in which they attempted to name the capital of each US state. This task took between five and seven minutes to complete.

Next, participants began the second phase of the study in which approach and avoidant actions were assessed. During this task, participants viewed the eight stimuli from the first phase (familiar stimuli) randomly intermixed with eight additional novel stimuli. Each trial began with presentation of the stimulus photo for one second. Then, the word "PUSH" or "PULL" randomly appeared in the center of the screen, and the participant, using their dominant hand, performed the corresponding motion with the joystick. The motion performed and the reaction time to conduct it was recorded. Once the participant completed the instructed behavior, the next trial began. After completing this task, participants were thanked, debriefed, and dismissed.

In total, participants completed 16 trials. On four of these, participants were asked to approach (pull in response to) a familiar stimulus; on another four trials, participants were asked to avoid (push in response to) a familiar stimulus; on another four trials participants were asked to approach an unfamiliar stimulus, and on the final four trials were asked to avoid an unfamiliar stimulus. Thus, the experiment employed a 3 (stimulus type: neutral, learned negative, innate negative)  $\times$  2 (motion: push, pull)  $\times$  2 (stimulus status: familiar, novel) mixed design, with the latter two factors manipulated within-subjects. In addition, within each stimulus type, half of the photos were randomly assigned to Set A and the other half to Set B. On a between-subjects basis, which set served as familiar and which served as novel, as well as which set was approached and which was avoided was counterbalanced<sup>1</sup>.

## Results

*Data transformations.* Before the primary analyses could be conducted, the data were examined for the presence of outliers and errors, and some simple transformations were performed. Based upon careful inspection of participant responses, the data from four participants were excluded from all analyses. Two of them were excluded for having high joystick error rates (greater than 80% of trials), and two were removed as outliers based on their reaction times being greater than three standard deviations away from the mean, leaving a final sample of 66 participants. In addition, for these remaining participants, error trials (where the participant made the incorrect motion with the joystick) were removed. A total of 23 trials were deleted for this reason, which represents roughly 2% of all trials completed. Additionally, reaction times below 300ms and above 3000ms were recoded to 300ms and 3000ms respectively (for similar methodology, see Greenwald, McGhee, & Schwartz, 1998), resulting in a total of three trials being recoded (2 below 300ms and 1 above 3000ms).

*Analyses.* The reaction times to make the instructed joystick motion were subjected to a 3 (stimulus type: neutral, learned negative, innate negative)  $\times$  2 (motion: push, pull)  $\times$  2 (stimulus status: familiar, novel) mixed-model ANOVA. This analysis yielded two significant effects of theoretical importance. First, there was a stimulus status  $\times$  motion interaction,  $F(2, 63) = 13.82, p < .001$ . As shown in Figure 1, however, the pattern of this interaction is exactly opposite what was hypothesized. Specifically, examining the effect of familiarity for each motion type, simple effects tests revealed that participants were significantly quicker to push in response to (avoid) familiar stimuli ( $M = 696.47, SD = 154.47$ ) than novel stimuli ( $M = 749.30, SD = 179.49$ ),  $F(1, 63) = 10.86, p = .002$ , which again, is contrary to predictions. No significant difference was found for pulling (approach) behavior when comparing novel ( $M = 696.78, SD = 174.53$ ) and familiar ( $M = 718.08, SD = 179.49$ ) stimuli  $F(1, 63) = 2.04, p = .16$ , though like the findings for pushing, this pattern is descriptively in a direction opposite to that which was predicted.

I also examined the simple effects of motion for both novel and familiar stimuli. These analyses revealed that participants were quicker to pull the joystick (approach) compared to push the joystick (avoid) when viewing novel stimuli,  $F(1, 63) = 11.27, p = .001$ , once more a pattern in direct contradiction to a priori predictions. No significant effect was found when comparing push (avoid) to pull (approach) motions for familiar stimuli,  $F(1, 63) = 1.61, p = .21$ , though like the findings for novel stimuli, this pattern is descriptively in a direction opposite of that which was predicted.

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<sup>1</sup> There were no effects of these counterbalancing factors. Therefore they are not discussed further.

The second theoretically relevant finding from the ANOVA was that the two-way interaction just described was not qualified by stimulus type,  $F(2, 63) = .30, p = .74^2$ . As shown in Figure 2, for all three stimulus types, the pattern was identical: participants were faster to push (avoid) in response to familiar stimuli relative to unfamiliar stimuli and were faster to pull (approach) in response to unfamiliar stimuli relative to familiar stimuli. Thus, the lack of the three-way interaction among stimulus type, stimulus status, and motion suggests that whether a stimulus is threatening (innately or via learning) or neutral did not differentially affect approach and avoidance behaviors toward familiar and unfamiliar stimuli.

### *Discussion*

The results of the current study indicate that familiarity does appear to influence behavioral tendencies. Specifically, participants were quicker to push the joystick when viewing familiar stimuli compared to when viewing novel stimuli and descriptively, though not significantly, faster to pull the joystick when viewing unfamiliar compared to familiar stimuli. In addition, participants were also quicker to pull rather than push the joystick when viewing novel stimuli, and non-significantly faster to push rather than pull the joystick when viewing familiar stimuli. Thus, these findings do shed light on whether mere exposure can influence evolutionarily-significant behaviors such as approach and avoidance. Curiously though, the nature of the statistically reliable effects seems to indicate that familiarity impels avoidant behaviors and novelty facilitates approach motor actions, as past research using a joystick paradigm has indicated that a pushing motion represents an avoidant behavior and pulling an approach behavior (e.g. Chen & Bargh, 1999; Marsh et al., 2005).

Assuming for the moment that pushing the joystick does in fact map on to avoidance, the results of the current study both run contrary to predictions and are also starkly counterintuitive. Past theorizing on the behavioral effects of familiarity has predicted that novel stimuli should be avoided, and that familiarity should attenuate this avoidant tendency (Bornstein, 1989; Zajonc, 1968). However, the current investigation finds just the opposite; an increased tendency to avoid the stimulus when it is familiar. Additionally, the lack of an interaction across conditions implies that the nature of the stimulus does not moderate this pattern, indicating that even when viewing stimuli of an innate or learned negativity, participants are quicker to “avoid” the familiar stimuli relative to novel stimuli as indicated by their hastened pushing of the joystick.

However, there may be reason to challenge the immutability of mapping pull and push motions to approach and avoidance behaviors respectively. First, from an anecdotal perspective, it should be noted that because the joystick was placed directly and closely in front of the computer screen, pushing the joystick did in fact move participants physically closer to the image, while pulling moved them further away. This fact suggests the possibility that participants construed “push” as approach and “pull” as avoidance, at least in the context of the current study.

Secondly, there is empirical work suggesting that push and pull need not always represent avoiding something negative and approaching something positive respectively. Specifically, Markman and Brendl (2005) report that participants’ construal of their location in space relative to that of a stimulus can reverse the evaluative meaning of pushing and pulling a joystick. To explain, participants saw their name located in the center of a virtual hallway on a computer screen. They were next presented with both positive and negative adjectives which appeared

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<sup>2</sup> Subsequent analyses revealed 726 participants would be needed for this interaction to reach statistical significance.

either above or below their name in the hallway (i.e., were “further away” or “closer to” their physical selves). On some trials participants were instructed to move the joystick from the location of the word to the location of their name (virtual self) when the word was positive and away from the location of the word to the location of their name when the word was negative. On other trials, participants were given the reverse of these instructions. On trials when the word was “far away,” the virtual representation of the self and the actual physical location of the self were similar in terms of their relative location to the word. And under these circumstances, the researchers expected and found that participants were faster to push in response to negative and pull in response to positive words, which conceptually replicates Bargh and Chen’s (1999) findings. But when the words were “closer,” the researchers found the opposite results: that participants were faster to push in response to positive and pull in response to negative words. Note that if “evaluations are connected to movement representations directly, then people would be faster to pull positive words toward their bodies and to push negative words away from their bodies regardless of the position of their names” (p. 7). The fact that such effects did not occur suggests that the evaluative/behavioral mapping offered by Bargh and Chen (1999) is not unconditional.

In other work, Wentura, Rothermund, and Bak (2000) had participants push a button away from the body or withdraw their hand toward their body when viewing stimuli. Button pressing was faster for positive than negative stimuli, and button withdrawing was faster for negative than positive stimuli. These findings directly suggest that movement away from the body can sometimes map onto approaching a positive stimulus, whereas movement toward the body can sometimes map onto avoiding a negative stimulus.

Given this apparent flexibility in the meaning of pushing and pulling the joystick, the results of the current study become potentially less perplexing. If, in the current research, pushing the joystick did in fact represent an approach motion and pulling an avoidance motion, then the pattern found follows the predictions. The faster reaction time to push the joystick when viewing familiar, relative to novel, stimuli would in fact indicate participants being more willing to approach these familiar stimuli. Similarly, the faster reaction times to pull compared to push the joystick when viewing novel stimuli would indicate a hesitation to approach novel stimuli. Together, these findings conform to predictions derived from the evolutionary/affective models of mere exposure (e.g. Bornstein, 1989; Zajonc, 1968). To lend additional empirical support to the possibility that “push” in this study was construed as approach and “pull” in this study was construed as avoid, an additional study was conducted.

## Study 2

In the current research, should pushing the joystick in fact represent an approach behavior, whereas pulling represent an avoidant behavior, then participants should be quicker to move the joystick when completing compatible trials (e.g., push = approach and pull = avoid) compared to incompatible trials (e.g., push = avoid and pull = approach). In greater detail, when participants are told to approach or avoid a stimulus, this should prepotentiate the concomitant motion. Therefore, if pushing the joystick in fact maps onto approach, reaction times when performing this motion should be facilitated following instructions to approach a stimulus and inhibited following instructions to avoid a stimulus. Similarly, if pulling the joystick maps onto avoidance, the converse should be true as well, such that reaction times when pulling should be facilitated following instructions to avoid a stimulus, and inhibited following instructions to



approach a stimulus. Study 2, therefore, was designed to test this possibility, and thus potentially shed light on the appropriate interpretation of the Study 1 findings, while also providing additional evidence that pushing and pulling motions have a flexible relationship to approach and avoid behaviors (see also Markman and Brendl, 2005).

### *Participants*

Participants were 56 students from the Miami University introductory psychology subject pool who participated in exchange for partial course credit.

### *Apparatus and Materials*

For Study 2, the identical joystick was used as in the previous study. Unlike Study 1 however, a pool of 32 images was used, and all stimuli (again taken from the IAPS) were neutral. The images used in Study 2 were all included in the initial pre-testing conducted prior to Study 1, and therefore were rated on the same 9-point scale by the same eleven participants. A one-sample t-test revealed once again that this larger pool of stimuli was not rated differently from the neutral point (0) of the scale ( $M = .08$ ,  $SD = .34$ ),  $t(10) = .79$ ,  $p = .44$ .

### *Method*

Although the method for Study 2 was similar to that of Study 1, several important changes were introduced. First, the initial picture viewing phase from Study 1 was removed, meaning participants completed only one task using the joystick, and stimulus familiarity was not manipulated. Additionally, as mentioned above, stimulus valance was held constant, such that all participants viewed only neutral images. The design of the study was a 2 (motion: push, pull) x 2 (behavioral instruction: approach, avoid) within-subjects design.

Upon arrival in the laboratory, participants were seated at a computer in an individual cubicle and told that they were participating in a task designed to test their responses on a motor control task. All participants then viewed 32 neutral images, presented randomly, each for two seconds. Following the presentation of the stimuli, the word "APPROACH" or "AVOID" randomly appeared on the screen for 500ms, followed by the word "PUSH" or "PULL," which remained on the screen until participants, using their dominant hand, completed the corresponding motion with the joystick. As soon as one trial was completed, the next immediately began. Across 32 trials, participants were asked to pull after the word "approach" appeared on eight trials, to push after the word "approach" appeared on eight trials, to pull after the word "avoid" appeared on eight trials, and to push after the word "avoid" appeared on eight trials. Which stimuli were paired with approach/push, approach/pull, avoid/push, and avoid/pull instructions was fully counterbalanced<sup>3</sup>. As in Study 1, participants' reaction times and motions with the joystick were recorded on each trial. Upon completion of the task, participants were thanked, debriefed, and dismissed.

### *Results*

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<sup>3</sup> There were no effects of these counterbalancing factors. Therefore they are not discussed further.

Prior to conducting the analyses, the same procedures used in Study 1 for treating error trials and latencies below 300ms and above 3000ms were performed on the data. Four participants were removed from the analyses, two for having high error rates (greater than 50%) and two more for having high RT recode rates (over 50% of trials needed to be recoded up to 300ms or down to 3000ms), leaving a final sample of 52 participants. From the remaining participants, 65 error trials were removed, representing roughly 4% the total trials completed. Finally, 26 latencies were also recoded (23 below 300ms and 3 above 3000ms).

The data were submitted to a 2 (motion: push, pull) x 2 (behavioral instruction: approach, avoid) within-subjects ANOVA. This analysis revealed a significant interaction,  $F(1, 48) = 6.91$ ,  $p = .01$  (See Figure 3). Simple effects tests showed that when instructed to approach the stimuli, participants were significantly faster to push the joystick ( $M = 665.33$ ,  $SD = 117.72$ ) than to pull the joystick ( $M = 701.72$ ,  $SD = 157.28$ ),  $F(1, 48) = 5.39$   $p = .03$ . When instructed to avoid the stimuli however, no difference was found between pushing ( $M = 707.40$ ,  $SD = 164.43$ ) and pulling ( $M = 685.09$ ,  $SD = 162.33$ ) the joystick,  $F(1, 48) = 1.28$   $p = .27$ , though the direction of means was as predicted. Additional simple effects tests found that pushing the joystick was faster following an approach command versus an avoid command,  $F(1, 48) = 3.96$ ,  $p = .052$ . No difference was found between pulling the joystick when approaching the stimuli compared to when avoiding the stimuli,  $F(1, 48) = 1.04$ ,  $p = .32$ , but again, the direction of this effect was in the predicted direction.

### *Discussion*

Based on the results above, several important implications can be drawn from Study 2. First, it does in fact appear that pushing the joystick, under the circumstances in this experiment, does map onto an approach behavior, and conversely, that pulling the joystick maps onto an avoidant behavior (though the evidence for this latter mapping is less definitive given the outcome of the simple effects tests). These findings run contrary to the existing body of literature demonstrating exactly the opposite, namely that pushing motions are avoidant and pulling motions are approach oriented (e.g. Chen & Bargh, 1999; Marsh et al., 2005). Accordingly, future research investigating the moderators of this effect may be profitable from both a methodological and theoretical standpoint, although such an endeavor is beyond the scope of the present research. Additionally, the results of Study 2 allow for a clear and theoretically meaningful conclusion to be drawn from Study 1; namely that familiarity can influence behavioral tendencies, such that participants are faster to approach familiar, relative to novel stimuli, as measured by faster reaction times when pushing a joystick while viewing familiar than when viewing unfamiliar stimuli. Additionally, novel stimuli seem to facilitate avoidant behavior, as participants were faster to pull than push in response to such stimuli.

### General Discussion

The current investigation was designed to address two independent, yet under-explored, areas of research within the mere-exposure literature: the effect of familiarity on approach/avoidant behavior and the potential moderating role of initial stimulus threat on that effect. Throughout the history of research on mere exposure, evaluations of neutral stimuli, both social and non-social, have been consistently shown to improve on a number of dimensions as a result of familiarity (e.g. Bornstein, 1989). Past efforts to explore if and how the mere-exposure

phenomenon generalizes to initially negative or threatening stimuli, however, have been mixed and equivocal (Berryman, et al., 1974; Bornstein et al., 1987; Grush, 1976). Similarly, although originally postulated as an evolutionary signal of the relative danger of approaching or avoiding a stimulus in one's environment (Zajonc, 1968), no previous work has directly tested the impact of familiarity on basic approach and avoidance behaviors. The present investigation offers meaningful insight into both of these important areas.

As demonstrated in Study 1, and clarified by the results of Study 2, familiarity does in fact appear to affect approach and avoidance behaviors in two important ways. First, as hypothesized, participants were quicker to approach (push toward) familiar stimuli than novel stimuli. Also, as predicted by Zajonc (1968) and Bornstein (1989), novel stimuli were also more hastily avoided than approached. This initial demonstration of direct behavioral effects is an important step forward in examining the extent to which mere exposure can influence dependent measures beyond attitudes and other evaluative measures. A significant contribution of the current research then, stems from testing and supporting one of the basic hypotheses derived from the evolutionary account of mere exposure, namely that behaviors relevant to approach and avoidance can be influenced by familiarity, with novel stimuli motivating avoidance and familiar motivating approach.

Importantly, initial stimulus threat appears not to moderate the effect of familiarity on behavior observed in Study 1. While this finding, based on the lack of a three-way interaction in study 1, must be treated cautiously it is nonetheless potentially surprising, and several possible interaction predictions were in fact considered in the introduction. The current results, however, suggest that mere exposure effects are not erased for stimuli that are initially perceived as negative/threatening, which runs contrary to the work of Brickman et al. (1972) and Grush (1976), and lends support to the findings of Zajonc et al. (1974) while also being consistent with clinical work demonstrating the effectiveness of in vivo exposure therapy for treating phobias (Emmelkamp, 2003).

Furthermore, the nature of the stimulus threat (innate or learned) also had no impact on the influence of familiarity on approach and avoidance behaviors. As suggested in the introduction, one might have suspected that the adaptive value of being slow to approach and quick to avoid innately threatening stimuli, such as predatory animals, would be immune to mere exposure effects. Yet, these stimuli, when made familiar, showed the same facilitation of approach speed than did the neutral and learned negative stimuli. Although this result is somewhat counterintuitive, it suggests that negativity/threat can be overwhelmed by the positivity associated with familiarity.

Interestingly, research has demonstrated that more attention is devoted to negative, potentially threatening, stimuli compared to either positive or neutral stimuli (Fenske & Eastwood, 2003; Ferre, 2003; Ohman, Flykt, & Esteves, 2001; Ohman & Mineka, 2001). As such, one potential future direction might be to explore whether familiar, yet initially negative stimuli, are less attention grabbing than are their unfamiliar counterparts. From an adaptive perspective, it might be sensible that once a potentially harmful stimulus in the environment has been seen repeatedly, yet has not been harmful, that this stimulus becomes less attentionally captivating, allowing one to devote attention to other tasks and demands of the environment.

Importantly, one would be unwise to assume that the results of these studies suggest that all negative stimuli, even all innately negative stimuli, are amenable to mere exposure effects. Evolutionary psychology and biological research suggest that certain aversive stimuli signal avoidance more strenuously than others, such as those that trigger disgust (Curtis et al., 2004;

Rozin, et al., 1994). As such, future research investigating the moderating role of stimulus valance/threat on mere-exposure effects may benefit from manipulating not just the innate or learned nature of the stimulus negativity, but also by more directly controlling for the specific type of negativity itself, as possibly disgust is less susceptible to mere-exposure effects than other negative emotions. Moreover, extending the results to social stimuli is an interesting future direction as well. Marsh et al. (2005), for instance, used human faces displaying either angry or fearful emotions and measured approach and avoidance, and the question remains if familiarity with these faces might moderate the behavioral tendencies demonstrated in that work.

### *Mechanism of Mere Exposure*

The results of the current research speak not only to the heretofore under-explored behavioral consequences of familiarity and the potential moderating effects of stimulus valance/threat, but also lend more support to prevalent theories regarding the mechanism that drives the mere-exposure effect. As summarized previously, past theorizing posited that the mere-exposure effect was a cold, purely cognitive phenomenon (Bornstein & D'Agostino, 1992, 1994; Mandler et al., 1987). However, more recently, compelling evidence in support of an affective/perceptual fluency position has accrued (Bornstein, 1989; Garcia-Marques et al., 2004; Garcia-Marques & Mackie, 2000; Harmon-Jones & Allen, 2001; Reber et al., 1998; Winkielman & Cacioppo, 2001). According to this model, familiar stimuli are more easily processed, and this processing ease gives rise to bona fide positive affect.

As discussed in the introduction, a great deal of work within the attitudes literature clearly demonstrates that stimuli evaluated positively motivate approach behaviors (Algiers & Byrne, 1973), while the opposite occurs for negatively evaluated stimuli (Macrae et al., 1994; McConnell & Leibold, 2001). Thus, if familiar stimuli really do trigger positive affective experiences in the perceiver, then those experiences might influence subsequent approach/avoidant reactions in response to those stimuli. The fact that familiar stimuli were approached more readily than their less familiar counterparts is therefore consistent with the view that mere exposure produces bona fide positivity in perceivers. Also, the behavioral effects demonstrated in the current research are inconsistent with a purely cognitive mechanism such as a misattribution of fluent processing (Bornstein & D'Agostino, 1992; 1994) or a non-specific activation of memory traces for the familiar stimuli (Mandler et al, 1987), as neither of these theories make any predictions regarding behavioral effects of familiarity and are unable to easily explain such results. Finally, an additional implication of the present findings is the potential for a linkage of evolutionary accounts of mere exposure (Zajonc, 1968) with more social-cognitive explanations of the effect based on perceptual fluency and affect (e.g. Garcia-Marques & Mackie, 2000), thus allowing for both a functional and cognitive-mechanistic understanding.

### *Implication for Approach and Avoidance*

Although investigating the flexibility of the mapping of pushing and pulling onto approach and avoidance movements was not an original aim of this research, Studies 1 and 2 nonetheless present interesting results beyond mere exposure, behavior, and moderation by valance/threat. Specifically, the findings of Study 1 suggested that arm flexion and arm tension may not always map on to avoidance and approach in the same manner as previous research indicates (Chen & Bargh, 1999; Marsh et al., 2005). The majority of past research using a

joystick to measure approach and avoidance tendencies has found that pushing maps onto avoidance and pulling to approach. Yet the results of Study 1, where participants were quicker to push the joystick when viewing familiar stimuli compared to viewing unfamiliar stimuli, and were quicker to pull compared to push the joystick when viewing novel stimuli, are difficult to explain if one assumes pulling is approach and pushing is avoidance.

Study 2, however, appears to confirm that, at least in the current research population and with the present stimuli and experimental set up, pushing does in fact equal approach whereas pulling appears to map onto avoidance (again, though, this latter mapping is less conclusive based on the results of simple effects tests). These findings are consistent with those of Wentura et al. (2000) who showed that motions away from the body can indicate approach, whereas motions toward the body can indicate avoidance. The fact that the same (or similar) behavioral motions may indicate approach and avoidance in different circumstances suggests that there are likely important moderators that dictate which motion/behavioral tendency mapping is operating in a particular context (see Markman & Brendl, 2005).

One speculative possibility is stimulus size. The images used in all conditions in this research were sized to take up nearly the entire screen of the monitor. As such, the images' large sizes may have led to the visual impression that they were extremely close. Thus, pulling the joystick, which was positioned directly in front of and near the monitor, moved participants away from the screen, and therefore away from the "imposing" image itself. Conversely, pushing the joystick moved participants physically closer to the screen, and therefore nearer to the image itself. However, had the images been smaller and taken up less of the monitor, and therefore potentially appeared as farther away, pushing the joystick may have represented a motion consistent with "keep away," whereas pulling the joystick may have mapped onto "come closer." Future research should explore this potential moderator, although such an inquiry is beyond the scope and goals of the current thesis. More germane to the current research however, Study 2 importantly allows the results of Study 1 to be interpreted as follows: familiar stimuli are more approachable than novel stimuli, and novel stimuli are also more quickly avoided than approached, which fits nicely with predictions.

### *Conclusion*

The present research offers three significant contributions to the mere-exposure literature. First, the results of Study 1 are amongst a small number (Burger et al., 2005; Rajecki, 1974) to show any behavioral effects of familiarity, and represent the only example, to the author's knowledge, demonstrating the long hypothesized (see Bornstein, 1989; Zajonc, 1968) effect on rudimentary approach and avoid behaviors. Since the ultimate goal of psychologists is indeed to understand and predict human behavior, finding that familiarity via repeated exposure to a stimulus can facilitate approach motions, and also that a novel stimulus will be more quickly avoided than approached is a significant step forward in the mere-exposure literature.

The second meaningful contribution of the current thesis is the investigation of a potential moderator of the mere-exposure effect: stimulus threat. Although a small amount of previous research has sought to examine the effect of repeated exposure on negative stimuli, some studies have found that negative items are rated even less positively when made familiar (Brickman et al., 1972; Grush, 1976), whereas others indicate familiarity increases positive ratings of initially negative stimuli (Zajonc et al., 1974). Outside of the social psychological literature, evidence exists suggesting that exposure to fear inducing stimuli in phobics (e.g.,

spiders) can reduce the fear and anxiety provoked by these objects (Emmelkamp, 2003). Adding support to this evidence that in fact familiarity does improve the evaluation of negative stimuli, be they innate or learned, the results of Study 1 offer important data to help clarify the impact of stimulus valance/threat on mere-exposure effects.

Finally, the present results also contribute further, albeit indirectly, to the already large body of research demonstrating that familiarity with a stimulus generates a bona fide sense of positive affect (e.g. Garcia-Marques & Mackie, 2000). Although affective reactions to the stimuli were not directly assessed, as stated previously, attitudes research illustrates that stimuli evaluated positively are approached more readily than objects evaluated negatively (e.g. Macrea et al., 1994; McConnell & Leibold, 2001). Previous research utilizing a similar joystick dependent measure has also found positive stimuli, be they valenced adjectives (Chen & Bargh, 1999) or emotive faces (Marsh et al., 2005), facilitate approach behaviors whereas negative stimuli impel avoidant actions. Extrapolating from these findings, the facilitated approach observed for familiar stimuli in Study 1, in concert with the somewhat hastened avoidance of novel stimuli, is consistent with the work on approach and avoidance detailed above, and suggests the repeated stimuli in the present study were imbued with positivity via their familiarity.

In summation, although a great many future directions are suggested, the results of the current research alone offer three important theoretical contributions to the study of mere exposure (Study 1) and make meaningful methodological and theoretical advancements regarding approach and avoidance (Study 2). Taken together, the two studies successfully demonstrate that familiarity can motivate approach behaviors, whereas novelty triggers avoidance, and that this effect occurs equally strongly across a variety of stimuli, differing not only in threat, but in the origin of that threat as well. Thus, the present paper begins to answer pressing and previously under addressed empirical questions, while opening up many new and exciting avenues of research as a result.

*Figure 1.* Reaction times to perform pushing and pulling motions in response to familiar and novel targets (Experiment 1).

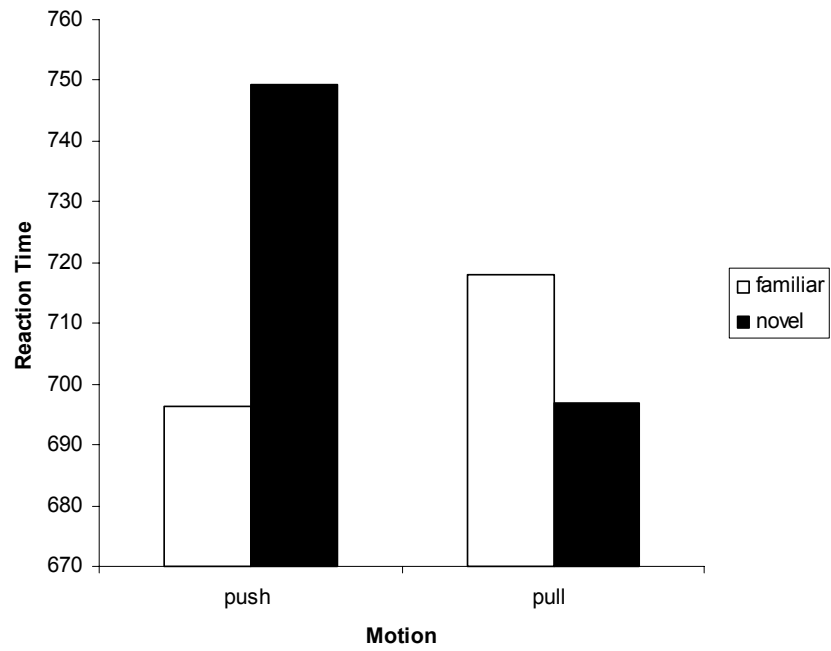


Figure 2. Reaction times to perform pushing and pulling motions in response to familiar and novel targets for each type of stimulus valence (Experiment 1).

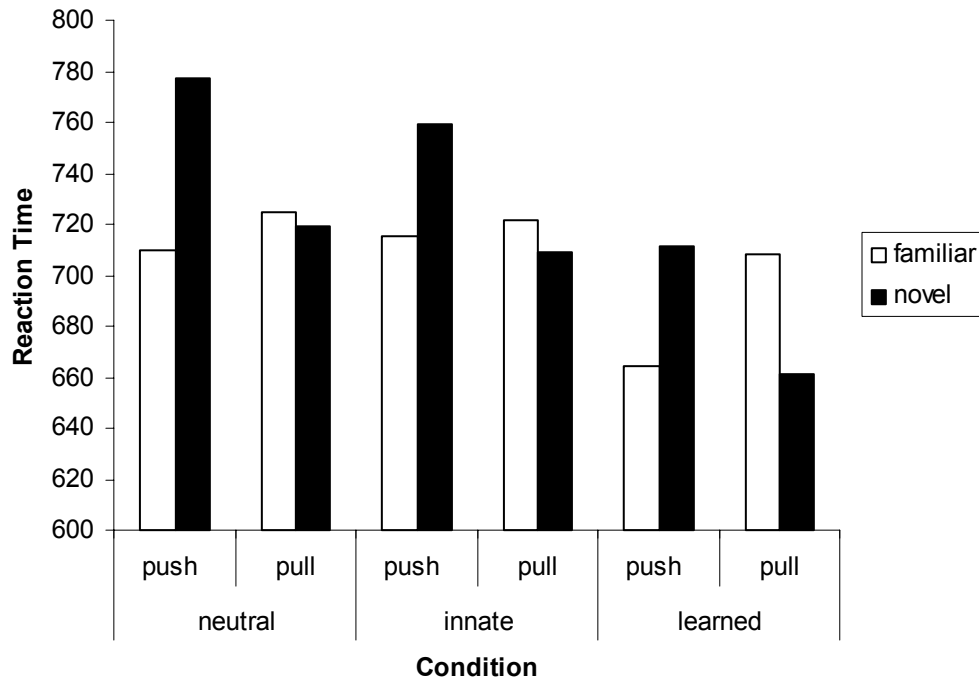
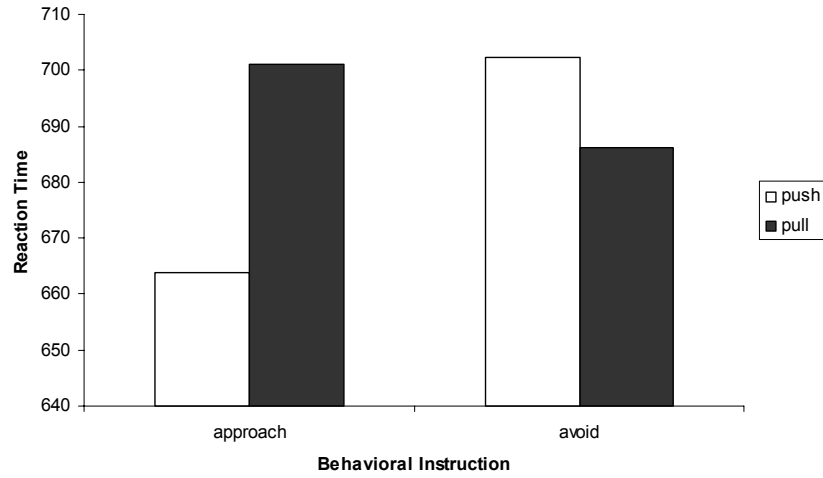




Figure 3. Reaction times to perform pushing and pulling motions when instructed to approach and avoid the stimulus (Experiment 2).



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