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The Heart Wants What It Wants: Effects of Desirability and Body Part Salience on Distance Perceptions (DeWitt)

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Abstract
Previous research has shown that the desirability of an object influences perceived distance from the object, such that desirable objects are perceived as closer than objects that are not desirable (Balcetis & Dunning, 2010). It has also been suggested that metaphors reflect how our knowledge is represented; so, for example, making the head or heart more salient produces characteristics commonly associated with those body parts (i.e., emotionality for the heart and rationality for the head) (Fetterman & Robinson, 2013). The current study examined the effects of head or heart salience and desirability on distance perception. We hypothesized that since common idioms relate the heart to desirability, salience of the heart would cause desirable objects to be perceived as closer than would salience of the head, but there would be no such difference between the head and heart conditions when the object was neutral. To test this hypothesis, participants had their attention drawn to either their head or their heart by placing their index finger there while throwing a beanbag towards a desirable or a neutral object. In Experiment 2, a verbal distance estimate was also included. We predicted that there would be a significant interaction between desirability of object and hand placement. Specifically, we expected that there would be no effect of hand placement when the object was neutral but that heart-pointers would perceive a desirable object as closer than the head-pointers. Results from both experiments failed to support our hypothesis.

Keywords
embodiment, distance perception, desirability, metaphors

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Comments
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Abstract

Previous research has shown that the desirability of an object influences perceived distance from the object, such that desirable objects are perceived as closer than objects that are not desirable (Balcetis & Dunning, 2010). It has also been suggested that metaphors reflect how our knowledge is represented; so, for example, making the head or heart more salient produces characteristics commonly associated with those body parts (i.e., emotionality for the heart and rationality for the head) (Fetterman & Robinson, 2013). The current study examined the effects of head or heart salience and desirability on distance perception. We hypothesized that since common idioms relate the heart to desirability, salience of the heart would cause desirable objects to be perceived as closer than would salience of the head, but there would be no such difference between the head and heart conditions when the object was neutral. To test this hypothesis, participants had their attention drawn to either their head or their heart by placing their index finger there while throwing a beanbag towards a desirable or a neutral object. In Experiment 2, a verbal distance estimate was also included. We predicted that there would be a significant interaction between desirability of object and hand placement. Specifically, we expected that there would be no effect of hand placement when the object was neutral but that heart-pointers would perceive a desirable object as closer than the head-pointers. Results from both experiments failed to support our hypothesis.

Keywords: embodiment, distance perception, desirability, metaphors

The Heart Wants What It Wants:

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While there is a popular phrase "seeing is believing," perhaps a more accurate statement would be that "seeing is deceiving." A wealth of cognitive research suggests that people do not see their environments as objectively as they believe they do. Rather, individuals' perceptions of the environment are distorted by a number of biases intended to optimize their ability to interact with their surroundings. This idea is consistent with a cognitive theory known as embodied cognition. This perspective proposes that the physical and psychological state of the human body affects cognitive and perceptual processes.

One factor that has been shown to influence perception is desirability of objects (Balcetis & Dunning, 2010). In a series of five studies, Balcetis and Dunning found that participants perceived desirable objects as being closer to them than undesirable objects. The researchers looked at a variety of desirable objects, including objects that fulfilled a physiological need (i.e., a bottle of water for thirsty participants), a social need (i.e., positive feedback), and a financial need (i.e., a $100 bill or a $25 gift card). Distance perceptions were measured using both an action-based beanbag toss towards the object as well as a numerical estimate. Across each type of desirable object and metric of perceived distance, results showed that participants perceived more desirable objects as closer to them than undesirable objects. In order to verify that desirability in particular influenced distance perceptions, in one study all participants estimated distance to a $100 bill, but those in one condition were told that they had an opportunity to win the money and those in the other condition were not given this information. Consistent with the results of the other studies, participants who were told that they could win the $100 bill

perceived it as closer than those who were not told of the opportunity to obtain it, demonstrating that desirability itself, as opposed to potential confounds, influences distance perception.

Metaphors have also been shown to influence perception in a variety of ways. Metaphors are used as cognitive tools to help people simplify and understand abstract concepts in a way that is distinct from schemas. Metaphors link source concepts, things that we do understand and have experienced, to target concepts, things that are abstract or we haven't experienced. The connection between the source and target concept allows us to better understand the target concept (Landau, Meier, & Keefer, 2010). For example, consider the abstract concept of love. People are better able to conceptualize love and relationships with a significant other as a physical journey using metaphors such as "Where do you see us ten years down the road?", or "I think we need to slow down." Metaphors were traditionally thought of as purely linguistic elements to represent abstract concepts, but recent research in cognitive linguistics has shown that metaphors also shape the way that we think about these concepts as well as how we act. Thus, the influence of metaphors on a variety of tasks, including perceptual ones, has been of increasing interest for psychologists in a variety of subdisciplines, including social and cognitive psychology.

One category of metaphors that affects perception consists of those referring to the head and the heart. Myriad metaphors about the heart suggest emotionality and, more specifically, a caring nature (i.e., saying that someone has a "big heart" suggests that they are extremely caring and loving). In contrast, metaphors about the head typically imply rationality and intelligence (i.e., telling someone to "use their head" when they need to think logically). Fetterman and Robinson (2013) examined the effects of head and heart metaphors in both correlational and experimental studies. In the correlational studies, participants were asked to self-locate in either

their heart or their head ("Irrespective of what you know about biology, which body part do you more closely associate with your self. (Choose one): heart or brain" prior to completing a battery of personality tests, intelligence tests, and/or moral dilemmas (p. 318). Participants who self-located in the heart (heart-locators) were found to be more emotional, feminine, and interpersonally warm, and they solved moral dilemmas in a more emotional way than those who self-located in the head (head-locators). Furthermore, head-locators correctly answered a greater percentage of general knowledge questions, described themselves as more logical, and preferred to solve a greater percentage of moral dilemmas in rational ways than heart-locators. In Fetterman and Robinson's (2013) experimental work, they manipulated the salience of the head or the heart by asking participants to place their dominant index finger on either the corresponding side of the temple (head condition) or the left portion of the upper chest (heart condition). After doing this, participants in the heart condition performed worse on a test of general knowledge and solved more moral dilemmas in emotional ways than those in the head condition, who solved the dilemmas more logically. These results show that traits associated with the head or the heart can be made more accessible when the body makes the respective organ salient. When these traits become activated, people act in a way that is consistent with the metaphor.

The current study combined the research of Balcetis and Dunning (2010) and Fetterman and Robinson (2013) to examine how the head/heart manipulation moderates the effects of object desirability on distance perception. Desirability is often associated with the heart, as exemplified in expressions such as "the heart wants what it wants." Hence, we hypothesized that increased heart salience decreases perceived distance away from desirable objects more than increased head salience, but that this effect does not exist when the objects are neutral. If our

hypothesis is supported, this would demonstrate that the head/heart manipulation is not relevant in all contexts and that it is related to desirability, such that desirability would affect the activated knowledge that is associated with the head and heart.

Our study was a novel combination of the methodologies employed by Balcetis and Dunning (2010) and Fetterman and Robinson (2013). In this study, we had participants touch either their head or their heart with their index finger (as in Fetterman and Robinson (2013)) and measured their perception of distance from either a desirable or a neutral object using a beanbag toss towards the object (as in Balcetis and Dunning (2010)). Proffitt (2006) demonstrated that haptic estimates of distance, like a beanbag toss, are more accurate and less suspectible to bodily effects than verbal estimates are. For this reason, we wanted to be consistent with Balecitis and Dunning (2010) and use a haptic method as our measure of percieved distance, as this would give us a more accurate measure of participants' percieved distance. We predicted that there would be a significant interaction between desirability of object and hand placement. Specifically, we predicted that there would be no effect of hand placement when the object was neutral (i.e., throwing distances would be equal in the head and heart conditions), but that, when the object was desirable, heart-pointers would perceive the object as significantly closer than the head-pointers and, thus, would throw the beanbag a shorter distance than the head-pointers.

Experiment 1

Method

Participants

Sixty Gettysburg College students (44 women) participated in this study. The mean age of participants was 20.07 years old (*SD* = 1.10). Participants were recruited via word of mouth and email communication and voluneered to complete the study. All participants gave consent

before participating in the study. A randomly selected participant was selected to win a $25 Amazon gift card regardless of the condition they were in.

Materials

As part of the study, participants threw a beanbag at a target object. The beanbag was one used in the game "Cornhole" (approximately 6 inches x 6 inches, weighing between 14 and 16 ounces). The beanbag was covered in saran wrap in order to limit its ability to slide across the floor. The target object was a $25 Amazon gift card or a Gettysburg College Student ID card belonging to the researcher. These two objects were of the same size, approximately 3.375 inches x 2.125 inches, and were taped to the ground 156 inches from the starting location (the same distance used in Balcetis and Dunning (2010)). Researchers used a measuring tape to record the distance that the participants threw the beanbag from the starting point. Paper questionnaires were administered both before and after the beanbag throw. See Appendix A for the pre-questionnaire and Appendix B for the post-questionnaire.

Research Design

This study was a 2 (Desirability: desirable vs. neutral) x 2 (Hand-placement: head vs. heart) between-subjects design. Each researcher ran one-third (20) of the participants. In order to avoid making the experimenter a confounding variable, each experimenter tested exactly five participants in each of the four treatment conditions. Participants were randomly assigned to a condition prior to completing the study. The dependent variable in this study was the participant's perceived distance away from the object, which was measured by the number of inches from the starting line that the participant threw the beanbag.

Procedure

Participants met the researcher in a designated hallway of the Gettysburg College Science Center. They then read and signed the informed consent form provided by the researcher. The researcher then explained that the current study was examining the effects of hand dominance on throwing accuracy Next, participants filled out a short paper questionnaire with demographic information, as well as questions about hand dominance and prior athletic experience.. The researcher informed participants that their goal was to throw the beanbag as close to the object as they could. Participants were randomly assigned to throw the beanbag at either a $25 Amazon gift card (desirable object) or a Gettysburg College Student ID Card belonging to the researcher (neutral object). In the desirable object condition, participants were told that the participant who threw the beanbag the closest to the gift card would win the gift card at the end of the duration of the study. No such comment was made in the neutral condition.

All participants were told that they were in the dominant hand condition and would be using their dominant hand to throw the beanbag. Then, the researcher explained that, in order to be sure that their non-dominant hand did not influence their throwing (due to aiming, balance, etc.), they would place the index finger of their non-dominant hand in a specific location. If the participant was assigned to the head condition, they were told to place their non-dominant index finger on the corresponding side of their temple. If they were assigned to the heart condition, the participant was told to place their non-dominant index finger on the left portion of the upper chest (identical hand placements to the ones used in Fetterman and Robinson (2013)). The participant then threw the beanbag from the designated starting line to the object, placed 156 inches away (the same distance used in Balcetis and Dunning (2010)). We did not control for type of throw (either overhand or underhand) as we believed whatever way the participant threw

it would be the way they were most confident throwing, and thus would give us the best measure of their distance perception.

After the participant threw the beanbag, the researcher measured the distance of the throw and informed the participant how far away from the object their throw was. It is important to note, however, that the metric of interest to the study was the total distance of the throw from the starting point rather than the distance of the throw from the object. Thus after reporting how close the throw was to the object to the participant, the researcher then measured the vertical distance in inches from the object in order to calculate the total distance the beanbag was thrown from the starting line.Then, the researcher asked the participant to fill out another short questionnaire, which included a manipulation check, a measure of suspicion, and the following question from Fetterman and Robinson (2013): “Irrespective of what you know about biology, which body part do you more closely associate with your self. (Choose one): heart or brain” (p. 318). Once the participant finished the questionnaire, the researcher debriefed him or her and the participant was free to leave.

Results and Discussion

A manipulation check showed that the gift card (M = 5.33, SD = 1.63) was significantly more desirable than the researcher’s Gettysburg College Student ID card (M = 3.40, SD = 1.92), t (58) = 4.21, p = 0.00. Thus participants wanted the $25 Amazon Gift Card significantly more than the student ID card. This shows that our manipulation of desirability as successful.

A two-way between subjects analysis of variance (ANOVA) was conducted in order to determine the effects of object desirability (desirable, neutral) and hand placement (head, heart) on percieved distance. Means and Standard Deviations are shown in Table 1. The interaction between hand placement and object desirability as well as the main effects of hand placement

and object desirability were all non-significant, all *F's* < 1.00. Overall, the results of Experiment 1 indicate that neither hand placement, nor object desirability, nor their interaction affected distance perception. In Experiment 1 we were unable to replicate the findings from Balcetis and Dunning (2010) that more desirable objects were perceived as closer. We were also unable to support our hypothesis that heart-pointers would perceive the desirable object as closer than the head-pointers and thus would throw the beanbag a shorter distance.

Experiment 2

Slight changes were made in Experiment 2 to improve upon the methods of Experiment 1 in the hopes of being able to replicate Balcetis and Dunning (2010) as well as supporting our hypothesis. One of the theoretical changes that were made was to increase the time participants spent having their hand in the specified position. Carney, Cuddy, and Yap (2010) found that in order for body posture related information to become accessible, the posture must be held for at least two minutes. In Experiment 2, we increased the time that participants held their hand position by having them complete a Remote Associates Task for two minutes while having their index finger placed on either their head or heart (Mednick, 1962). We were not interested in scoring the RAT; we simply needed a task for participants to complete while holding their hand position. This was done in order to be more certain that the body part became more salient and to increase the accessibility of the information associated with that body part. Since another task was added, questions were also added to both the demographic questionnaire and follow up questionnaire related to written tasks. This was to ensure that participants were unaware of the purpose of the study. Participants were also told that the study was interested in the effects of hand dominance and task performance generally which aided in the cover story and helped reduce participant suspicion.

The distance that the object was placed away from the participant was increased from 156 inches in Experiment 1 to 192 inches in order to allow for more variation in distance perception. This was consistent with Proffitt, Stefanucci, Banton, and Epstein (2003). In their study, they were interested in determining the distances in which bodily state affects distance perception. Proffitt et al. determined that there was a significant difference in distance perception when participants either were wearing a backpack or not between six and 14 meters (2003). 192 inches is within that range and we hoped that this increase in distance might create more variability in our results as well as being a better distance to notice an effect of our two independent variables on distance perception. Proffitt (2006) found that verbal estimates are more susceptible to bodily effects and are less accurate than haptic estimates, like a beanbag toss. In Experiment 2 we asked participants to verbally estimate the distance between themselves and the beanbag prior to throwing the beanbag towards the object. This would allow us to compare the haptic and verbal estimates and determine which was more accurate. We also changed the neutral object from a researcher's Student ID card to a black piece of paper of the same size. This was done because in Experiment 1 some participants noted that the Student ID card was hard to see when taped to the ground. The location was also changed from the hallway of the Science Center, with tiled floor, to McCreary 313B, which had carpet. This was done in order to ensure that participants could not use the tiles on the floor to aid with their verbal estimate of distance.

Method

Participants

60 previously untested Gettysburg College students (42 women) completed this study. The average age of participants was 19.85 years old (*SD* = 1.15). Participants were recruited in

the same manner as Experiment 1. Similar to Experiment 1, all participants voluntarily completed the study and were entered in the raffle for the $25 Amazon gift card regardless of condition.

Materials

The materials for Experiment 2 were the same as Experiment 1 except a black piece of paper of the same dimensions as the $25 Amazon gift card was used as the neutral object. Also prior to the verbal estimate, researchers showed the participants what 12 inches looked like using a ruler in order to provide a frame of reference for their estimation. Since Experiment 2 took place in a carpeted hallway, there no longer was saran wrap on the beanbag, as we did not anticipate it sliding after it was thrown. Both questionnaires also included additional questions in order to keep participant suspicion low and be consistent with the cover story. See Appendix C for the pre-questionnaire and Appendix D for the post-questionnaire.

Research Design

The research design of Experiment 2 was exactly the same as Experiment 1. Again all researchers ran one-third (20) participants. Each researcher ran five participants in each condition, which was pre-determined before participants came to the lab.

Procedure

The procedure for Experiment 2 was similar to Experiment 1 but there were some changes that were made. Experiment 2 took place in McCreary 313B as well as the hallway in room 313. Participants met the researcher in 313B where the first read and signed the informed consent form. The researcher then explained that the purpose of the study was to determine the effects of hand dominance on task performance. The participant was then given and filled out the demographic questionnaire. The demographic questionnaire was the same as Experiment 1

except a there was an additional question: “How much do you enjoy reading for pleasure”. Participants rated this on a scale of 1 to 7, with higher numbers being associated with greater feelings of pleasure. Then the researcher explained that the participant would be doing two tasks: first a written task (RAT) and then the throwing task. See Appendix E for the RAT. When the researcher mentioned the throwing task, they opened the door to 313B and pointed towards the object that the participant would be throwing at, which was placed in the hallway of 313. Before giving more instructions, the researcher ensured that the participant actually saw the object they would be throwing at. Participants were then told that they were going to be in the dominant hand condition and must place their index finger in specified location, same as Experiment 1, in order for their non-dominant hand to not affect their performance. The participant then completed the RAT for two minutes with their index finger on the specified location. Instructions for completing the RAT were on the front side of the paper. Once the participant understood the directions, they flipped over the paper and the researcher began timing the two minutes.

Once the two minutes was over, the researcher took the participant in the hallway where they first verbally estimated the distance and then threw the beanbag at the object, underhand. All participants were told to throw underhand in order to ensure consistency and to limit potential confounds. Prior to the verbal estimate, researchers showed participants what a foot looks like using a ruler, for reference. Participants gave their estimate in feet, which the researchers converted to inches for analysis. Once the participant threw the beanbag and the experimenter made note of the distance, just like in Experiment 1, the participant went back into 313B and completed the manipulation check and suspicion questionnaire. This questionnaire was the same as Experiment 1 except two questions were added: “How much confidence do you have in your handwriting abilities with your **dominant** hand?” and “How much confidence do

you have in your handwriting abilities with your **non-dominant** hand?" Both questions were on a scale from 1-7, which greater numbers meaning greater confidence. The participant was then debriefed and was free to leave.

Results and Discussion

A manipulation check showed that the gift card (M = 4.73, SD = 1.51) was not significantly more desirable than the piece of paper (M = 4.20, SD = 2.02), t (58) = 1.16, p = .252. Participants did not indicate that they wanted the gift card significantly more than the piece of paper. Thus, our manipulation of desirability did not work.

A two-way between subjects ANOVA was conducted in order to determine the effects of object desirability (desirable, neutral) and hand placement (head, heart) on distance perception. For the haptic measure of distance perception, the interaction between hand placement and object desirability, as well as the main effects of hand placement and object desirability were all non-significant, all F's < 1.00. Means and Standard Deviations are shown in Table 2. For the verbal measure of distance perception, the interaction between hand placement and object desirability, as well as the main effects of hand placement and object desirability were all non-significant, all F's < 1.00. Means and Standard Deviations are shown in Table 3.

Overall, haptic estimates of distance were more accurate (M = 15.87, SD = 13.18) than verbal estimates of distance (M = 53.20 SD = 39.04), t (59) =-6.83, p = 0.00. Accuracy was measured by subtracting distance reported from the actual distance (192 inches) and then finding the absolute value of that number. This finding supports Proffitt's findings (2006) that haptic estimates are more accurate than verbal estimates.

Overall the results from Experiment 2 failed to replicate both the findings from Balcetis and Dunning (2010) and our hypothesis. However we did support Proffitt (2006) because in the current study haptic estimates of distance were more accurate than verbal estimates.

General Discussion

The results of both Experiment 1 and Experiment 2 failed to supported our hypothesis that when the object was desirable, the heart-pointers would throw the beanbag a shorter distance than the head-pointers, thus percieving the distance to the object to be shorter. We also failed to support the finding from Balectis and Dunning (2010) that more desirable objects were percieved as closer than neutral objects as we did not find a main effect of desirablity in either experiment.

There are some limitations in the current study that may have impacted our ability to find significant results. The first of those being sample size. In each experiment, only 60 participants were tested, with 15 in each condition. Having more participants would increase our power which would increase the potential of getting significant results. In addition, the distance in both experiments was shorter than those tested in Proffitt et al. (2003). Although in Experiment 1 we used the same distance as Balcetis and Dunning (2010), increasing the distance even futher than what was used in Experiment 2 may have increased the bodily effect and potentially given us a significant result. This would have been difficult for us to change in the current study due to limitations in locations for the study to be conducted. Another factor that may have led to insignificant results in Experiment 2 was the failed desirability manipulation. Since the gift card was not rated as significantly more desirable than the black piece of paper, one of our independent variables was not manipulated properly. It is interesting to note that we were able to manipulate desirability in Experiment 1 using a Student ID card as the neutral object but not in Experiment 2 using a black piece of paper. We did use a different item but we had no reason to

believe that a black piece of paper would be considered just as desirable as a $25 Amazon gift card. Future studies should first determine object desirability via a pilot study before using it as an independent variable to ensure that it is manipulated properly.

Another limitation of the current study was the hand used in the head/heart manipulation was different from that used in Fetterman and Robinson (2013). In their study participants used the index finger on their dominant hand to point either to their head or their heart whereas in our study participants used their non-dominant hand. In our study, the non-dominant hand was used to point because we believed that using the dominant hand to throw the beanbag would provide us with the best measure of distance perception. People often have a hard time throwing with their non-dominant hand so we thought that asking participants to throw with their non-dominant hand would affect their throwing ability and thus not be an accurate representation of their percieved distance. However, individuals are often more aware of their dominant hand and if they had pointed to their head or heart with their dominant hand this may have increased the sailence of the body part more than their non-dominant hand did, thus activating the knowledge associated with that body part to a greater extent. This would require finding a different way to measure distance perception that would be accurate using participants' non-dominant hand. Future research should aim to determine if there is a difference in head/heart sailence when using the dominant versus non-dominant hand first, prior to making it an independent variable in another study. Once this is determined, researchers could combine that manipulation with desiraibilty and use a different way of measuring distance perception using whatever hand is not being occupied.

Also, in Experiment 1 participants only had their index finger on either their head/heart while doing the throw, potentially not allowing the body part to become sailent enough, and this

was only increased to two minutes in Experiment 2. Although Carney, Cuddy, and Yap (2010) showed that a body pose only needs to be held for two minutes to have an effect, head/heart pointing does not involve the entire body like the poses in their study did. Thus it might take more time for the head/heart to become sailent since it involves less bodily activation, only the index finger. Future studies should increase time participants point to their head or heart in order to overcome this and allow for the body part to become more sailent. This could be done by increasing the number of questions asked prior to the throw or adding an additional task. Our inability to increase head or heart sailence may have implications for the replicability of body posture research. Since we were unable to increase body part salience in two mintues, perhaps a longer time is needed, even for whole body postures. The RAT also may have been too difficult of a task to be completed in two minutes. Participants could have gotten frustrated with the task and this may have affected how sailent the body part became as well as their distance perception. Future research should try to use an easier task in order to limit the task's potential effects on later parts of the study.

Additionally another method could be used to measure distance perception. Proffitt (2006) indicated that haptic estimates are the most accurate but there are multiple ways to test distance percpetion haptically. The beanbag toss was used in both Experimen 1 and 2 as it was the same method used in Balcetis and Dunning (2010) but other methods could be used as well. Future research should investigate other haptic measures of distance perception to determine which one is most accurate and least susceptible to bodily effects. Future studies should also try to determine if there is indeed a relationship between heart sailence and desirability. There may not actually be a relationship between these two variables, which could be one reason why our

study did not support our hypothesis. Once this relationship is established, studies looking at the effects of their interaction might be more acccurate.

Despite these limitations, our study was able to support Proffitt (2006) that haptic estimates of distance are more accurate than verbal estimates of distance. This adds to the body of research that shows that individuals are bad at estimating distance verbally and that haptic estimates are more accurate. It is also interesting to note that in Experiment 1, on average, participants underthrew the beanbag in all conditions but in Experiment 2 participants slightly over threw it. This is interesting because the distance used in Experiment 1 was four feet shorter than that used in Experiment 2. This may have been because 192 inches was far enough away where participants felt like they needed to put a lot of energy into the throw whereas 156 was too short and thus they didn't put a lot of effort into. Future research should look at what distances are suspecible to bodily effects using a beanbag toss.

While the current study contained limitations that may have affected its ability to gain significant results, future studies should continue to determine if there is a relationship between head/heart sailence and object desirabilty. Once this relationship is determined, it could be utilized in other studies interested in how those variables interact to affect distance perception as well as a variety of other variables. If this were to be found, it would provide greater evidence for emboidment as a theory that has the ability to unify the field of psychology.

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Table 1

Means and Standard Deviations for Experiment 1

Group	Mean	StDev	N
Desirable, Head	143.08	21.10	15
Desirable, Heart	151.86	17.53	15
Undesirable, Head	146.47	22.58	15
Undesirable Heart	145.79	22.84	15

Table 2

Means and Standard Deviations for Experiment 2: Haptic Measure

Group	Mean	StDev	N
Desirable, Head	204.14	25.21	15
Desirable, Heart	195.03	21.71	15
Undesirable, Head	196.13	14.25	15
Undesirable, Heart	195.98	17.27	15

Table 3

Means and Standard Deviations for Experiment 2: Verbal Measure

Group	Mean	StDev	N
Desirable, Head	166.40	54.59	15
Desirable, Heart	178.40	72.12	15
Undesirable, Head	168.00	67.14	15
Undesirable, Heart	180.00	67.73	15

Appendix A

Hand-Dominance and Throwing Accuracy: Pre-Survey

Celeste Campbell, Ellie DeWitt, and Bailey Heath

1. How old are you? _____

2. What is your gender?

- Man
- Woman
- Unlisted
- Prefer not to answer

3. Which is your dominant hand?

- Right
- Left

4. Prior athletic experience: Please indicate what sports you have played and the number of years you played them since you began high school.

Sport	Number of Years Played

Appendix B

Hand-Dominance and Throwing Accuracy: Post-Survey

Celeste Campbell, Ellie DeWitt, and Bailey Heath

1. How appealing was the card at which you threw the beanbag (i.e., how much did you want it)?

1 2 3 4 5 6 7

2. How much confidence do you have in your throwing abilities with your **dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

3. How much confidence do you have in your throwing abilities with your **non-dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

Please turn the page over to answer the remaining questions.

4. Did anything about the study seem unusual? If so, please explain.

- Yes
- No

5. Irrespective of what you know about biology, which body part do you more closely associate with your self?

- Heart
- Brain

Appendix C

Hand-Dominance and Task Performance: Pre-Survey

Celeste Campbell, Ellie DeWitt, and Bailey Heath

1. How old are you? _____

2. What is your gender?

- Man
- Woman
- Unlisted
- Prefer not to answer

3. Which is your dominant hand?

- Right
- Left

4. How much do you enjoy reading for pleasure? Greater numbers indicate greater levels of pleasure.

1 2 3 4 5 6 7

5. Prior athletic experience: Please indicate what sports you have played and the number of years you played them since you began high school.

Sport	**Number of Years Played**

Appendix D

Hand-Dominance and Task Performance: Post-Survey

Celeste Campbell, Ellie DeWitt, and Bailey Heath

1. How appealing was the card at which you threw the beanbag (i.e., how much did you want it)?

1 2 3 4 5 6 7

2. How much confidence do you have in your throwing abilities with your **dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

3. How much confidence do you have in your throwing abilities with your **non-dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

4. How much confidence do you have in your handwriting abilities with your **dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

5. How much confidence do you have in your handwriting abilities with your **non-dominant** hand? Please circle a number below. Greater numbers indicate greater levels of confidence.

1 2 3 4 5 6 7

6. Did anything about the study seem unusual? If so, please explain.

- Yes
- No

7. Irrespective of what you know about biology, which body part do you more closely associate with your self?

- Heart
- Brain

Appendix E

1. aid/rubber/wagon ____band_____ (easy)
2. fox/man/peep _____hole_____ (medium)
3. home/sea/bed ____sick_____ (very hard)
4. fence/card/master _____post ___ (very hard)
5. hound/pressure/shot _____blood_____ (easy)
6. fur/ rack/ tail _____coat____ (easy)
7. opera/hand/dish _____soap_____ (medium)
8. pie/luck/belly _____pot_____ (medium)
9. way/ground/weather _____fair_____ (very hard)
10. cast/side/jump _____broad___ (very hard)
11. wet/business/law _____suit_____ (medium)
12. safety/cushion/point _____pin_____ (easy)
13. flake/mobile/cone _____snow_____ (easy)
14. trip/house/goal _____field_____ (very hard)
15. cat/number/phone _____call_____ (medium)
16. rive/note account _____bank_____ (easy)
17. sage/paint/hair _____brush_____ (medium)
18. time/hair/stretch _____long_____ (easy)
19. bald/screech/emblem _____eagle_____ (medium)
20. sore/ shoulder/sweat _____cold_____ (very hard)
21. shadow/ chart/ drop _____eye_____ (very hard)

Note: Difficulty levels and answers were not shown to participants.