Need States and Behavioral Compensation Following (Online) Ostracism

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Abstract

Ostracism, the process of rejection and exclusion, presents a threat to the satisfaction of psychological needs. According to the Need-Threat model (Williams, 2009), threatened needs are aimed to be fortified. Need fortification may be displayed through diverse behavioral measures. In the present study, participants were told to enter a social media platform and interact with other users. Within this social media platform, participants were either excluded (the experimental condition) or included (the control condition). The current paper explores whether a change in need satisfaction after a behavioral compensation, namely need fortification, can be observed in ostracized people. First, we tested whether individuals in the experimental condition experience less need satisfaction than individuals in the control condition, after being ostracized. Further, we expected that antisocial behavior mediates the process of need fortification of power needs (need for control, need for esteem) and explains the need satisfaction change in ostracized participants. As anticipated, ostracized participants, compared to non-ostracized participants, reported a lower need satisfaction after the threat. In line with our hypothesis, ostracized participants reported a higher change in need satisfaction, compared to participants in the control condition. However, we found that antisocial behavior did not mediate this effect, which leaves the reasons for the change in need satisfaction, unexplained in the present paper. Future research is advised to extend evidence on the relationship between need states and compensation behavior in the context of ostracism. With the current relevance of social media, future projects should also pay more attention to online ostracism.

Keywords: Need States, Behavioral Compensation, Need Fortification, Online Ostracism, Antisocial Behavior

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Innate biological needs like hunger, thirst, and sleep are driving factors to guarantee an individual's health. But there are also psychological needs that must be fulfilled to ensure mental health and general well-being. Ryan and Deci (2000) argue, in context of their self-determination theory, that people have basic psychological needs in the realms of competence, autonomy, and relatedness. They are defined as "innate, organismic necessities" which are critical for psychological growth, integrity, and well-being. All of the three basic psychological needs have to be met, as only in that case, optimal functioning of the individual may be observed (Ryan & Deci, 2000).

Belonging is crucial for individual well-being, and if not fulfilled this can result in physical and psychological suffering (Williams, 2009). The exclusion of individuals in social regards can be highly adaptive. From early history reaching into present times, standard practices instrumentalizing exclusion in social situations are used for multiple purposes. Social exclusion is used to exert social control, for example, legal punishments use means like imprisonment and social isolation to punish criminals (Gruter & Masters, 1986). Even children use rejection and exclusion as means to distance themselves and to suppress aggressive behavior from other individuals (Barner-Barry, 1986). This power of social interactions can be traced back to an inborn need for individuals to have a minimum number of interpersonal connections (Baumeister and Leary, 1995). In the event of need threats, individuals are provoked to counteract the threatening of their needs. Behavioral reactions are used to compensate for lower need satisfaction. This process is more closely described in the Need-Threat model of Williams (2009).

Ostracism is a process in which individuals are experiencing a threat to the satisfaction of those needs. Ostracism is defined as the general process of exclusion and rejection (Williams, 2009). Ostracized individuals are likely to suffer predominantly from an increase in negative affective states, leaving victims of ostracism feeling anxious, sad, and angry

(Williams, 2000). In similar regard, heightened levels of depression, loneliness, anxiety, frustration, invisibility, and helplessness have been recognized as consequences of ostracism (Williams et al., 2009). Behavioral reactions follow and are supposed to alleviate those negative states. Being aware of the negative outcomes of ostracism, we are interested in exploring the relationship between behavior and need states in ostracized individuals.

Temporal Need-Threat Model of Ostracism

Williams (2009) defines ostracism as an evolutionary adaptive group behavior. Reactions to and consequences of ostracism are described in three stages within this model. Before entering the first stage of the model, a minimal signal is needed for the detection of ostracism.

In stage 1, the reflexive stage, a reflexive unconscious pain is caused by the experience of ostracism which leads to elevated attention and cognitive appraisal by the ostracized individual. Detection of ostracism, according to the model, can also lead to a situation of need-threat, in which the ostracized individual is feeling threatened in their need satisfaction. The needs that may be threatened by ostracism are defined as need for belonging, need for self-esteem, need for control, and need for a meaningful existence. For this particular paper, the relevant needs are the needs for self-esteem and control. The need for self-esteem is defined as the motivation to maintain a high evaluation of oneself and defend it when it comes under threat (Pyszczynski et al., 2004). Need for control is defined as the belief in one's ability to have control over their surroundings and to create desired results successfully (Leotti et al., 2010).

In stage 2, the reflective stage, the ostracized individual reflects consciously on the motives, relevance, and meaning of the incident. Following and depending on this appraisal, a need fortification process may be initiated to regain need satisfaction of the threatened needs. This process is called need fortification; individuals engage in this fortification of threatened needs by different means. Antisocial behavior seems to be a valid way to regain need

satisfaction; people act violently or aggressively to fortify their need for control (Pittman & D'Agostini, 1988). But, also prosocial behavior has been documented to be a behavioral consequence of ostracism (Carter-Sowell et al., 2008). This stage is central to our research question, the behavioral response to need threats and ostracism in general. It can be assumed that individuals respond pro- or antisocial depending on their need states, not their ostracism status (Leiro and Zwolinski, 2014). The third, and last, stage of the model is not of relevance for this paper, therefore not further discussed.

Behavioral Responses to Ostracism

Antisocial behavior is observed as a common response to ostracism (Gerber and Wheeler, 2009). In the case of ostracism, frustration is experienced, and aggression follows. Generally, aggression seems to be the result of frustration, according to the frustration-aggression hypothesis (Berkowitz, 1989). Warburton et al. (2006) have demonstrated that individuals, if ostracized, respond more aggressively compared to non-ostracized individuals, even to parties that have not been involved in the ostracism process.

As the aforementioned findings have indicated, ostracism is mostly associated with aggressive behavior. However, few studies have also demonstrated that ostracized individuals may also react as opposed to the aggressive responses demonstrated in the majority of the research. In the study of Carter-Sowell et al. (2008) ostracism resulted in more conformity and social susceptibility. Ostracized individuals were more likely to behave in ways to increase the liking of others (Carter-Sowell et al., 2008). It has generally been observed that prosocial behavior is usually engaged in if the future is of relevance for the ostracized person (Balliett & Ferris, 2013). Similar to this, ostracized individuals tend to act prosocially when making re-inclusion efforts (Wesselmann et al., 2015).

Picking up the idea of Leiro and Zwolinsky (2014) again, need states are the driving forces behind the behavior following ostracism. There should be a link between the type of behavior and the satisfaction of specific needs (Leiro and Zwolinski, 2014). According to

Wesselmann et al. (2015), when individuals intend a re-inclusion, they most likely engage in prosocial behavior. The motivation to seek re-inclusion is reflected most closely by the satisfaction of the inclusionary needs; needs for belonging and meaningful existence. It can be assumed that when the possibility for re-inclusion attempts is not given, antisocial behavior may be more promising for individuals to fortify needs. This is mostly done when needs are threatened that relate to power; hence needs for control and esteem are aimed to be fortified by antisocial behavior as they represent power motives (Wesselmann et al., 2015).

Present Research

Hypothesis 1

In the present study, we will use an experiment that allows an investigation of participants' behavioral tendencies after being threatened in their needs. In the case of ostracism, we expect that participants in the exclusion condition report lower overall need satisfaction, compared to the control condition (H1).

Hypothesis 2

Further, we assume that there is a difference in change of need satisfaction between the two conditions. We expect that the change in overall need satisfaction for participants in the exclusion condition will be higher, compared to the control condition (H2).

Hypothesis 3

As stated before, need states seem to be predicting the behavioral response of ostracized individuals. The motivation to satisfy inclusionary needs; needs for belonging and meaningful existence is assumed to be closely reflected by re-inclusion attempts. However, considering the experiment's design, re-inclusion attempts by participants are unlikely. We expect that individuals will tend to act antisocially after being ostracized. This assumption is based on the previously mentioned notion of antisocial behavior as the more promising path to fortify needs when re-inclusion is not possible (Wesselmann et al., 2015). Hence, it is

expected that satisfaction for the needs of 'control' and 'esteem' before the puzzle task has predictive quality over participants' antisocial behavior (H3).

Hypothesis 4

Following the logic that antisocial behavior serves to fortify needs of control and esteem, we expect an increase in satisfaction of those needs after participants acted antisocially in the puzzle task (H4).

Methods

Participants

We established the appropriate sample size of 401 participants for this study through a power analysis using an effect size of f = .15, a power of β = .85, and an alpha error probability of α = .05 in the program G. Power 3.1 (Faul et al., 2007). A total of 475 US citizens were randomly sampled via the Prolific participant pool and compensated 1.95 pounds for participation. An additional twenty-six participants were excluded, for reasons of straight-lining, double IP addresses, and software errors on the task. The final sample (N = 449) consisted of 198 women and 237 men (11 participants identified as "other"). The most selected age category was between 35 and 44 years. The most occurring educational level was college graduate. The annual income most selected was between $35.000 and $50.000. All of the included participants provided informed consent. Data collection took place between the second and seventh of June 2022. The study received approval from the Ethical Committee of Psychology from the Faculty of Behavioural and Social Sciences at the University of Groningen.

Procedure and Design

Due to our specific focus in this paper, we are ignoring some irrelevant variables and scales in the description of our study that were included in the study design. The full survey flow can be found in Appendix A.

Social Exclusion Manipulation

We adopted the Ostracism Online – a social media-resembling paradigm by Wolf et al. (2014). We altered the avatars and one profile description, which we used in this task. Participants first had to create a personal profile, consisting of a name, a text about themselves, and a chosen avatar. Next, they were directed to the online environment where the participants looked at other profiles and had the opportunity to give them likes in the form of a thumbs up. The other profiles consisted of 10 ostensible other participants. The level of ostracism was manipulated by the number of likes a participant's personal profile received. Participants were randomly assigned to one of two conditions. The excluded participants received one like whereas the participants in the control condition received nine likes.

Following the social interaction task, participants were directed back to the survey. First, participants were asked whether they had encountered problems or technical difficulties during the Ostracism Online task, such as not being able to like other profiles. Afterwards, as a manipulation check, they were asked to indicate to what degree they felt (1) ignored or (2) excluded (1 = *not at all* to 5 = *extremely*).

Need Assessment

Next, participants filled out the Need-Threat Scale (van Beest & Williams, 2006). The need-satisfaction scales include belonging (e.g. "I feel I belong"), self-esteem (e.g. "I feel good about myself"), control (e.g. "I feel I can alter events in my life"), and meaningful existence (e.g. "I feel important"). These were assessed with three out of five items, each randomly assigned. As this resulted in two missing items, we used random forest imputation (Stekhoven & Buehlmann, 2022). We reformulated the items to be in the present tense instead of the past tense (e.g. "I feel rejected" instead of "I felt rejected"; see Study Flow, Appendix A). Answers were provided on a 7-point Likert scale (1 = not at all; 7= extremely). For the analysis, we computed overall need satisfaction scores, combining all need scales (belonging, self-esteem, control, and meaningful existence). Further, a variable was computed that reflected the change in overall need satisfaction, by subtracting the overall need satisfaction

scores before the puzzle task from the overall need satisfaction scores after the puzzle task.

The reliability scores of the scales were good (See Table 1, Appendix B).

Assessing Pro and Anti-Social Behavior

After engaging with the need scales, participants were invited to a task in which they allocated puzzles to unknown others. We used a new behavioral online task to assess pro- and anti-social behavior. The idea behind this task is based on the validated Tangram Help/Hurt Task (Saleem et al., 2015; modified by Leander and Chartrand (2017)). We introduced the second part of our study with the following text; "We are currently running another study at our laboratory on the effects of monetary rewards on cognitive performance. Participants in this on-campus study receive pay, depending on their performance: $1.00 for a correctly answered puzzle. You get to decide which puzzles the other participants will have to solve." Choices of puzzle selection were defined as prosocial responses and antisocial responses, depending on what puzzles the participants picked. Each time they had to choose, they were provided with two puzzles, one was considered to be very easy and one very hard to solve. After the recording of their behavioral responses, the Need-Threat Scale was measured again.

Additional Measures

Finally, a number of scales unrelated to this research were measured including personality, sense of power, and social dominance orientation. After providing demographics, participants were thanked and debriefed.

Results

Manipulation Check

We conducted a manipulation check for the social exclusion manipulation, using an independent samples t-test. As expected, participants in the ostracized experimental condition felt significantly more ignored ($M = 2.7$, $SD = 1.4$) than the included control group ($M = 1.1$, $SD = 0.4$), $t(445) = 17.13$, $p < .001$, $d = 1.62$. Moreover, the ostracized participants felt significantly more excluded ($M = 2.6$, $SD = 1.4$) than the control group ($M = 1.1$, $SD = 0.3$),

$t(445) = 16.16$, $p < .001$, $d = 1.53$. These manipulation checks indicate that the ostracizing of individuals in the experimental condition worked.

Hypothesis 1

The first hypothesis stated that following the manipulation participants that have been ostracized report lower overall need satisfaction, compared to participants that have been included. An independent samples *t*-test was conducted to test this. Assumptions of normality (See Table 2, Appendix B) and linearity (See Table 3, Appendix B) were not met, which is why we used a Mann-Whitney U Test. As expected, ostracized participants reported significantly less need satisfaction ($M = 4.44$, $SD = 1.31$) than included participants ($M = 5.44$, $SD = 0.96$), $U = 13855.5$, $p < .001$, $d = -0.45$.

Hypothesis 2

A one-way ANOVA was conducted to test whether participants' levels of need satisfaction differ over time, depending on the condition they were assigned to. The dependent variable, change in need satisfaction, was expected to be higher for participants in the exclusion condition, compared to the inclusion condition. The assumption of normality was met (See Table 4, Appendix B). However, the assumption of homogeneity was violated (Levene's test $p < .001$ (See Table 5, Appendix B)), which is why we used the Welch test which is robust against violations of homogeneity of variances.

The results indicate that there is evidence to reject the null hypothesis, (F= 45.95, p = <.001). We observed a higher change in need satisfaction over time for the exclusion condition ($M = 0.27$, $SD = 0.53$) compared to the control condition ($M = -0.01$, $SD = 0.33$). This suggests that we have evidence for a higher change in need satisfaction for participants in the exclusion condition (See Figure 6, Appendix B). It seems as if the condition participants are in has an effect on how much the need satisfaction differs from the first measurement to the second measurement.

Hypothesis 3

A correlation was used to test whether need satisfaction of control and esteem before the puzzle task, as independent variables, predict antisocial behavior in the puzzle task, the dependent variable. As the assumptions for normality (See Table 7, Appendix B) and linearity were not supported (See Figure 8 & Figure 9, Appendix B), I used Spearman's rho for the correlation analysis. Contrary to our hypothesis, satisfaction of the need for control ($r = -.04$, $p = .365$) and need for esteem ($r = .02$, $p = .658$), we did not find evidence that they are related to subsequent antisocial behavior. To sum up, we fail to provide evidence that the satisfaction of needs for control and esteem before the puzzle task is related to the prosocial behavior of the participants.

Hypothesis 4

To test whether antisocial behavior in the puzzle task can predict the level of need satisfaction for the needs of control and esteem after the puzzle task, we used a correlation analysis. Here again, a Spearman's rho correlation was used, as the data does not support the assumptions for normality and linearity (See Table 10, Figure 11 & Figure 12, Appendix B).

Not supporting the hypothesis, there seems to be no significant relationship between antisocial behavior as a predictor variable and the dependent variables of need for control ($r = -.07$, $p = .132$) and need for esteem ($r = .00$, $p = .933$). As the results indicate, there seems to be no significant relationship between antisocial behavior and the satisfaction of needs for control and esteem change after the puzzle task.

Mediation Analysis for H3 and H4

Even though we did not find any significant relationships between the needs for control and esteem before the puzzle task and antisocial behavior, as well as no significant relationship between the antisocial behavior and the needs for control and esteem after the puzzle task, we conducted a mediation analysis to test the underlying mechanism of this relationship. Bootstrapping was used to provide standard errors and confidence intervals, and to remain robust against violations of the normality assumption. Due to the central limit

theorem and the bootstrapping method, we argue that the analysis does not violate any assumptions. A mediation analysis (See Figure 13 & Figure 14, Appendix B) was set up with the predicting variables of need satisfaction for esteem and control, before the puzzle task, and the need satisfaction for esteem and control after the puzzle task, as dependent variables. Antisocial behavior was proposed as the mediator of this relationship.

Analyzing the indirect effects, results indicate that antisocial behavior does not significantly mediate the change of need satisfaction in the needs of control ($ab = .00$, $z = 0.74$, $p = .46$, (95% CI : -.00 to .01)) and esteem ($ab = .00$, $z = 0.05$, $p = .96$, (95% CI : -.00 to .00)).

Confirming previous findings, the mediation analysis did also not provide evidence that antisocial behavior explains the change in need satisfaction of control and esteem.

Discussion

Summary of Analysis

The first hypothesis suggested that threatening participants' needs by ostracizing them results in reduced need satisfaction, which was indicated by our results. Next, we proposed that following the threat to their needs, participants in a behavioral task would aim to fortify their threatened needs, and the difference in need satisfaction change would be higher for ostracized people, compared to non-ostracized people. As anticipated, this effect was observed. However, in the following analysis in which it was tested whether antisocial behavior could explain this change in need satisfaction, no significant results were obtained.

Interpretation of Results

Hypothesis 1

In line with our first hypothesis, we found that the manipulation of ostracism resulted in lower satisfaction of needs for the participants in the experimental group, compared to participants in the control group. This finding supports the notion that ostracism is a process

that is threatening an individual's needs. Our findings suggest that when being ostracized, the satisfaction of the needs is reduced.

Hypothesis 2

We expected to find a change in need satisfaction that is higher for the exclusion condition compared to the control condition, which was supported by our findings. We can conclude that being in the exclusion condition resulted in a higher change of need satisfaction levels before and after the puzzle task. This outcome was suggested by the Need-Threat model of Williams (2009), which states that ostracized individuals aim to satisfy threatened needs in a compensatory action, a need fortification. This notion seems to be supported by our results, as they suggest the process of need fortification has been shown in ostracized individuals. Testing whether this actually is the case, we have run analyses for the second hypothesis.

Hypothesis 3

In the third hypothesis, we proposed that in the context of the need fortification process, we would find a relationship between the need for control and the need for esteem and antisocial behavior. It was suggested that because of the low possibility of re-inclusion, participants would act in an antisocial way to fortify their needs of power (Wesselmann et al., 2015). However, my findings are in disagreement with this notion.

Generally, the underlying reasons for the results of H2 are to this point still left unexplained as H3 did not provide significant findings and the antisocial behavior can not explain the change in need satisfaction. A few ideas arise as to why the findings of Wesselmann et al. (2015) could not be replicated. Possibly, participants engaged in need fortification, but simply outside of the scope of this experiment. Further, other variables that were not included in this analysis might moderate the effect. Future research is needed to investigate this incidence of non-replication.

Hypothesis 4

The fourth hypothesis stated that antisocial behavior would result in need fortification of the needs for control and esteem after the puzzle task, however, the results did not indicate that. Just like the second hypothesis, findings were not as stated by Wesselmann et al. (2015); for similar reasons stated in H3. A reason for non-replication might be that the experiment failed to measure the mediation model properly. The assessment of the behavioral compensation by participants, due to a new measuring instrument, possibly was lacking.

Practical Implications

Combining the results of all hypotheses, we find evidence for a higher need fortification in ostracized people compared to included participants, but can not provide any explanation for this effect. We proposed, in line with Wesselmann et al. (2015), that a change in need satisfaction would be mediated by antisocial behavior, but this was not supported by my analysis. This study's evidence, however, supports the idea of a need fortification in the event of ostracism, proposed in the Need-Threat Model by Williams (2009). Why this is the case and what the underlying mechanisms are, remains unanswered.

Nevertheless, there are some ideas that could deliver possible explanations for the effect of need fortification that we have observed. For one, it could be that simply the longitudinal design allowed time to be the factor that influenced the change in need satisfaction. Another idea is that an ingroup dynamic could have biased the behavioral response of the participants. Participants were told that they would allocate the puzzles to other participants. Possibly, as participants in our study identify themselves in that moment as part of the same group (participants in a study), they could think of the other as part of their ingroup resulting in more prosocial behavior. Further, it could be that people simply do not compensate for threats to their needs by acting antisocially, which would have important practical implications.

Even though there is evidence that suggests that aggression and antisocial behavior are valid means to need threats, future research should explore whether antisocial behavior really

is effective in the process of need fortification. With this in mind, our study possibly did not find a significant effect of need fortification by antisocial behavior because of control restoring wording in the instructions of the puzzle task. Participants might have been primed by being instructed to help another person, which could have functioned as a restoration of control for the participant. With that, we would have combated the anti-social effect, and offered highly interesting insights into how low control perceptions could be afforded. Future research should explore more in-depth what underlying mechanisms are at play in the relationship between need states and subsequent compensation behavior in ostracized individuals. It should also look into which variables could add explanatory value to the process of need fortification.

Limitations and Strengths

Naturally, there are a few limitations that must be considered when classifying the results. We were not able to record the documentation of participants' behavior within the platform. When considering that social interactions in this online medium are manipulating the participants to feel excluded, it is possible that participants already on the platform take reflective actions, giving likes and interacting with the (fictional) others, to fortify their threatened needs. This behavior could distort much of the data that is retrieved at a later point, and future research should become aware of it. When working with the Online Ostracism paradigm, future projects should invest effort into a more thorough documentation of participants' behavior.

The introduction of the puzzle task, the dependent variable, somewhat primed the prosocial behavior of giving easy puzzles to other people, due to the formulation of the instructions. Generally, the prosocial choices are most likely perceived by the participants as the normative correct option; possibly also conceived as socially desirable. This factor could have caused a biased choice of behavioral response, favoring prosocial behavior in the participants. Another effect of this wording was described earlier, namely that the instructions

functioned control restoring, and therefore the effect of need change could be explained by the formulation of the instructions. The deficiency of the measurement tool might have confounded results for H2 and H3, which is why future research should explore possible adjustments.

Another aspect to focus on in future research is the addition of a no-choice option to our puzzle task. As the puzzle task generally has been shown to be a valid tool to test behavioral tendency, improving this tool by adding an option for participants to not make a choice could make it even more accurate in reflecting the participant's intention.

Despite these limitations, there are strengths to this study that should be emphasized. In this high-powered study, we were able to validate a new method of measuring behavioral responses on a two-dimensional axis, assessing prosocial and antisocial behavior in the same task. As current research has not provided such measures in much quantity, this adds to the development of this field of study.

By manipulating participants into an ostracism experience in an online environment, we were able to frame an environment that closely reflects real-life settings of ostracism incidents in social media. This allows the study to make claims that are representative of many individuals that engage in social platforms and experience forms of ostracism. In general, however, more attention should be directed towards online ostracism, as the impact social media has on individuals' daily lives is increasing.

Conclusion

This paper investigated the relationship between behavior and need states, in the scope of ostracism. We first tested whether ostracized individuals would differ in need satisfaction after the threat. Further, we tested need satisfaction of the power needs, control and esteem, before and after a behavioral compensation to see whether a change in need satisfaction that is explained by the behavioral response can be observed. In line with our hypotheses, participants that were ostracized reported lower need satisfaction after the ostracism

experience and subsequently a higher change in need satisfaction, compared to the participants that were included. We hypothesized that this change in need satisfaction could be caused by behavioral compensation. Antisocial behavior would mediate the relationship between the threat and fortification of power needs, the need for control, and the need for esteem (Wesselmann et al., 2015). The analysis of this paper, however, did not confirm these assumptions, and the effect of change in need satisfaction in ostracized people could not be explained by my results.

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Appendix A

Study Flow

Informed Consent

Principal Investigators: N.P. Leander, University of Groningen, n.p.leander@rug.nl Ethics approval: ecp@rug.nl (study code: PSY-2122-S-0325)

Purpose of the research
In this study we investigate the effects of social interaction. You will create a profile and use it to interact in an online environment that resembles social media platforms like Facebook or Instagram. You will furthermore work with a puzzle task and answer some questions. Participation takes around 15 minutes.

You are under no obligation to participate in this survey. If you agree to participate, you are free to stop your participation at any time by closing the browser window. Your data will then be removed from the data set.

Types of data collected
This is a list of sensitive questions you will encounter in this
survey. Note that you can always skip any question you do not feel comfortable answering.
Personal data
Directly identifiable personal data:
- Prolific IDs, location data (i.e., IP addresses)
Indirectly identifiable personal data:
- Gender, age range, education level, income
Sensitive personal data (a.k.a. special categories of personal data)
- Political beliefs

How will data be collected and handled
We have specified a full list of steps on how we handle your data and protect your privacy. Especially your directly identifiable data is protected through a rigorous mechanism. Please see the following points for more information on how we protect your privacy:

(1) We will ask you to provide your Prolific ID. Your Prolific ID is categorized as "directly identifiable personal data". We will delete your Prolific ID four weeks (02.07.2022) after data collection. After that, we are unable to provide you with access to your research data.
(2) We collect your IP address to ensure data quality. In statistical analyses it is important to ensure independence of measurement points. The IP addresses help us in accomplishing that. We will delete them four weeks (02.07.2022) after the data collection. This has no influence on your study experience or compensation.

(3) Your directly identifiable personal data can only be accessed by one person (Maximilian Agostini, m.agostini@rug.nl). All personal data will be removed from the dataset before sharing the data with other researchers from the core team.

(3) We also ask you to optionally provide "indirectly identifiable personal data" (i.e., your gender, age, education level, and income). We collect these data in order to learn more about individual and group differences. However, to minimize access to your sensitive and personal data only the core research team has access to this data.

(4) The data from this study will be stored in a secure location in the Department of Psychology at the Universities of Groningen.

(5) Only members of the research team will have access to the survey data.

(6) The data will be used solely for scientific and public information purposes, but will not be used for commercial purposes.

Rights of participants

If you have any questions about your rights, do not hesitate to contact privacy@rug.nl or the data protection officer at a.r.deenen@rug.nl (A.R. Deenen). You can also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl.

I have read the above information. I agree to participate in this study and to the processing of my personal data as described above. I also agree to my data being transferred outside of the European Economic Area. I understand that my participation is entirely voluntary and that I may withdraw at any time by closing the browser window. I know that I can ask to have my data accessed, changed, or erased until Prolific IDs are removed from the dataset.

Manipulation Check for Manipulation

Before starting Part 2 of the study, please answer the following questions about your experiences in the social interaction task.

Your answers are completely anonymous and will not influence your role or participation in the study in any way.

During the social interaction task, I felt...

	Not at all (1)	(2)	(3)	(4)	Extremely (5)
...ignored. (1)	O	O	O	O	O
...excluded. (2)	O	O	O	O	O

Need Assessment Before Puzzle Task

Following next are some statements about how you feel **right now.**

Please use the corresponding scale to indicate how representative each statement is of your **current feelings**.

How much do you feel each of the following, right now?

I feel....

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
..."disconnected". (1)	O	O	O	O	O	O	O
...rejected. (2)	O	O	O	O	O	O	O
...like an outsider. (3)	O	O	O	O	O	O	O
...I belong. (4)	O	O	O	O	O	O	O
...others interact with me a lot. (5)	O	O	O	O	O	O	O

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
...good about myself. (1)	O	O	O	O	O	O	O
...I have high self-esteem. (2)	O	O	O	O	O	O	O
...liked. (3)	O	O	O	O	O	O	O

...secure. (4)	O O O O O O O	
...satisfied. (5)	O O O O O O O	

I feel....

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
...invisible. (1)	O	O	O	O	O	O	O
...meaningless. (2)	O	O	O	O	O	O	O
...non-existent. (3)	O	O	O	O	O	O	O
...important. (4)	O	O	O	O	O	O	O
...useful. (5)	O	O	O	O	O	O	O

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
...powerful. (1)	O	O	O	O	O	O	O
...I have control. (2)	O	O	O	O	O	O	O

...I can alter events in my life. (3)	O	O	O	O	O	O	O
...I am unable to make things happen. (4)	O	O	O	O	O	O	O
...as though others decide everything. (5)	O	O	O	O	O	O	O

Behavioral Puzzle Task

We are currently running another study at our laboratory on the effects of monetary rewards on cognitive performance. Participants in this on-campus study receive pay, depending on their performance: **$1.00 for a correctly answered puzzle.** You get to decide which puzzles the other participants will have to solve.

On each of the following screens, you will see two puzzles. Select one of the puzzles to send to the campus laboratory. The next participant at the lab must try to solve the puzzles you send. Make your decision within 15 seconds. After you sent a puzzle, two new puzzles will appear on screen. **There will be 9 puzzles in total. The laboratory participant will be paid $1.00 for each correctly solved puzzle.**

You are connecting to our servers. This might take a few moments, do not close or reload the page.

Hovering to the left or right will show two puzzles. Click on the puzzle you want to send to the other participant. Make your decision within 15 seconds:

You have made all your choices. The survey will continue in a second.

Need Assessment After Puzzle Task

The final part of this study involves general questions about your experience with this research study, followed by questions about you in general.

Following next are some statements about how you feel **right now.**

Please use the corresponding scale to indicate how representative each statement is of your **current feelings**.

How much do you feel each of the following, right now?

I feel....

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
..."disconnected". (1)	O	O	O	O	O	O	O
...rejected. (2)	O	O	O	O	O	O	O
...like an outsider. (3)	O	O	O	O	O	O	O
...I belong. (4)	O	O	O	O	O	O	O
...others interact with me a lot. (5)	O	O	O	O	O	O	O

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
...good about myself. (1)	O	O	O	O	O	O	O

...I have high self-esteem. (2)	O	O	O	O	O	O	O
...liked. (3)	O	O	O	O	O	O	O
...secure. (4)	O	O	O	O	O	O	O
...satisfied. (5)	O	O	O	O	O	O	O

I feel....

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)
...invisible. (1)	O	O	O	O	O	O	O
...meaningless. (2)	O	O	O	O	O	O	O
...non-existent. (3)	O	O	O	O	O	O	O
...important. (4)	O	O	O	O	O	O	O
...useful. (5)	O	O	O	O	O	O	O

	1: Not at all (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7: Extremely (7)

...powerful. (1)	O	O	O	O	O	O	O
...I have control. (2)	O	O	O	O	O	O	O
...I can alter events in my life. (3)	O	O	O	O	O	O	O
...I am unable to make things happen. (4)	O	O	O	O	O	O	O
...as though others decide everything. (5)	O	O	O	O	O	O	O

Manipulation Check for Puzzle Task

How much do you agree or disagree with the following statements:
When I was sending the puzzles to the other participant in the second part of the study, I felt...

	Strongly disagree (-3)	Disagree (-2)	Somewhat disagree (-1)	Neither agree nor disagree (0)	Somewhat agree (1)	Agree (2)	Strongly agree (3)
... powerful.	O	O	O	O	O	O	O
... in control.	O	O	O	O	O	O	O
... happy.	O	O	O	O	O	O	O
... content.	O	O	O	O	O	O	O

How much do you agree or disagree with the following statements:
To what extend do you think sending the puzzles to the other person...

	Strongly disagree (-3)	Disagree (-2)	Somewhat disagree (-1)	Neither agree nor disagree (0)	Somewhat agree (1)	Agree (2)	Strongly agree (3)
... had an impact on the other person.	O	O	O	O	O	O	O
... made the other person feel good.	O	O	O	O	O	O	O

How much do you agree or disagree with the following statements:
Do you think other people...

	Strongly disagree (-3)	Disagree (-2)	Somewhat disagree (-1)	Neither agree nor disagree (0)	Somewhat agree (1)	Agree (2)	Strongly agree (3)
... **would** send challenging puzzles to the other person.	O	O	O	O	O	O	O
... **should** send challenging puzzles to the other person.	O	O	O	O	O	O	O

During the social interaction task, did you encounter any problems? (e.g. not being able to like other profiles, errors in the display, etc.).

○ Yes (1)

○ No (0)

What was the problem during the social interaction task (your feedback is greatly appreciated)?

_____

_____

_____

_____

_____

Did you experience any problems with the task where you sent puzzles to the other person?

○ Yes (1)

○ No (0)

What was the problem during the puzzle sending task (your feedback is greatly appreciated)?

_____

_____

_____

_____

_____

Other Scales (irrelevant for this paper)

Next are some questions about you in general.

Imagine that you encounter the following opportunities to help others. Please indicate how willing you would be to perform each behavior.

	1 (Definitely would **not** do this) (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (Definitely would do this) (7)
Comfort someone I know after they experience a hardship.	O	O	O	O	O	O	O
Help a stranger find something they lost, like their key or a pet.	O	O	O	O	O	O	O
Help to care for a sick friend or relative.	O	O	O	O	O	O	O

Assist a stranger with a small task (e.g., help carry groceries, watch their things while they use the restroom).	O	O	O	O	O	O	O

In my relationships with others...

	Strongly disagree (-3)	Disagree (-2)	Somewhat disagree (-1)	Neither agree nor disagree (0)	Somewhat agree (1)	Agree (2)	Strongly agree (3)
I can get them to listen to what I say.	O	O	O	O	O	O	O
I can get them to do what I want.	O	O	O	O	O	O	O
My wishes do not carry much weight.	O	O	O	O	O	O	O
Even if I voice them, my views have little sway.	O	O	O	O	O	O	O
I think I have a great deal of power.	O	O	O	O	O	O	O

My ideas and opinions are often ignored.	O	O	O	O	O	O	O
Even when I try, I am not able to get my way.	O	O	O	O	O	O	O
If I want to, I get to make the decisions.	O	O	O	O	O	O	O

There are many kinds of groups in the world: men and women, ethnic and religious groups, nationalities, political factions.

How much do you support or oppose the ideas about groups in general?

Next to each statement, indicate a number from 1 (extremely opposed) to 10 (extremely in favor) to show your opinion.

	Extremely opposed (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Extremely in favor (10)
In setting priorities, we must consider all groups.	O	O	O	O	O	O	O	O	O	O
We should not push for group equality.	O	O	O	O	O	O	O	O	O	O
Group equality should be our ideal.	O	O	O	O	O	O	O	O	O	O

| Superior groups should dominate inferior groups. | O | O | O | O | O | O | O | O | O | O |

How much do you agree or disagree with the following statements.

I see myself as:

	Disagree strongly (1)	Disagree moderately (2)	Disagree a little (3)	Neither agree nor disagree (4)	Agree a little (5)	Agree moderately (6)	Agree strongly (7)
Extraverted, enthusiastic. (1)	O	O	O	O	O	O	O
Critical, quarrelsome. (2)	O	O	O	O	O	O	O
Dependable, self-disciplined. (3)	O	O	O	O	O	O	O
Anxious, easily upset. (4)	O	O	O	O	O	O	O
Open to new experiences, complex. (5)	O	O	O	O	O	O	O
Reserved, quiet. (7)	O	O	O	O	O	O	O
Sympathetic, warm. (8)	O	O	O	O	O	O	O
Disorganized, careless. (9)	O	O	O	O	O	O	O

Calm, emotionally stable. (10)	O	O	O	O	O	O	O
Conventional, uncreative. (11)	O	O	O	O	O	O	O

Agree or disagree:

	Strongly disagree (-2)	Disagree (-1)	Neither agree nor disagree (0)	Agree (1)	Strongly agree (2)
Not a lot is done for people like me in the US.	O	O	O	O	O
If I compare people like me against other people in the US, my group is worse off.	O	O	O	O	O
Recent events in society have increased my struggles in daily life.	O	O	O	O	O

Demographics

What is your gender?

O Male (1)

O Female (2)

O Other (3)

What is your age?

O 18-24 (1)

O 25-34 (2)

O 35-44 (3)

O 45-54 (4)

O 55-64 (5)

O 65+ (6)

What is your education?

O Some High School or Less (1)

O High School Graduate / GED (2)

O Some College (3)

O College Graduate (4)

O Graduate Degree (5)

What is your annual income?

O Under $15,000 (1)

O $15,000 - $25,000 (2)

O $25,000 - $35,000 (3)

○ $35,000 - $50,000 (4)

○ $50,000 - $75,000 (5)

○ $75,000 - $100,000 (6)

○ $100,000 - $150,000 (7)

○ $150,000 - $200,000 (8)

○ $200,000 + (9)

Debriefing

Thank you for your participation in this study. **You can click "Next" to be redirected to prolific for the completion code.**

Debriefing:

The goal of this university-based psychological study is to examine the effects of ostracism, a form of social exclusion, on psychological needs and compensatory behavior as measured by the allocation of puzzles to an ostensible other.

We apologize that deception was necessary for the experimental set-up of this study. You were told that the profiles you encountered in the social-medial online environment were those of other participants. However, these were preexisting profiles created by researchers. To make it possible for us to compare social exclusion with social inclusion, you were randomly selected to be either excluded by receiving none to few likes on your profile or included by receiving many likes. This was done by computer scripts. **Please note that no matter how you designed your profile, the number of likes on your profile was predetermined and generated not by real people but by a computer**. Moreover, to assess your reaction to this experience we asked you to send puzzles to an ostensible other. **Here we also had to use a bit of deception in that there was no other participant**. We are very sorry to have done that.

The results will be used for scientific research purposes only. Your data will be treated confidentially. You have the right to withdraw your data without any negative consequences. If you have any questions or concerns about the study or your participation, you are welcome to contact the lead investigator, M. Agostini (m.agostini@rug.nl). You are also welcome to contact our university ethics board at ecp@rug.nl.

Now that you know the purpose of this study, do you have any advice or suggestions to improve the survey experience? If you would like to share any concerns, we are also very happy to hear about them. We appreciate any feedback you can offer.

Please click "Next" to be redirected to prolific for the completion code.

_____

_____

Appendix B

Statistical Analyses

Table 1

Cronbach's α and Descriptives for all Need Scales

Need Scales	Cronbach's *α*	*M*	*SD*
Belongingness P1	0.93	5.06	1.46
Belongingness P2	0.93	5.21	1.33
Existence P1	0.91	5.24	1.35
Existence P2	0.91	5.37	1.28
Esteem P1	0.97	4.75	1.48
Esteem P2	0.97	4.87	1.44
Control P1	0.86	4.73	1.16
Control P2	0.87	4.89	1.17
Overall Needs P1	0.97	4.96	1.25
Overall Needs P2	0.97	5.09	1.22

Table 2

Hypothesis 1: Test of Normality (Shapiro-Wilk)

Overall need satisfaction		*W*	*p*
Overall need satisfaction	Exclusion	.98	< .001
	Overinclusion	.96	< .001

Note. Significant results suggest a deviation from normality.

Table 3

Hypothesis 1: Test of Equality of Variances (Levene's)

	F	df	*p*
Overall need satisfaction	32.25	1	< .001

Note. Significant results suggest a deviation from linearity.

Table 4

Hypothesis 2: Test of Normality (Shapiro-Wilk)

Need_satisfaction_change_p2-p1		*W*	*p*
Need_satisfaction_change_p2-p1	Exclusion	.92	< .001
	Overinclusion	.90	< .001

Note. Significant results suggest a deviation from normality.

Table 5

Hypothesis 2: Test of Equality of Variances (Levene's)

	F	df	*p*
Need_satisfaction_change_p2-p1	27.22	1	< .001

Note. Significant results suggest a deviation from linearity.

Figure 6

Change in need satisfaction in exclusion condition and control (inclusion) condition
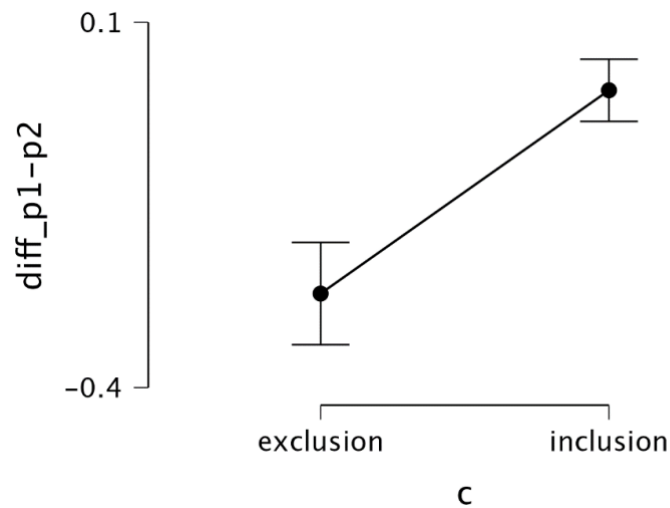
Note. Values diverging from 0, mean higher change in need satisfaction. In this figure, being in the exclusion condition resulted in more change in need satisfaction, compared to being in the inclusion condition.

Table 7

Hypothesis 3: Test of Normality (Shapiro-Wilk)

W	p
.99	.002

Note. Significant results suggest a deviation from normality.

Figure 8

Hypothesis 3: Scatterplot
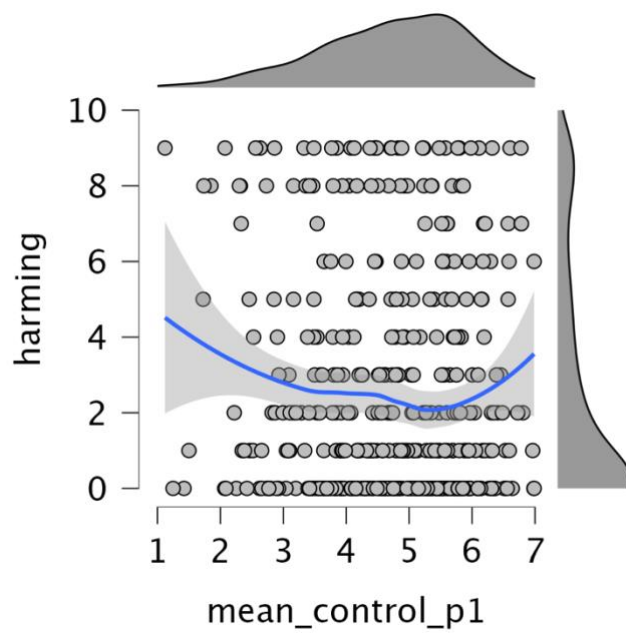
Note. Scatterplot for checking assumption of linearity. A non-linear relationship between variables of antisocial behavior and need of control before the puzzle task is indicated.
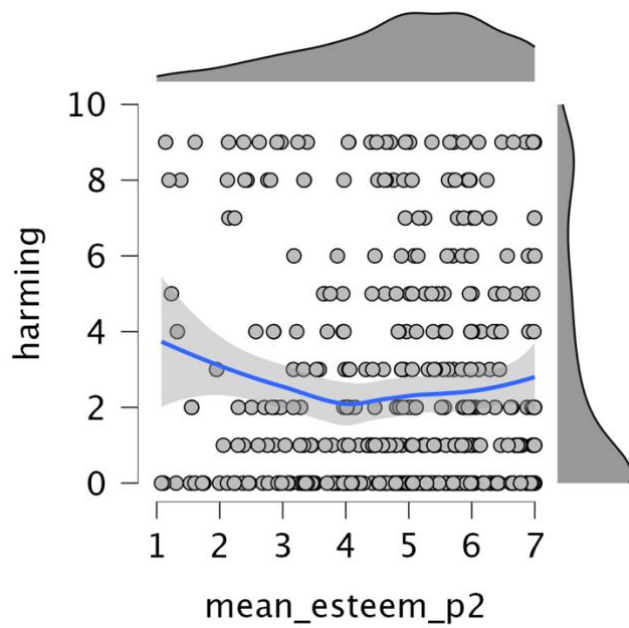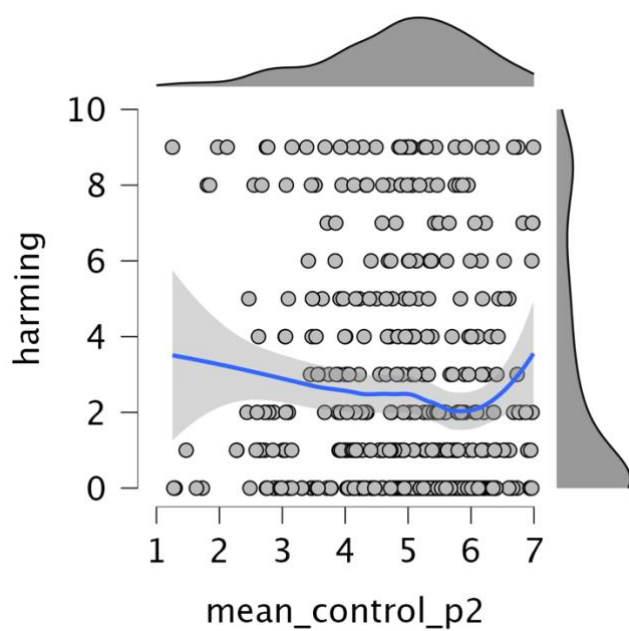
Figure 9

Hypothesis 3: Scatterplot
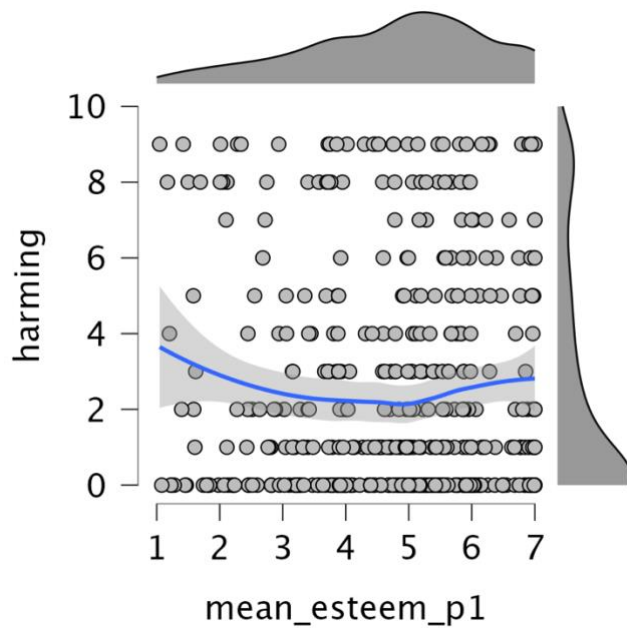
Note. Scatterplot for checking assumption of linearity. A non-linear relationship between variables of antisocial behavior and need of esteem before the puzzle task is indicated.

Table 10

Hypothesis 4: Test of Normality (Shapiro-Wilk)

W	*p*
.98	<.001

Note. Significant results suggest a deviation from normality.

Figure 11

Hypothesis 4: Scatterplot

Note. Scatterplot for checking assumption of linearity. A non-linear relationship between variables of antisocial behavior and need of esteem after the puzzle task is indicated.
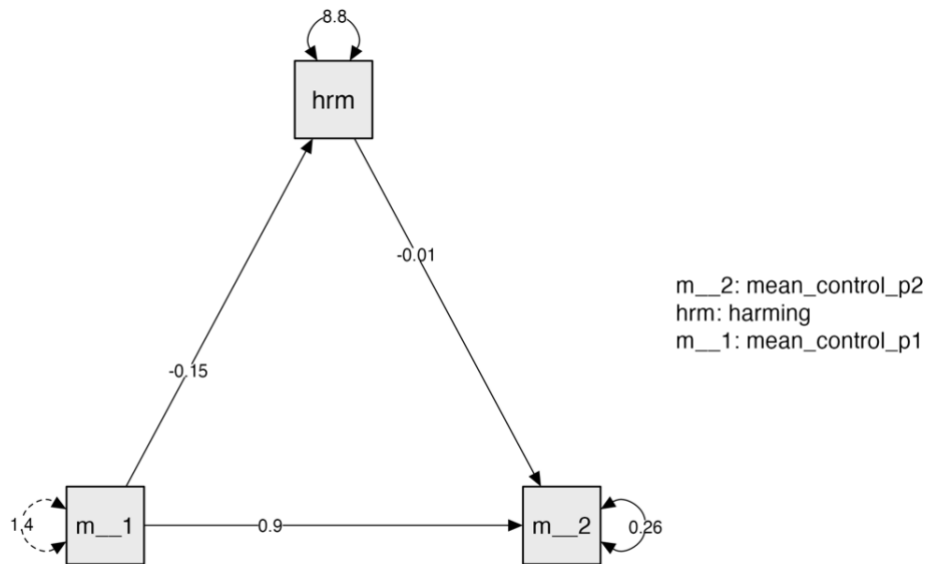
Figure 12

Hypothesis 4: Scatterplot

Note. Scatterplot for checking assumption of linearity. A non-linear relationship between variables of

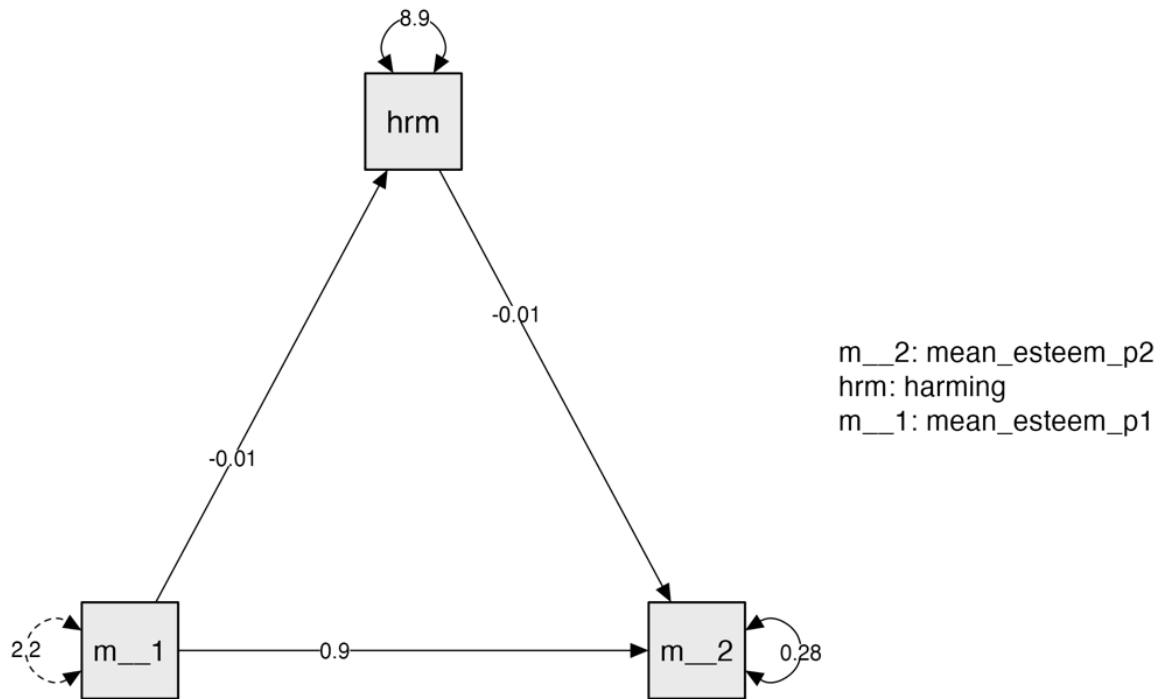antisocial behavior and need of control after the puzzle task is indicated.

Figure 13

Model Plot of Mediation (Control)

Note. Effect of antisocial behavior as mediator between satisfaction of need for control before puzzle

task and after puzzle task. Mean control (p1) is defined as the need satisfaction of control prior to the

puzzle task, and Mean control (p2) is defined as the need satisfaction after the puzzle task. 'Harming'

in this plot reflects antisocial behavior, the mediator.

Figure 14

Model Plot of Mediation (Esteem)

Note. Effect of antisocial behavior as mediator between satisfaction of need for esteem before puzzle

task and after puzzle task. Mean esteem (p1) is defined as the need satisfaction of control prior to the

puzzle task, and Mean esteem (p2) is defined as the need satisfaction after the puzzle task. 'Harming'

in this plot reflects antisocial behavior, the mediator.