

The Tendency to Approach Positive Stimuli and Avoid Negative Stimuli¹

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Choosing to approach pleasant stimuli (e.g. cake) and to avoid unpleasant ones (e.g. snakes) has survival functionality. There are two main types of theories about these approach and avoidance behaviors. One is a “muscle-process theory” related to the movements of the arm muscle in response to approach and avoidance stimuli: flexing a bicep for an approach movement, and extending the tricep for an avoid movement. The other is a “distance-result theory” where the movement varied depending on the environment and was defined by whether the stimuli were close or far after movements. The purpose of the present study is to examine the theories of approach/avoidance by focusing on touch responses, as in Bamford and Ward (2008), using Japanese university students. The results best support the “distance-result theory”.

Key words: muscle-process theory, distance-result theory, approach, avoidance

Introduction

The urges to approach positive stimuli and avoid negative stimuli are survival mechanisms. For example, an approach response of reaching a hand to pick up pizza to eat is a functional behavior in order to get nutrients while an avoidance response of fleeing from a snake is a functional behavior to avoid harm.

Some researchers have assumed that the perceived valence of a stimulus is innately associated with specific muscle response. Chen and Bargh (1999) measured approach and avoidance responses as arm flexion and extension by using a lever. They found that participants were faster to pull the lever than to push it when exposed to pleasant words, while the subjects were faster to push it than to pull it when exposed to unpleasant words. Rotteveel and Phaf (2004, Study 1) also demonstrated that participants responded faster to the button in arm extension condition than arm flexion when exposed to negative faces and faster to flex than extend his/her arm when exposed to positive faces. Based on these studies, positive stimuli are possibly linked with arm flexion, and negative stimuli with arm extension. There were significant differences in reaction time, suggesting that arm flexion and extension were strongly associated with tendencies for approach and avoidance (see also Cacioppo, Priester, & Berntson, 1993; Duckworth, Bargh, Garcia, & Chaiken, 2002, Experiment 3). Herein, this hypothesis is referred to as the “Muscle-process theory”.

However, Bamford and Ward (2008) argued that the muscle responses are not uniquely

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associated with approach and avoidance and the associations are varied depending mainly on the functionality. For instance, when exposed to an unpleasant stimulus, such as a spider, some people might try to push it away by extending an arm, while others might flex the arm away from it because they feel disgust. Both muscle responses are avoidance responses to escape from the unpleasant stimulus. Markman & Brendl (2005) measured arm flexion and extension by alternatively assigning functions of approach and avoidance to each stimulus. They demonstrated that the combination of approaching pleasant stimuli and avoiding unpleasant stimuli was faster than the opposite pattern, concluding that arm flexion and extension are not uniquely associated with approach and avoidance tendencies. Herein, this hypothesis is referred to as the “Distance-result theory”.

Thus, there are two different theoretical positions. One is the muscle-process theory. It assumes that approach and avoidance are uniquely associated with specific muscle movements. The other is the distance-result theory. It assumes that the associations are varied depending on the environment. The purpose of the present study is to use touch responses to examine which of these contrasting hypotheses is more valid.

Most previous studies have used buttons or a lever in order to categorize stimuli presented a computer screen. Afterwards the methods were improved to link participants and their movements by presenting their name or the word “me” aside from the stimuli in the screen. However, the self in the screen is in actually a representation not the original self. Bamford and Ward (2008) introduced a new paradigm to examine approach and avoidance responses using a touch screen. Approach was defined as touching valent stimuli, while avoidance meant touching neutral stimuli. Participants were faster to approach the positive stimuli or avoid the negative stimuli (congruent condition) than when they were assigned to approach the negative stimuli or avoid the positive stimuli (incongruent condition).

In the present experiment, derived from Bamford and Ward (2008), Japanese participants were asked to touch pleasant stimuli (approach pleasant stimulus) and to not touch unpleasant stimuli (avoid unpleasant stimulus) in the congruent condition, while in the incongruent condition, participants were asked to touch an unpleasant stimulus (approach unpleasant stimulus) and to not touch a pleasant one (avoid pleasant stimulus). The distance modulation hypothesis predicts that reaction time will faster in the congruent condition. In contrast, the motor response hypothesis predicts that there will be no difference in the reaction time between these two conditions. The present experiment used positive and negative words and pictures (e.g., pizza).

Method

Participants

Fifteen undergraduate students participated (7 females, age: $M=21.1$, $SD=0.77$). All were right-hand dominant. All participants gave their signed informed consent after receiving an explanation of the experimental conditions and being informed that their participation would

be strictly voluntary.

Stimuli

To select the stimuli for this experiment, twenty-one undergraduates participated (13 females, age: $M=21.0$, $SD=0.87$) in an assessment of possible stimuli. Ninety-two word stimuli (46 pleasant and 46 unpleasant) and 80 picture stimuli (40 pleasant and 40 unpleasant) were used. The word stimuli were taken from Bamford and Ward (2008) and the picture stimuli were taken from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1999). Participants were asked to rate these stimuli on a 9-point scale. Nine was “like” and one was “dislike.” Forty word and 40 picture stimuli, 20 positive and 20 negative of each type, were respectively taken from the average of all stimuli. These selected word and picture stimuli were used for the primary experiment.

Stimuli were presented on an Elo touch systems monitor controlled by a Dell computer. Stimuli were presented on either side of the screen. Participants were seated at a viewing distance of approximately 50 cm from the screen. The neutral stimulus was a green circle 9 cm in diameter. A valent stimulus and the neutral stimulus were presented on each side of a computer screen. Examples of the pleasant pictures are a rabbit, beautiful scenery, and cakes. Examples of the unpleasant pictures are a snake, an injection, and broken glass. The pictures were 16 x 23 cm in size. Examples of positive words included ピザ (*pizza*), 贈り物 (*gift*), and 子猫 (*kitten*). Examples of negative words included スズメバチ (*hornet*), 犯罪 (*crime*), and 離婚 (*divorce*). Words were presented in bold Gothic font.

Procedure

In the congruent condition, participants were instructed to touch the provided positive stimulus if they liked it, that is, an approach response to a pleasant stimulus, or touch the neutral stimulus if they did not like the valent stimulus, that is, an avoidance response to an unpleasant stimulus, as quickly as possible. In the incongruent task, they were asked to touch the provided valent stimulus if they did not like it, — approaching an unpleasant stimulus — or to touch the neutral stimulus if they liked the presented stimulus — avoidance of a pleasant stimulus — as quickly as possible. Each participant was asked to complete four conditions: congruent words, incongruent words, congruent pictures, and incongruent pictures. In each condition, each stimulus was presented twice on different sides of the screen, making 80 trials in each condition. Thus, the participant’s reaction time was measured over 320 trials. The order of tasks was counterbalanced. The experimental design consisted of three within-participant factors: valence (positive vs. negative), response pattern (congruent vs. incongruent), and stimulus type (word vs. picture). The dependent variable was reaction time. Participants were asked to touch the start button to initiate a trial, and to respond to the stimulus presentation according to the task instructions as quickly as possible. The time interval between responses was measured.

Results

A repeated measures analysis of variance was conducted on the reaction time with valence (positive/negative), pattern (congruent/incongruent), and stimulus type (word/picture) as within-participant effects. A significant main effect was observed for response pattern. The reaction time in the congruent condition was faster than in the incongruent condition ($F(1,14)=5.36, p<.05$). Additionally, a significant interaction effect was also found. For the positive stimuli, there was a significant effect between congruent and incongruent conditions ($F(1,14)=6.57, p<.05$); for the congruent condition, there was a significant difference between positive and negative stimuli ($F(1,14)=6.09, p<.05$); and for the incongruent condition, there was found a significant effect between positive and negative stimuli ($F(1,14)=4.74, p<.05$). No differences were found between words and pictures. These results are presented in Table 1.

Table 1 Mean (SD) RTs in the Congruent and Incongruent Responses to Positive and Negative Stimuli

	Positive	Negative
Congruent	901.9 (195.72)	939.5 (179.92)
Incongruent	1115.1 (424.64)	1001.0 (263.68)

Discussion

Participants were faster to approach pleasant stimuli and avoid unpleasant stimuli than they were to approach unpleasant stimuli and avoid pleasant stimuli. Consistent with Bamford and Ward (2008), the mean reaction time was faster in the congruent condition. Furthermore, the results support the distance-result hypothesis. Strack and Deutsch (2004) postulated that approach orientation is a preparation to decrease the distance from the target, and avoidance orientation is similarly a preparation to increase the distance. In this experiment, touching the valent stimuli meant decreasing the distance from the target, while touching the neutral stimuli meant increasing the distance. Thus, it was hypothesized that an approach response to decrease the distance from the stimuli or an avoidant response to increase the distance from it (the congruent condition) will be faster than the opposite pattern (the incongruent condition), and the results of the present study supported this distance-result hypothesis. In other words, the results suggested that the evaluation of the valence of a stimulus generates approach/avoidance motivation, which selects a behavioral response according to distance modulation and that appropriate responses were more rapidly conducted than the inappropriate responses.

A significant difference was observed between congruent and incongruent conditions for positive stimuli, and also a significant difference between positive and negative stimuli for the

congruent condition. Both results suggested the responses to touch positive stimuli were faster than other responses, and this pattern corresponded to decreasing the distance from positive stimuli in line with the theory of Strack and Deutsch (2004).

Ecologically, however, these findings raise questions. In this experiment, negative stimuli such as a snake may cause fear or disgust, but the touch response worked on eliminating them. If an approach response functioned to remove negative stimuli, it might have been promoted. On the other hand, the approach response to positive stimuli had no functionality in this sense. In the incongruent condition, the response to touch negative stimuli was faster than the other response. In the future research, this issue of ecological functionality must be considered.

References

- Bamford, S., & Ward, W. (2008). Predispositions to approach and avoid are contextually sensitive and goal dependent. *Emotion, 8*, 174-183.
- Cacioppo, J. T., Priester, J. R., & Berntson, G. G. (1993). Rudimentary determinants of attitudes. II: Arm flexion and extension have differential effects on attitudes. *Journal of Personality and Social Psychology, 65*, 5-17.
- Chen, S., & Bargh, J. A. (1999). Consequences of automatic evaluation: Immediate behavior predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*, 215-224.
- Duckworth, K. L., Bargh, J. A., Garcia, M., & Chaiken, S. (2002). The automatic evaluation of novel stimuli. *Psychological Science, 13*, 513-519.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). International affective picture system (IAPS): Digitized photographs, instruction manual and affective ratings. Tech. Rep. No. A-6. Gainesville, FL: University of Florida.
- Markman, A. B., & Brendl, C. M. (2005). Constraining theories of embodied cognition. *Psychological Science, 16*, 6-10.
- Rotteveel, M., & Phaf, H. (2004). Automatic affective evaluation does not automatically predispose for arm flexion and extension. *Emotion, 4*, 156-172.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review, 8*, 220-247.

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