Valence-space associations in vertical touchscreen interactions

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Abstract

Embodied cognition research suggests that bodily experiences might ground mental representations of emotional valence in the vertical dimension of space (i.e., positive is up and negative is down). Accordingly, recent studies show that upward and downward arm movements may also influence the evaluation of valence-laden stimuli, suggesting that upward (downwards) movements lead to more positive (negative) evaluations. Interestingly, these studies typically did not investigate paradigms that require a direct hand interaction with the stimuli. With the advent of touchscreen devices and their use for experimental environments, however, a direct and more natural hand interaction with the stimuli has come to the fore. In this regard, the goal of the present study is to examine how direct hand interaction with valence-laden stimuli on a touchscreen monitor affects their perceived valence. To do so, participants evaluated emotional pictures after touching and moving them either upwards or downwards across a vertically mounted touchscreen. In contrast to previous findings, the results suggest that positive pictures were evaluated as more positive after downward movements while negative pictures were evaluated as less negative following upward movements. This finding may indicate that a matching between the pictures' valence and the valence associated with their vertical touch location leads to more positive evaluations. Thus, the present study extends earlier results by an important point: Touching the emotional pictures during movement may influence their valence processing.

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Protocol

Participant's recruitment

Step 1.

- Participants were recruited by means of the Online Recruitment System for Economic Experiments (www.orsee.org)
- Concretely, in this study, participants were able to sign up at most 72 hours before the experimental session took place (e.g., if an experimental session was scheduled on the 04.06 at 12.00 h., the deadline to sign up for the said session was set on the 01.06 at 12.00h)
- In addition, the candidates were informed that right-hand dominance was set as an inclusion criterion for the experiment. Furthermore, it was specified that, in order to carry out appropriately the experimental task, it was necessary to complete first the valence evaluation of a set of emotional pictures

Valence evaluation of emotional pictures prior to the experimental task

Step 2.

- The purpose of this task was to control for potential individual differences in the valence evaluation of emotional pictures, which were used later as experimental stimuli
- Accordingly, 48 h. before the experimental session, each participant received a link from the Questback on-line platform (www.questback.com)[2]
- This link gave access to the evaluation of 20 positive and 20 negative pictures from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2005)[3]. Concretely, the pictures were displayed centered on the screen in a randomized order, and with a 9-point Likert scale below them in order to evaluate their valence (i.e., '1' representing the lowest valence value and '9' the highest valence value)
- Therefore, in this task, participants were able to observe and rate the pictures' valence, but not to interact with them

2.- Researchers may present here, for instance, online questionnaires and/or tasks

3.- The following pictures were used as stimuli: Positive (1340, 1811, 1920, 1999, 2154, 2209, 2311, 2340, 2346, 2352, 2362, 2373, 2391, 2398, 2550, 2900.2, 4250, 4520, 5628, 8500). Negative (1111, 1270, 1274, 2120, 2141, 2205, 2375.1, 2692, 2710, 2800, 3350, 6242, 9000, 9090, 9280, 9342, 9417, 9440, 9560, 9911). According to the IAPS ratings, the pictures differed in their valence category (i.e., positive or negative) but not in their arousal (the pictures had, on average, neutral arousal). The pictures can be retrieved upon request in the following site: http://csea.phhp.ufl.edu/media/iapsmessage.html

Experimental Task: Valence evaluation of emotional pictures in the context of touchscreen interactions

Step 3.

- The experimental sessions were set individually for each participant and took place in a quiet room at the Leibniz-Institut für Wissensmedien (IWM). The researcher welcomed the participants and asked them to sign an informed consent for the experimental task and, in addition, to fill in the Edinburgh Inventory by Oldfield (1971) modified by Salmaso and Longoni (1985). Such inventory provided more specific information regarding the participants' handedness
- After filling in those documents, participants were invited to sit down in front of a touchscreen monitor (TM; Dell™-Monitor S2340T), which was mounted vertically on a desk. The TM was connected to a computer (Lenovo ThinkPad T410, Intel Core i7 620M, 2.67 GHz) in order to display the IAPS pictures (397 x 340 pixels (10.5 cm x 9 cm)). The TM was of 23 inches (20.99' (V) x 12.28' (H)) Activ-Matrix-TFT-LCD and featured a resolution of 1600 x 900 pixels
- Nonetheless, in order to ensure that participants were able to reach the screen in similar conditions, they were asked to extend the right arm towards the center of the screen. This made possible to estimate whether the chair where participants were sitting had to be adapted to a higher or lower height
- Then, participants received instructions about the experimental task. Concretely, the instructions indicated that the task consisted in the valence rating of emotional pictures after touching and swiping them across the vertically mounted touchscreen.
- To put things more concrete, participants were randomly assigned to one of two experimental groups. In one group, participants had to touch and swipe the randomly presented pictures with their right hand from the upper border of the TM towards an empty square (6.2 cm x 6.2 cm), which was displayed at a distance of 42 cm at the lower border of the TM (i.e., downward movement condition). The other group had to touch and swipe the pictures with their right hand from the lower border of the TM towards the white square that, this time, was located at the upper border of the TM (i.e., upward movement

condition)[4]

- Critically, after participants swiped each picture, they were presented in the middle of the TM together with a 9-point Likert scale below for valence evaluation (i.e., '1' representing the lowest valence value and '9' representing the highest valence value). After this evaluation, the next trial began. The presentation order of the pictures was randomized.
- Once the last trial was completed, a message appeared on the screen indicating the end of the experiment[5]
- Finally, participants were thanked, debriefed and paid a total amount of 8 euros

4.- To get familiar with the task participants were asked first to complete four training trials. Such trials consisted in evaluating the valence of color squares (i.e., red, blue, green, and yellow) after touching and swiping them across the screen. The resolution of these trials was identical to the emotional pictures

5.- It is important to remark that participants were instructed that, during the task, the researcher would wait outside the room, right in front of the door. This procedure intended to avoid any pressure or influence on the participants' valence ratings of the pictures. When the experiment was completed (or if any problem was experienced during the task) they could inform immediately the researcher