

Replication of “Terror management and adults’ attachment to their parents: The safe haven remains” by CR Cox, J Arndt, T Pyszczynski, J Greenberg, A Abdollahi, S Solomon (2008, *Journal of Personality and Social Psychology*).

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Introduction

In their original article “Terror management and adults’ attachment to their parents: The safe haven remains,” Cox, Arndt, Pyszczynski, Greenberg, Abdollahi, and Solomon (2008) suggest that young adults’ parental attachment helps them to manage their anxiety over mortality and the inevitability of death.

Terror management theory (TMT) postulates that humans are aware of their mortality and that this can be distressing. Moreover, TMT posits that attachment to close others can relieve this distress, by providing the self-esteem to give each day meaning (Greenberg, Pyszczynski, & Solomon, 1986). Whereas previous research in this domain has focused on secondary relationships that come later in life, such as romantic relationships and friendships, Cox et al., (2008) focus on young adults’ primary relationships, such as the relationship with their parents. The current replication of Cox et al. (2008) was conducted as part of the Reproducibility Project: Psychology, which asks volunteers to replicate the final study in their article of choice. As such, we sought to exactly reproduce the methodology used in Experiment 6 of the original article. In this experiment, the original authors examined whether young adults, when experiencing an instance of mortality salience (MS), prefer to rely on primary relationships (i.e. with parents) to secondary relationships (i.e. with friends or romantic partners).

Furthermore, they hypothesized that “after MS, insecurely attached individuals should report increased preference for a parent. However, we predicted that this effect would be specific to those with high levels of attachment anxiety and low levels of attachment avoidance, since previous research has found that such individuals have problems transferring attachment functions from parents to subsequent relationships” (Cox et al., 2008, p. 710). Results indicate that participants who scored low on avoidance but high on anxiety demonstrated an increased

relative preference for a parent after MS as opposed to dental pain (DP), $b = -32.04$, $SE = 14.47$, $t = -2.22$, $p = .03$.

Method

Power Analysis

A power analysis to calculate the necessary sample size was conducted using G*Power. While no effect size measure was given in the article, an estimate of the partial R^2 can be derived from the reported regression t-value with the following formula:

$$\text{partial } R^2 = \sqrt{[(t^2)/((t^2) + df_{\text{residual}})]}$$

$$\text{So, in this case, partial } R^2 = \sqrt{[(-2.22^2)/((-2.22^2) + 93)]} = 0.224$$

In G*Power software, this effect size was converted to an $f^2 = 0.289$. G*Power was then used to calculate the necessary sample size. “T-tests” was chosen as Test Family, “Linear multiple regression: Fixed model, single regression coefficient” as statistical test, “A-priori” as the type of power analysis, effect size was determined to be $f^2 = 0.289$, the error of probability = 0.05, number of predictors = 7. This yielded a sample of 30 participants for 80% power, 39 participants for 90% power, and 48 participants for 95%.

Planned Sample

Based on the above power analysis, we would only need 48 participants to have a high-powered replication. However, to ensure stability of means and more accurate estimations of standard deviations and correlation structures, we chose to collect data from the same number of participants as in the original study which had an $n = 100$.

Materials and Procedure

Upon arrival in the lab, participants were asked for informed consent and filled in the Relationship Scales Questionnaire (RSQ). After a series of unrelated studies, participants either answered two questions about death (MS, experimental condition) or two questions about dental pain (DP, control condition). Participants then worked on a word puzzle, which served as a delay distraction task, after which they completed the PANAS. Finally, participants were asked to allocate calling minutes in a hypothetical phone plan to parents, siblings, good friends and partner, and were debriefed. The original materials and procedure below were followed precisely.

“The study was conducted in a laboratory setting. All packets were identical in content except for the MS manipulation.” (Cox et al., 2008, p. 710).

Attachment. “Participants completed Griffin and Bartholomew’s (1994b) 30-item Relationship Scales Questionnaire as part of a mass screening session approximately 2 weeks prior to their participation in the study... Items were presented on a 5-point scale ranging from 1 (not at all like me) to 5 (very like me). Since most researchers currently suggest that attachment should be measured in relation to two distinct attachment dimensions (see, e.g., Fraley & Waller, 1998), we calculated separate anxiety (e.g., “I worry about being abandoned”; .81) and avoidance (e.g., “I find it difficult to trust others completely”; .72) scores following procedures recommended by Kurdek (2002; see also Simpson, Rholes, & Nelligan, 1992).” (p. 710).

Mortality salience, dental pain, mood, and delay distraction. “To maintain the cover story, we included in all packets filler questionnaires and then, following previous research (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), we randomly assigned participants to answer questions related to either death or another aversive topic. In the MS conditions, the questions were “Please briefly describe the emotions that the thought of your own

death arouse in you” and “Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.” In the control condition, participants were asked parallel questions about experiencing dental pain. This has been the most commonly used aversive thought control condition” (Cox et al., 2008, p. 699).

“[W]e asked participants to complete the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) and a word search task to provide a 3- to 5-min delay. The word search puzzle was a 10 x 10 matrix of letters with instructions asking people to search and circle 10 neutral words (e.g., book, movie). We used the PANAS in subsequent analyses to determine whether MS influenced people’s mood, although previous research indicates that it typically does not (see, e.g., Greenberg, Solomon, & Pyszczynski, 1997)” (Cox et al., 2008, p. 699).

Cell phone task. “The dependent measure was a cell phone minute allocation task that we created to assess preference for various relationships. Specifically, participants were presented with a questionnaire described as a ‘Consumer Behavior and Marketing Survey.’ To maintain the cover story for the task, we told participants,

Recent evidence suggests that observing people’s attitudes and behaviors toward certain products can be very informative. By having a fuller sense of how people use a product, researchers gain important insight into how people make decisions and what they look for.

The instructions further stated that everyone was randomly assigned to evaluate a common, everyday household product; actually, all participants completed the same cell phone calling plan evaluation. The instructions read,

Imagine you are given a cell phone with 100 minutes allotted to you per week. These are whenever minutes, so you can call anyone at anytime without additional fees or penalties; however, you must partition these minutes in advance. In the space below, indicate how you would partition (or breakdown) your 100 minutes. That is, please indicate how many minutes that you would use to call each of the following people. Keep in mind that your total time should add up to 100 minutes.

“Following the instructions, participants were presented with four relationships: parent, sibling, romantic partner, and a close friend. A blank space was placed next to each relationship, and participants were asked to indicate the number of minutes they would use to call each person.” (Cox et al., 2008, p. 710).

“The dependent measure consisted of the number of minutes allocated to each of the four relationships” (Cox et al., 2008, p. 710).

Analysis Plan

In order to investigate the key effect, we performed separate regression analyses on the minutes allocated to each relationship (parent, romantic partner, sibling, close friend). As in the original study, MS vs. DP (dummy coded) and attachment anxiety and avoidance (centered) were entered simultaneously as predictors in the first step, followed by all two-way interactions in the second step, and the three way interaction in the third step.

Subsequently, we conducted simple slope analyses in order to investigate whether we replicated a significant difference in time allocated to parents between the MS and dental pain conditions when attachment anxiety was high (1 SD above) and attachment avoidance was low (1 SD below), and a significant difference in time allocated to romantic partners between the MS and dental pain conditions when attachment anxiety was low (1 SD below) and attachment avoidance was low (1 SD below).

We then conducted separate regression analyses for participants scoring above and below the median of attachment avoidance. Specifically, we regressed minutes allocated to all target groups on attachment anxiety and MS vs. DP, in order to investigate the presence of a two-way interaction of attachment anxiety and MS vs. DP.

Differences

To ensure that our Dutch participants understand the materials, we will translate all materials to Dutch. Where possible, we will use validated Dutch translations of the scales and manipulation.

Actual Sample

The replication was conducted in the Social Psychology lab at Tilburg University, where 202¹ bachelor psychology students participated in exchange for partial course credit. Two participants were excluded from the data set. The first participant was excluded due to a technical error during the experiment, and the second participant was excluded since s/he only completed the Relationship Scales Questionnaire (RSQ). After cleaning the data set, the sample size was $N = 200$ with a mean age of 19.8 years ($SD = 2$ years) and 159 women.

Differences from pre-data collection methods plan

Participants completed the RSQ two weeks prior to the experiment in the original study of Cox et al., in order to estimate general attachment styles. In the replication, the delay between the RSQ and the second part of the experiment was approximately 30 minutes instead of two weeks. We do not expect the duration of the delay to affect the results because the RSQ estimates the relative stable relationship style. Also, possible spillover effects of the RSQ on the remaining

¹ The lab in which we conducted the experiment usually runs a session of experiments in one week, and continues running it until the end of the week. Furthermore, the session in which our replication was embedded contained studies that aimed for a sample size of approximately 200 participants. For this reason, we have not used a fixed stopping rule and obtained twice as many participants as the sample size we aimed for.

experiment are minimized by having participants completing unrelated studies during the delay.

As stated before, the experiment was part of a lab-session with multiple experiments. However, this lab-session was organized after consulting the other experimenters to secure that the replication of Cox et al. would not be influenced by other manipulations or tests.

The experiment was conducted in Dutch, since the participants were Dutch undergraduate students. All materials were translated to Dutch and back translated to English, after which the two English versions were compared. A widely used, validated translation of the PANAS was used, composed by Peeters, Ponds, and Vermeeren (1996).

We did not include a relationship status variable in our replication. However, because this variable did not affect the time allocations in the original article, we expect that this omission cannot account for a failure to replicate.

Furthermore, the presentation order of the relationships in the cell phone task was not counterbalanced. It is unclear from the results of the original article whether order effects were present, thus we cannot exclude the possibility that this omission affected our results.

Lastly, participants were only able to continue with the experiment after spending at least three minutes on the word puzzle, to avoid that participants would continue with the experiment without completing the filler task.

Results

Data preparation

The attachment avoidance ($\alpha = .81$) and attachment anxiety ($\alpha = .71$) variables were computed from calculating the mean score of the RSQ items 11, 18, 21, 23, 25 and the RSQ items 10, 12, 13, 15, 20, 24, 29, 30, respectively, as described by Kurdek (2002). Items 12, 13, 20, 24 and 29 were reverse coded following Collins and Read (1990), as described in the original

article. The positive mood scales ($\alpha = .88$) and negative mood scales ($\alpha = .85$) were computed by taking the sum score of the PANAS items 1, 3, 5, 9, 10, 12, 14, 16, 17, 19 and PANAS items 2, 4, 6, 7, 8, 11, 13, 15, 18, 20, respectively (Watson, Clark, & Tellegen, 1998).

Confirmatory analysis

First we conducted separate regression analyses to see if we could replicate the pattern of significant and non-significant three-way interactions of anxiety attachment, avoidance attachment and condition (MS = 1 vs. DP = 0) on the amount of minutes allocated to siblings, close friends, parents, and romantic partners.

As in the original article, there were no significant three-way interactions on time allocated to siblings, $b = -2.94$, $SE = 3.61$, $t(192) = -.81$, $p = .42$, $f^2 = .06$ (calculated from partial $R^2 = .06$), and time allocated to close friends, $b = .09$, $SE = 5.58$, $t(192) = .02$, $p = .99$, $f^2 = .001$ (calculated from partial $R^2 = .001$). However, unlike in the original article, we also found no significant three-way interactions on time allocated to parents, $b = 5.80$, $SE = 5.61$, $t(192) = 1.03$, $p = .30$, $f^2 = .08$ (calculated from partial $R^2 = .07$), and romantic partners, $b = -2.95$, $SE = 7.01$, $t(192) = -.42$, $p = .67$, $f^2 = .03$ (calculated from partial $R^2 = .03$).²

Despite finding no significant three-way interaction for time allocated to partners and romantic partners, in order to compare the original findings with our replication attempt, we conducted the simple slope analyses. First, we conducted a simple slope analysis of the effect of MS(1) as compared to DP(0) on preference for parents for participants high in anxiety (+1 SD) and low in avoidance (-1 SD). The effect was not in the same direction as in the original article, and did not reach statistical significance, $b = -2.93$, $SE = 4.04$, $t(192) = -.73$, $p = .47$, $f^2 = .05$

² Unlike in the original paper, MS ($M = 21.24$, $SD = 6.39$) lead to significantly less positive affect (as measured by the PANAS) than the DP condition ($M = 23.35$, $SD = 7.14$), $t(198) = -2.20$, $p = .03$, $d = -.31$. However, including it as a covariate in the regression analyses does not lead to meaningful differences nor did it yield any main or interaction effects (all $ps > .10$).

(calculated from partial $R^2 = .05$). Second, we conducted a simple slope analysis for the effect of MS(1) as compared to DP(0) on preference for romantic partners for participants low in anxiety (-1 SD) and low in avoidance (-1 SD). This time the effect was in the same direction as in the original article but also did not reach statistical significance, $b = -4.93$, $SE = 5.30$, $t(192) = -.93$, $p = .35$, $f^2 = .08$ (calculated from partial $R^2 = .07$).

Next, like the original authors, we inspected the two-way interaction between MS and anxiety, both for individuals scoring above and below the median of avoidance (for allocations to all close others). This only yielded a significant two-way interaction of MS(1) vs. DP(0) and anxiety on minutes allocated to parents for participants low in avoidance (i.e. those scoring below the median), $b = -13.20$, $SE = 6.60$, $t(96) = -2.00$, $p = .048$, $f^2 = .25$ (calculated from partial $R^2 = .20$) (see Figure 1). However, a simple slope test shows that, for participants low in avoidance (i.e. those scoring below the median) and in the MS condition, the effect of anxiety on minutes allocated to parents is negative, $b = -11.61$, $SE = 5.27$, $t(47) = -2.20$, $p = .03$, $f^2 = .45$ (calculated from partial $R^2 = .31$), opposite to the positive effect found by the original authors. No effects were found for allocations of minutes to other close other groups (siblings, romantic partners, and good friends), participants high in avoidance, nor for participants in the DP condition (all $ps > .10$).

Finally, multiple regression analyses regressing minutes allocated to the target groups on attachment avoidance, attachment anxiety, and MS vs. DP revealed some main effects. There was a negative effect of attachment avoidance on minutes allocated to siblings, $b = -1.91$, $SE = .96$, $t(192) = -1.98$, $p = .049$, $f^2 = .16$ (calculated from partial $R^2 = .14$) and parents, $b = -3.00$, $SE = 1.51$, $t(192) = -1.99$, $p = .048$, $f^2 = .16$ (calculated from partial $R^2 = .14$). Furthermore, there was a negative effect of attachment anxiety on minutes allocated to parents, $b = -4.78$, $SE = 2.16$,

$t(192) = -2.22, p = .03, f^2 = .19$ (calculated from partial $R^2 = .16$). The results also show a positive effect of attachment anxiety on minutes allocated to romantic partners, $b = 5.95, SE = 2.69, t(192) = 2.21, p = .03, f^2 = .19$ (calculated from partial $R^2 = .16$), and a positive effect of attachment avoidance on minutes allocated to romantic partners, $b = 5.14, SE = 1.88, t(192) = 2.73, p = .007, f^2 = .23$ (calculated from partial $R^2 = .19$). All other main-effects and possible two-way interactions were non-significant (all $ps > .10$).

Discussion

Summary of Replication Attempt

In this direct replication of Cox et al., (2008), our main goal was to see whether we could reproduce the interaction effects of MS (vs. DP), attachment avoidance and attachment anxiety on allocated time to parents, siblings, friends and partners. The results did not yield the predicted significant interaction effects, nor a main effect of MS. Thus, the current study did not replicate the original finding.

Whereas the results of one of the three simple slope analyses were in the direction of the effects in the original article, the effects obtained in this replication did not come close to statistical significance. Given that we had a sample twice the size of the original sample, we think it unlikely that a lack of power explains this non-significance.

Commentary

We have no explanation for the failure to replicate nor do we have reasons to suspect that any of the differences between the original article and our replication can account for it. We did not include relationship status as a control variable, but because this variable did not affect the dependent variables of interest in the original article, we expect that this omission did not have substantial effects on the results of this replication. Whether the omission of the randomization

of relationships in the phone call task has had an effect on our results is unclear, because the original article does not report the (lack of) existence of an order effect.

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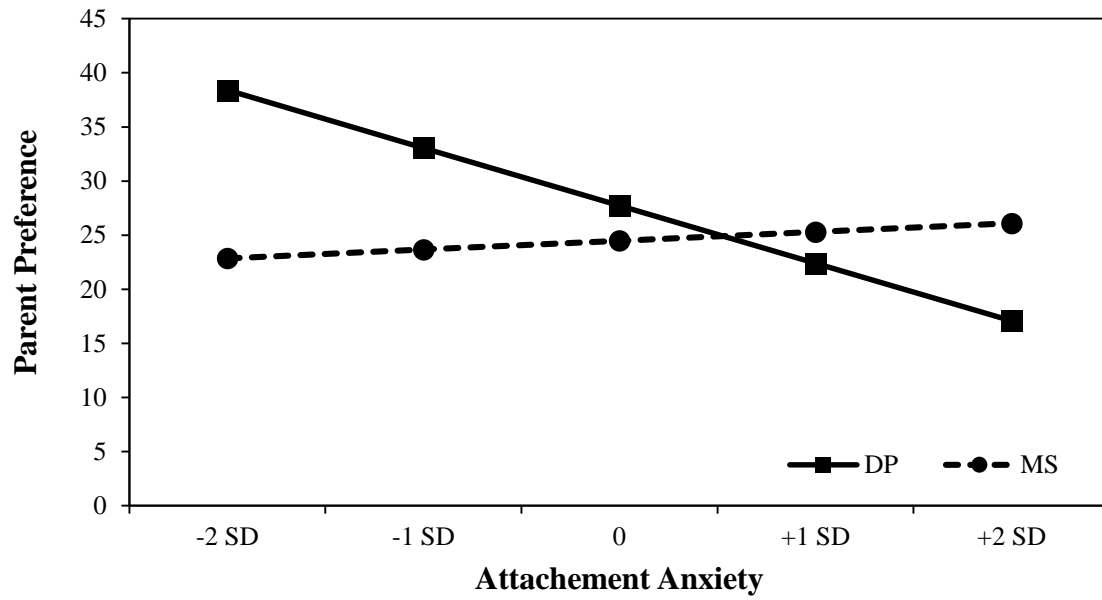


Figure 1. Cell phone minutes allocated to a parent as a function of mortality salience and anxiety among low-avoidant individuals.