Journal of Experimental Social Psychology 47 (2011) 1192–1197

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Reports

Miller (1944) revisited: Movement times in relation to approach and avoidance conflicts

Ryan L. Boyd *, Michael D. Robinson, Adam K. Fetterman

North Dakota State University, USA

ARTICLE INFO

Article history:
Received 10 January 2011
Revised 13 April 2011
Available online 6 May 2011

Keywords:
Motivation
Approach
Avoidance
Conflict
Movement
Implicit

ABSTRACT

Three experiments (total $N = 291$) sought to provide support for the idea that avoidance conflicts, relative to approach conflicts, are more difficult to motorically resolve. Conflicts were instantiated by asking individuals to approach desirable stimuli and avoid undesirable stimuli under conditions in which there was no objectively-correct direction of movement. To control for baseline movement speeds, non-conflict trials presented desirable (e.g., reward) and undesirable (e.g., threat) stimuli in the absence of any spatial conflict. In addition, movement times were isolated through the use of a joystick movement paradigm in which movement speeds were quantified subsequent to some initial tendency to move in one direction or the other. Consistent with hypotheses, all experiments found that movement times were slowed in the context of avoidance conflicts relative to approach conflicts. Results are discussed in terms of theories of motivation, affective processing, conflict, and anxiety.

Miller's (1944) seminal chapter presaged many subsequent developments in the modern affect and motivation literatures. Miller proposed a positivity offset, whereby approach tendencies are stronger than avoidance tendencies under neutral conditions or when threats to be avoided are not very proximate. This phenomenon appears to be a general one (Cacioppo & Berntson, 1999). Miller also suggested that the gradient for avoidance is steeper than that for approach, presumably because of the greater evolutionary costs in failing to avoid a threat relative to failing to approach a reward (LeDoux, 1996). This principle may explain why negative events appear more consequential than positive events in influencing decision making and behavior (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

Miller (1944) then presented a theoretical analysis of motivational conflicts. Approach–approach (henceforth approach) conflicts are those in which the organism is faced with two desirable incentives. Avoidance–avoidance (henceforth avoidance) conflicts are those in which the organism is faced with two undesirable incentives. In both cases, the organism has to make a choice. Especially when incentives are equally attractive or aversive, neither conflict has a "correct" or obvious resolution. In the first case, approaching one desirable incentive necessarily involves forsaking the other and, in the second case, avoiding one undesirable incentive necessarily involves contact with the other. Therefore, both such conflicts could be difficult to resolve. In the case of approach conflicts, for example, Miller mentions the parable of the donkey that starved to death when located in the middle of two equally desirable haystacks.

Nevertheless, Miller (1944) suggested that approach and avoidance conflicts should differ in their psychological impact. The approach conflict is potentially one associated with an unstable equilibrium. Although choosing which incentive to pursue might be difficult, especially if both incentives are equally attractive, any initial tendency to approach one incentive rather than the other should be reinforced because pursuing it renders the chosen alternative more attractive once a course of action is decided. By contrast, Miller suggested that the avoidance conflict is a stable equilibrium. In avoiding one undesirable stimulus, the organism is now placed in a position in which the other undesirable stimulus must be physically or psychologically moved toward. In doing so, the aversive properties of the moved-toward undesirable stimulus should become increasingly apparent over time, stalling movement progress as a result.

Revisiting Miller's (1944) conflict predictions

Miller's (1944) analysis and conclusions were primarily based on rodent models, but human beings possess far more flexible behavioral tactics in relation to desired and undesired stimuli (Lang, Bradley, & Cuthbert, 1997). Miller manipulated incentives in a relatively extreme fashion (e.g., electric shock). The incentives that humans routinely encounter are much more subtle and symbolic in nature (Osgood, Suci, & Tannenbaum, 1957). Nonetheless, subtle manipulations of affect (e.g., the presentation of affective words) have proven utility in modeling attitudinal and motivational processes among human

* Corresponding author at: Psychology, NDSU Dept 2765, PO Box 6050, Fargo, ND 58108-6050, USA. Fax: +1 701 231 5398.
E-mail address: Ryan.Boyd@ndsu.edu (R.L. Boyd).

0022-1031/$ – see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.jesp.2011.04.017

beings (Wittenbrink & Schwarz, 2007). Even so, no research of this type has examined Miller's conflict predictions.

In three experiments, we instructed individuals to approach desirable objects by moving toward them and to avoid undesirable objects by moving away from them. They did so using a joystick. On half of the trials, there was an objectively correct answer in that only one stimulus – either a desirable or undesirable one – was presented, either in a higher or lower spatial position. In the case of an undesirable upward stimulus, for example, individuals should move the joystick backward, in essence moving away from the undesirable object. Such trials not only reinforced the movements to be made, but also served as control conditions for the conflict conditions.

The conditions of greater interest were conflict conditions. In them, two desirable stimuli or two undesirable stimuli were presented simultaneously, in different vertical positions. In such cases, there was no objectively correct answer. In the case of approach conflicts, this meant moving toward one desirable stimulus while simultaneously moving away from the other desirable stimulus. In the case of avoidance conflicts, this meant moving away from one undesirable stimulus yet toward the other undesirable stimulus.

The word motivation is from the Latin root *movere,* meaning "to move" (Parkinson & Colman, 1995) and it is also the case that Miller's (1944) analysis of conflicts emphasizes movement speed. Accordingly, we modified procedures initially used by Abrams and Balota (1991) by "starting the clock" subsequent to a movement deviation in the direction of the movement subsequently performed. Such procedures ensure that effects reflect movement times rather than other factors (e.g., the speed with which stimuli were appraised) that were of lesser interest. Following Miller's analysis, we hypothesized that movement times would be slower in the context of avoidance conflicts than approach conflicts. Three experiments used different types of stimuli for the sake of conceptual replication.

Experiment 1

Method

Participants

Participants were 92 (63 females) undergraduate students from North Dakota State University who received course credit. Experimental sessions consisted of groups of six or less. General instructions indicated that the experiment was broadly concerned with affect and cognition. Subsequently, specific task instructions were administered via desktop computers.

Apparatus

Joysticks. Responses and movements were made with a *Saitek* brand Aviator-01 Dual Throttle joystick, typically used in flight simulation games. This model of joystick is easy to grasp, possesses a grip standing 6 inches tall, and produces intuitively compelling motor movements. Such joysticks were used in all three experiments.

Computers. Desktop computers were used for trial presentation and data collection. The experiment was programmed using E-Prime software and run on a 32-bit version of the Windows XP operating system. Computer monitors had a screen height of 13.65 in. and the screen resolution was set to 1280 × 1024 pixels.

Procedure

Task instructions. Participants were instructed to approach desirable stimuli by moving toward them and to avoid undesirable stimuli by moving away from them. They were to approach desirable stimuli by moving forward if stimuli were presented high on the computer screen and by moving backward if stimuli were presented low on the computer screen. By contrast, they were to avoid undesirable stimuli by moving backward if they were presented high on the computer screen and by moving forward if they were presented low on the computer screen. They were further told that many trials had an objectively correct movement direction, but some did not. In any case, they were to be as fast and accurate as possible.

To reinforce task instructions, eight practice trials were included. To simplify the task, only the words "reward" and "punishment" were presented in this practice block. Such words were assigned to higher or lower vertical positions at random. Joystick movements in an incorrect direction (e.g., toward the word "punishment") were penalized with an error message. Accuracy rates for the practice block were reasonably high ($M = 82.07\%$), but were quite a bit higher subsequently (as will be reported below), likely due to this initial training.

Experimental word stimuli. All experimental trials presented word stimuli constituting somewhat universally desired (5 words: acceptance, happiness, love, praise, and success) versus undesired (5 words: danger, failure, pain, rejection, and threat) objects or outcomes and were selected on the basis of Higgins' (1997) analysis of promotion versus prevention focus. Such words have been validated as stimuli to be approached or avoided in previous investigations of ours (e.g., Tamir, Robinson, & Clore, 2002).

Stimulus presentation. Stimuli were presented in white, against a black background, in an 18-point Arial font, and were fully capitalized. They were randomly assigned to high versus low spatial positions. The high position was 1.6 in. from the top edge of the computer screen and the low position was 1.6 in. from the bottom edge of the computer screen.

Trial sequence and movement quantification. A word or set of words was presented at the beginning of each trial along with a joystick cursor at center screen. Participants were to move the joystick up (forward) or down (backward) to register their responses. An E-prime script was created such that we started timing the movement for a particular trial only after the joystick had been deflected 1/15 of the way in the direction of the movement subsequently performed. Movement times therefore reflected the time that elapsed between movement initiation and movement completion, the latter defined in terms of moving the joystick cursor to the top or bottom of the computer screen on that particular trial. Following the completion of each movement, participants were instructed to move the joystick to center screen, followed by a 400 ms blank delay prior to the next trial stimulus or stimuli.

Experimental conditions. There were 120 trials in the experiment. On 30 of them, a single desirable stimulus was presented — i.e., that to be approached. Another 30 trials involved the presentation of a single undesirable stimulus — i.e., that to be avoided. Sixty trials, by contrast, involved conflicts. On 30 of them, two desirable words were presented simultaneously and on 30 of them, two undesirable words were presented simultaneously. Word stimuli were chosen at random for all trials, spatial positions were also chosen at random, and the trial sequence was randomly ordered for each participant. Such conditions constitute a 2 (incentive type) by 2 (non-conflict versus conflict) experimental design. "Incentive type" could be termed "valence," but we refer to incentive type given the nature of the stimuli and responses to them.

Results

When non-conflict trials were involved, there was an objectively-correct movement direction to be performed. Movements were made in the correct direction 97% of the time, indicating that participants understood the task well. Even so, we removed the relatively few non-