The effect of viewing cute images on behavioural carefulness

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How do we behave upon viewing objects/organisms that strike us as being cute? It is fairly common to see people reacting in a wide range of ways to stimuli that is perceived as being cute. These reactions can range from euphoria to disgust and sometimes even violence. In an attempt to replicate a study that sought to establishing a link between perceived cuteness and behavioural carefulness (Sherman, Haidt, & Coan, 2009), we sought to test the conclusions that the authors had arrived in a different setting with a few, albeit significant changes to the original design.

The authors begin with the assertion that infantile physical features are primed to elicit caregiving behaviour amongst adults. These features, namely a large rounded forehead, large low-set eyes and a small chin are defined by the authors as being cute. They argue for the need to understand how 'cuteness' helps shape behaviour immediately and conceptualised behaviour in the context of fine-motor dexterity tasks to check for carefulness. 'Behavioural carefulness', as they address it, is hypothesized to be positively influenced by exposure to stimuli that is high on cuteness.

Their results, which confirmed their hypothesis is that cuteness as a trait does induce higher performance in fine-motor dexterity tasks by amplifying carefulness. They outline this argument by presenting this phenomenon as an adaptive mechanism. Our paper seeks to test this claim by running this study in a different setting to check if the results still held (or hold?). Our research question remains the same as the topic of Sherman et al. (Sherman et al., 2009), - **How does viewing cute images influence behavioural carefulness?**

It should be noted that the study conducted by Sherman et al. consisted of two experiments. Experiment 1 involved only female participants, and used slideshows that varied significantly on dimensions besides cuteness (such as interestingness), which may have acted as a confound. To deal with this, in Experiment 2 the non-cute slideshows were

modified such that the only dimensions on which the cute and non-cute slideshows varied was cuteness. Additionally, Experiment 2 involved both male and female participants. This study has incorporated both these changes and should be considered to be a replication of Experiment 2.

Our study differs from the original study in a manner of ways. The first major change was the fine-motor dexterity task that was used to observe and measure carefulness. The authors had originally used the children's game 'Operation' (Hasbro, Pawtucket, Rhode Island, USA) as the medium for measuring carefulness. The game requires players to retrieve small objects from narrow and confined spaces using tweezers. The number of objects that were successfully removed acted as a proxy score for carefulness. The maximum attainable score in the game was limited by the number of pieces: in this case, twelve.

We instead chose to the classic electric wire loop game, of which the basic principles of the Operation game were based off of. The wire loop game, which is highly popular in fun fairs, requires the player to guide a metal loop through a serpentine length of wire while ensuring that the loop doesn't come into contact with the wire. Both the loop and the wire were connected to a common power source, which would form a closed and complete circuit upon contact. Our circuit also featured a white LED (light-emitting diode) strip which glow every time the loop touched the wire. We believe that the subjects' performance in this game acts as a good indicator of carefulness. Due to the difficulty inherent to the game's design, participants would require good hand-eye coordination and the ability to sustain their level of focus, both of which are traits that are manifestations of behavioural carefulness. Our prediction was in line with the authors' prediction that people who were exposed to cute images would significantly outperform those who weren't.

Another detail worth noting is that our study did not incorporate additional measures such as heart rate, skin conductance level and grip strength. These measures were omitted primarily due to lack of equipment to conduct these tests, and also because the authors found no significant effect of these variables in their original study.

Hypothesis:

The null hypothesis and the alternate hypothesis are:

H_0: Viewing cute images does not lead to an increase in behavioural carefulness

H_A: Viewing cute images leads to an increase in behavioural carefulness

Our proposed explanation for rejecting the null hypothesis H_0 and accepting the alternate hypothesis H_A remains the same as what was proposed by Sherman et al. They conjectured that cuteness may lead to an immediate increase in behavioural carefulness because "two factors—the importance of physical contact in early mammalian development and the extremely delicate nature of human young—may have exerted evolutionary pressures favouring those who could respond to the presence of cues colloquially described as 'cute' with increased carefulness" (Original paper, Sherman et al., p. 285).

Methods

Participants

Forty-one undergraduates (19 females, 22 males) from Ashoka University participated in the study. The subjects were between 18-23 years old. Out of the 41 subjects, 7 were left handed, while the others were right handed. To recruit subjects for the study, an e-mail inviting participants for the study was sent out to the entire student body. The email consisted of an open invitation to the student populace of Ashoka to participate in a research project, and that their participation would be rewarded with a cookie and a lollipop. The nature of the study wasn't revealed and the email also contained a link to an online spreadsheet where interested students could sign their names against suitable time slots. The exclusion criteria involved sickness, visual problems, and hand-related motor difficulties. None of the subjects who signed up for the study were excluded from participating.

Design

The two independent variables (factors) in the study were slideshow type (Cute vs. Non-Cute), and Gender (Male vs. Female). Hence, the study employed a 2 (Type: Cute vs. Non-Cute) X 2 (Gender: Male vs. Female) fully between-subjects design. The dependent variable – behavioural carefulness – was operationalised as the number of sections on the buzz-wire in which the participant made an error, which is meant to test fine-motor dexterity (see the "Materials" and "Procedure" section in Methods for further reference on the buzz-wire task).

Materials

Each participant was tasked with finishing the electrical wire loop game. Due to non-availability of the Operation game, we resorted to constructing the apparatus (henceforth

referred to as the buzz-wire) by ourselves. The buzz-wire was constructed on a plywood base that was 101.7cms long and 91 cms wide. The wire was propped onto the supports of a pull-up bar, which was bolted to the base. The supports were made of metal and the buzz-wire itself was made using steel wire that was sourced from a local hardware store in Haryana, India. The length of the wire used for the purpose of the experiment was 355.5cms. The diameter of the loop which the participants were required to trace along the path of the buzz-wire was 1.5 cms, this detail is particularly relevant as it has direct implications on the difficult of the task itself.

The apparatus was essentially a circuit which would be complete whenever the loop touched any portion of the buzz-wire. The circuit was powered by three AAA batteries of 1.5V each, which were placed in a battery casing that could accommodate up to three cells. The metal loop was housed in the chassis of a ball-point pen and was connected to the battery casing using common electric wire. The same was done to connect the buzz-wire to the power source as well. A bright red electric tape was used to tape certain sections in the buzz-wire itself. This was done in order to separate the wire into sections to facilitate easier scoring and will be discussed in greater detail in the procedure section.

Stimuli

The structure of both the slideshows we used was identical to what was used by Sherman et al. The only difference is that we used different images. Two slideshows (Cute vs. Non-Cute) were created consisting of three sections, each consisting of nine images. Thus, each slideshow had 27 images in total. The first section (baseline), as well as the last section (end) contained neutral images of home interiors and were similar in their content across the images. Each image was automatically presented on screen for ten seconds, with a blank white screen interspersed in between the images for three seconds as a transition.

For the middle section, a set of nine images were prepared for either slideshow, one with images of animals depicting a high level of cuteness, and one where the level of cuteness was comparatively lower. For the high cuteness image set, nine images of puppies and kittens were sourced. For the low cuteness image set, nine images of adult dogs and images of exotic animals such as lions and tigers were used. To establish that the difference in the two slideshows for the factor of cuteness was significant, we conducted a pilot survey.

An independent sample of participants (N=29) assessed and rated the following dimensions for both sets of images: cute, interesting, enjoyable and exciting using a 6-point scale ranging from 0 *(Not at All)* to 5 *(Extremely high).* The high cuteness image set was rated as being cuter than the low cuteness image set (M = 4.207, SD = 1.207 vs. M = 1.897, SD = 1.543), t (28) =6.271, $p < 0.001$. The two sets did not differ significantly for the following dimensions: interesting (M = 2.517, SD = 1.455 vs. M = 3.172, SD = 1.649), enjoyable (M = 3.241, SD = 1.550 vs. M = 2.931, SD = 1.510), and exciting (M = 2.586, SD = 1.593 vs M = 2.897, SD = 1.739) In all cases, the t-statistic was less than 1.104 and the p-values were greater than 0.105.

Procedure

All participants were sent a reminder 10-15 minutes before their chosen time-slots. Each participant signed a consent form, in which they consented to their participation in the experiment and authorised the use of any information collected from them within the scope of the study.

Since the study had a 2 (Type: Cute vs. Non-Cute) x 2 (Gender: Male vs. Female) fully between-subjects design, participants could be assigned to exactly one out of four groups. Each participant was assigned to a group based on their gender (Male vs. Female), and when they arrived; they were alternately assigned to either the Cute or Non-Cute group

for their gender based on their order of arrival. The aim here was to ensure that each group had an equivalent number of participants. Based on their group allotment they were administered either the cute or the non-cute slideshow, which played automatically. Once the slideshow was completed, they were briefed on the buzz-wire task.

During the buzz-wire task, each participant was required to hold the loop in their dominant hand and pass it from one end of the buzz-wire apparatus to the other, while ensuring the loop does not touch the buzz-wire at any point. If the loop came into contact with the buzz-wire apparatus at any point not covered by tape, the circuit was completed and the LED bulb connected to the apparatus would light up for the duration of the contact. The participants were allowed to rest the loop on the taped sections of the buzz-wire (which does not count as an error) so as to counter fatigue.

The wire was divided into 14 different sections of varying lengths and steepness. The start and end of each of these sections were demarcated by a piece of red electric tape; each demarcation point was located at either a peak or a trough in the wire. An experimenter unobtrusively observed the participant, and scored each section based on whether the participant made an error (score of 1) or did not (score of 0). Since the wire had 14 sections, this meant that a total error score out of 14 was obtained for each participant. It is important to note that for each section, the experimenter did not count the number of errors made; merely the presence (score of 1) or absence (score of 0) of an error was counted. Additionally, to prevent bias the experimenter who kept track of the errors was blind to whether or not the participant belonged to the cute or non-cute group.

Following the buzz-wire task, the participants were debriefed. They were told about the nature of the study, the hypothesis, and the proposed explanation. They were asked to contact the Chair of the Institutional Review Board (IRB), Professor Kai Qin Chan if they had ethics-related concerns or complaints. Lastly, they were thanked for their participation,

and given a lollipop and a cookie. The entire process – from the arrival of the participant to their departure – took around 10-15 minutes.

Results

Twenty subjects were shown the Cute slideshow before being administered the buzz wire task, the other 21 were shown the Non-cute slideshow. Of the 20 people in the cute group, 9 were females and 11 were males. Meanwhile, in the Non-cute group, there were 10 females and 11 males.

Participants who were shown the cute slideshow (M = 7.750, SD = 2.221) made fewer errors compared to the participants who were shown the non-cute slideshow (M = 8.238, SD = 2.322), but these results were not significant, t (39) = –0.687, p = 0.248. See Fig. 1.

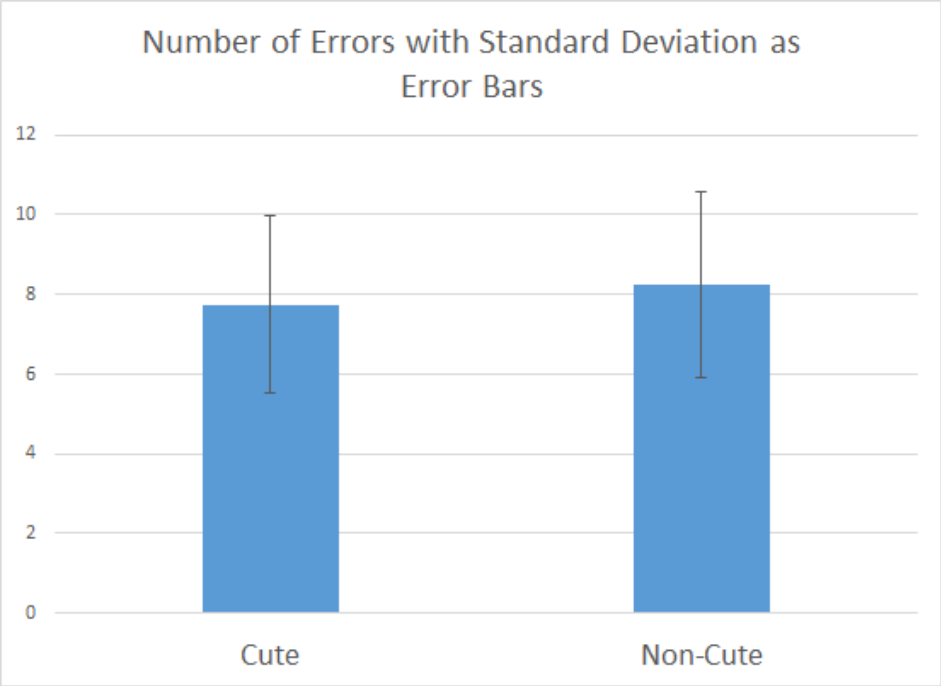

Figure 1: Mean number of errors with standard deviation for participants belonging to either the Cute or Non-Cute group (both genders)

A 2 (Slideshow Type: Cute vs. Non-Cute) x 2 (Gender: Male vs. Female) fully between-subjects ANOVA on Number of Errors revealed no main effect of Gender, F (1, 37) = 1.227, p = 0.275, and no main effect of Slideshow Type, F (1, 37) = 0.495, p = 0.486.

Additionally, there was no significant interaction between the two factors, F (1, 37) = 0.003, p = 0.957. See Fig. 2.

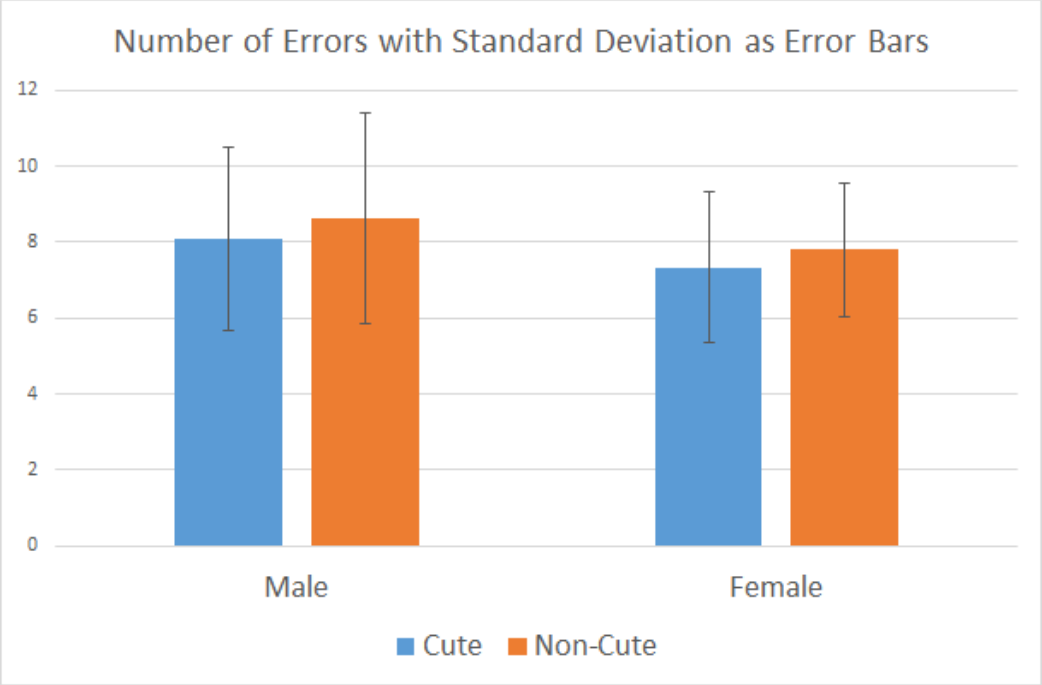

Figure 2: Mean number of errors with standard deviation by gender and group

Simple effects analysis revealed that under the cute condition, females made fewer errors compared to males, but this wasn't statistically significant, t (37) = 0.734, p = 0.4675. A similar trend was observed under the non-cute condition where females made fewer errors when compared to males, but again, this wasn't statistically significant, t (37) = 0.834, p = 0.4098. Moreover, males made fewer errors when exposed to cute stimuli as compared to other males who weren't exposed to cute stimuli, but this result wasn't significant, t (37) = -0.557, p = 0.5808. The same results were observed within females, where those who were exposed to cute stimuli made fewer errors compared to those who were not exposed to cute stimuli, albeit this difference was not significant, t (37) = -0.442, p = 0.6608. Since none of our results were significant, we fail to reject the null hypothesis H_0 – viewing cute images does not increase behavioural carefulness.

Discussion

While the Cute group did have a lower score on the buzz-wire task compared to the Non-Cute group –thus indicating higher carefulness– the difference was not significant, which means that the alternate hypothesis did not hold. Clearly, this is in contrast to the what was established by Sherman et al. The following 3 factors may mean that we cannot rule out type II error (false negative) i.e. we failed to accept the alternate hypothesis despite it being true.

(i) May need a greater sample size

A major limitation of the study is the small sample size. Based on the sample sizes used by Sherman et al. (n = 40 for experiment 1, and n = 56 for experiment 2), we assumed our sample size (n = 41) was large enough to establish a significant main effect of slideshow type (Cute vs. Non-Cute). However, this may not have been the case; assuming an effect size *d = 0.5* (which is close to the effect size Sherman et al. calculated for experiment 2, which was *d = 0.48*), power of 0.8, and alpha as 0.05, the required sample size, as computed by G*Power *(Test family - t tests; Statistical Test - Means: Difference between two independent means (two groups); Type of Power Analysis: A priori, compute required sample size given alpha, power and effect size),* was 102.

(ii) The buzz-wire apparatus was too ‘mechanical’, which may have made it harder to elicit as much carefulness from participants in the Cute group compared to the game 'Operation'

Our preliminary reading of Sherman et al.’s paper suggested that their main criteria for choosing 'Operation' seemed to be that it was similar enough to standard fine-motor dexterity tasks, except that it did not quantify performance with respect to speed. As they put it,

> “Standard laboratory dexterity tasks score performance as the number of objects successfully moved per second. Because cuteness may not make people faster (only more careful), we used a similar task that was not time dependent: the classic children’s game 'Operation' (Hasbro, Pawtucket, RI), in which participants use tweezers to remove small objects (body parts) from confined spaces. This task is similar to standard fine-motor dexterity tasks (e.g., the O’Connor tweezer dexterity task, Lafayette Instrument, Lafayette, IN), but performance can be quantified without reference to speed.” (Sherman et al., 2009, p. 282)

In hindsight, 'Operation' may be different from standard fine-motor dexterity tasks in an important way: the apparatus it uses is humanlike. The ‘patient’ looks like a human, albeit a cartoonish one. The somewhat human-like appearance of the patient, along with the context of ‘Operation' – which, as its name suggests involves a form of mock surgery– may help elicit a greater degree of carefulness once a person is primed for it. Hence, using 'Operation' to measure fine-motor dexterity may have led the participants who were shown the cute slideshow to be additionally careful, since 'Operation' may have placed them in a context of caring for something humanlike. If this was the case, it would increase the chances of achieving significance and confirming the hypothesis.

In contrast, achieving a significant difference in carefulness may have been inherently more difficult with the buzz-wire, since it is purely a fine-motor dexterity task; even if the cute slideshow did prime participants to be more careful, the buzz-wire task itself may have been too ‘mechanical’ to take full advantage of this priming.

Were Sherman et al. aware that 'Operation' may have been different from standard fine-motor dexterity tasks because it involved a human element? While nothing in the paper

explicitly states so, we feel that the use of 'Operation' to measure carefulness was quite appropriate given that increased behavioral carefulness following cuteness probably has its roots in caring for human infants, which means that it makes sense to use a humanlike apparatus to test behavioral carefulness. Thus, while the results of Sherman et al. may only be applicable to fine-motor behaviour in the context of increased carefulness towards a humanlike apparatus, this in itself is not problematic if one does not want to generalise the results to encompass carefulness towards objects which are more mechanical. If the hypothesis in the current study involving the buzz-wire task had been established, it would have shown that increased behavioral carefulness after exposure to cuteness also extends to mechanical objects that are not humanlike. Unfortunately, this did not happen.

It is suggested that a future study should be conducted to establish if the humanlike appearance of the ‘patient’ in 'Operation' does indeed lead to greater carefulness once a participant has been exposed to cute stimuli. Two groups can be shown a cute slideshow, following which participants are measured on behavioural carefulness. A normal version of 'Operation' can be used to measure the carefulness of the first group. For the second group, a modified version of 'Operation' can be used to measure behavioral carefulness; in this modified version the ‘patient’ will be painted over, thus making the apparatus less humanlike. Our hypothesis is that the participants whose carefulness was tested using the normal, more humanlike 'Operation' game will demonstrate greater carefulness. Such a study will employ a single-factor between-subjects design; the factor (Apparatus type) has 2 levels (normal patient v. modified patient).

(iii) Too much difference in relative difficulty of different sections of the buzz-wire task

The plastic objects used in the game 'Operation' are of different sizes, which makes it reasonable to assume that some objects are harder to remove than others. To make sure our buzz-wire also demonstrated this feature, we tried to ensure that the various sections of the wire were of varying difficulty. Hence, some sections were longer than others, or varied in terms of steepness. However, the relative difficulties of the various sections may have varied too much. There were some sections where almost everyone made an error, and others where almost no one made an error. The fact that the difficulty of each section varied to this extent may have reduced the variance in the number of errors observed, which would have made it harder to observe a significant difference. This is another limitation of the study. Future studies should ensure that the different sections of the buzz wire do not vary as much in terms of difficulty.

Other limitations

We have discussed 2 limitations so far:

(i) The sample size may have not been large enough

(ii) There was too much difference in relative difficulty of different sections of the buzz-wire task

Other important limitations include:

(iii) More diverse sample needed

The current sample consisted entirely of college students from Ashoka University. While this homogeneity may not be problematic if one assumes that the phenomenon of increased behavioral carefulness after exposure to cute stimuli does have evolutionary roots, it may still be prudent to conduct a similar study on participants from different age groups (e.g. children) or cultures, who may have different ways of responding to cute infants.

(iv) Apparatus-related limitations

Since the buzz-wire apparatus was built in-house, anyone aiming at replicating this research will not have access to the same apparatus, although similar buzz-wire tasks can be constructed. Secondly, extremely subtle touches of the loop to the buzz-wire did not result in a blink. However, since this occurred across participants, we believe that it did not act as a confound; only touches above a certain minimal threshold –although it should be stressed that this threshold was very small– caused the light to blink, which may have helped avoid a ceiling effect.

Lastly, the wire was not always completely still throughout the task. While the experimenters ensured that the wire was motionless before each participant started the task, they did not intervene once the task was underway. This became an issue if a participant made too many errors, since how much the wire would sway was directly proportional to the number of times the participant came into contact with the wire. Hence, future construction of the buzz-wire should use more stable wiring for construction.

In conclusion, the current study has not been able to replicate the results found by the authors in the original study. However, as we have indicated there may be a chance of a type II error (false negative) due to our small sample size, and the nature of the buzz-wire apparatus. We have not been able to generalize our conclusions to mechanical apparatuses that lack the human element that 'Operation' had. In terms of addressing limitations that we could have worked around, we would like to go with a larger, more representative sample the next time. We also feel that the apparatus in question –despite conforming to the general norms that fine motor dexterity tasks demand– was not robust enough. If we were to replicate this again, we would choose a more robust apparatus.

References

Sherman, G., Haidt, J., & Coan, J. (2009). Viewing cute images increases behavioral carefulness. *Emotion*, *9*(2), 282-286. doi: 10.1037/a0014904