Psychology Research and Behavior Management

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ORIGINAL RESEARCH

Effects of Alexithymia on Moral Decision-Making in Sacrificial Dilemmas: High Alexithymia is Associated with Weaker Sensitivity to Moral Norms

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Purpose: Although several studies have investigated the association between alexithymia and moral decision-making in sacrificial dilemmas, the evidence remains mixed. The current work investigated this association and how alexithymia affects moral choice in such dilemmas.

Methods: The current research used a multinomial model (ie, CNI model) to disentangle (a) sensitivity to consequences, (b) sensitivity to moral norms, and (c) general preference for inaction versus action irrespective of consequences and norms in responses to moral dilemmas.

Results: Higher levels of alexithymia were associated with a greater preference for utilitarian judgments in sacrificial dilemmas (Study 1). Furthermore, individuals with high alexithymia showed significantly weaker sensitivity to moral norms than did those with low alexithymia, whereas there were no significant differences in sensitivity to consequences or a general preference for inaction versus action (Study 2).

Conclusion: The findings suggest that alexithymia affects moral choice in sacrificial dilemmas by blunting emotional reactions to causing harm, rather than through increased deliberative cost–benefit reasoning or general preference for inaction.

Keywords: alexithymia, moral decision-making, deontology, utilitarianism, CNI model

Introduction

Alexithymia is a multidimensional personality trait characterized by difficulty in identifying one's own feelings and distinguishing them from bodily sensations, difficulty in verbalizing one's feelings, and an externally oriented thinking style.[1] It is normally distributed in the general population (at nearly 10%),[2] and high levels of alexithymia are commonly associated with more severe psychopathological symptoms.[3] Alexithymia is widely considered an important transdiagnostic risk factor for diverse affective disorders, such as anxiety,[4] depression,[5] psychopathy,[6] and autism spectrum disorder.[7]

It has been widely reported that people with alexithymia exhibit impairments in their ability to cognitively process and experience emotions.[8] For instance, people with alexithymia show problems in forming social attachments and motivating themselves to act altruistically to relieve others' distress.[9,10] Individuals with deficits in emotional processing may exhibit poor performance on social cognition tasks because social cognition abilities require people to understand mental states and emotions.[11] Indeed, alexithymia has been found to be linked to impairment in social cognition skills, including the identification of other people's emotional facial expressions,[12] higher-order mentalizing.[13] A mechanistic cognitive model of self-to-other emotional contagion has been proposed to provide a framework for understanding

Received: 14 March 2023
Accepted: 13 June 2023
Published: 27 June 2023

abnormal emotion processing in alexithymia, psychopathy, and autism. This model suggests that the primary impairment in alexithymic individuals may lie within an Affective Representation System, and that this impairment is likely to interfere with affective learning. If the Affective Representation System is impaired, individuals with alexithymia will be unable to shape a consciously accessible representation of their own emotional state, and this lack of a differentiated emotional state in the self provides no chance for the emotional internal state to be linked with perceptual cues to those states in other people (for more details, see Bird and Viding).[14]

Moral Dilemma Judgments

A substantial body of research in psychology has investigated how individuals resolve moral dilemmas in which aggregate outcomes for the greater good conflict with moral norms.[15] The most famous example is the trolley dilemma, in which a runaway trolley will kill five people unless an individual acts to stop or redirect the trolley.[16] In a variant called the footbridge dilemma, the five people can be saved if the individual pushes a large person from a bridge in order to stop the trolley.[17] From a utilitarian perspective, pushing the large person from the bridge would be morally acceptable because such an action improves well-being in the aggregate. Conversely, pushing the large person from the bridge would be morally unacceptable from a deontological point of view because such actions violate moral rules.[18] Thus, individuals are typically claimed to be making a utilitarian judgment if the described action is believed to be acceptable, whereas they are said to be making a deontological judgment if the described action is believed to be unacceptable.[19]

Greene's[20] dual-process theory postulates that automatic affective reactions to harms typically motivate deontological judgments, whereas deliberate cost–benefit reasoning typically motivates utilitarian judgments. According to Greene's dual-process theory, people experience an emotional response of disgust to the prospect of actively harming someone physically when faced with a high-conflict personal (ie, sacrificial) moral dilemma, in which they would be inflicting direct harm on one person in order to save more people. If this aversive emotional reaction to the prospect of harming someone is strong enough, people are prone to make deontological judgments. Conversely, if this emotional reaction is weak, then deliberative reasoning dominates the choice process and leads to the endorsement of utilitarian judgments.[21] Thus, blunted emotional reactions to victims can lead to utilitarian judgments in sacrificial moral dilemmas, as do deliberative reasoning.[21] A growing body of research has shown that patients with damage to the brain regions involved in emotion processing (eg, ventromedial prefrontal cortex, vmPFC) tend to endorse utilitarian solutions to sacrificial moral dilemmas.[22,23] Similarly, there is overwhelming evidence that those with impaired emotion-processing abilities and shallow affect, such as psychopaths, exhibit a preference for utilitarian judgments in sacrificial moral dilemmas.[24–26]

Alexithymia and Moral Dilemma Judgments

Given this cumulative evidence for the role of decreased emotional reactions in making utilitarian judgments, it is valuable to explore populations with alexithymia who have known deficits in emotional processing to see if they exhibit an increased inclination toward utilitarian decisions in sacrificial moral dilemmas. Using the footbridge dilemma and other similar moral problems, several studies have shown that people with high levels of alexithymia are more likely to make utilitarian moral judgments in sacrificial dilemmas.[21,27–31] For example, Patil and Silani[21] found that alexithymia is associated with increased utilitarian tendencies in personal (ie, sacrificial) moral dilemmas featuring emotionally aversive harm (eg, pushing one person to death to save another five). Brewer et al[27] found that moral acceptability judgments could be predicted by higher levels of alexithymia in a healthy population but not in a population with autism. Recently, Zhang et al[31] found that people with high levels of alexithymia make more utilitarian judgments than do those with low levels of alexithymia and that people with high levels of alexithymia exhibit reduced empathic concern, which diminishes deontological tendencies and, in turn, leads to more utilitarian judgments.

Although there seems to be some convergence of findings, a discrepancy in the association between alexithymia and utilitarian judgments in sacrificial moral dilemmas has also been described. Cecchetto et al[32] reported that utilitarian responses are not predicted by high levels of alexithymia and that alexithymia is characterized by decreased physiological responses (ie, skin conductance) during moral dilemma judgments, whereas self-report measures (ie, valence of emotions and arousal elicited by the judgments) are normal. They concluded that alexithymia influences affective responses to moral dilemma judgments but not the judgments themselves.

Although several studies have investigated correlation between alexithymia and moral decisions, the evidence on such association remains mixed. Some studies have shown a significant correlation between alexithymia and more utilitarian judgments over deontological judgments,[21,31] whereas others have shown that alexithymia is not associated with moral dilemma judgments.[32] Given this uncertain evidence, further studies are required to clarify this association. Moreover, moral dilemma responses in past research using the traditional dilemma paradigm are conceptually ambiguous.[25] One ambiguity is that the traditional dilemma paradigm treats deontological and utilitarian responses as bipolar opposites despite their underlying processes are believed to be functionally independent.[33] A second ambiguity is that utilitarian responses (eg, pushing the man) in the traditional dilemma paradigm are usually confounded with a preference for action, whereas deontological responses (eg, not pushing the man) are usually confounded with a preference for inaction.[34] These confounds make it difficult to pinpoint whether the observed results in moral dilemma judgments are driven by differences in sensitivity to moral norms, differences in sensitivity to consequences for the greater good, or differences in general action tendencies.[35]

The Current Research

To resolve these ambiguities, the current research investigated the link between alexithymia and moral decision-making in sacrificial dilemmas and how alexithymia affects such moral choice. Study 1 examined the association between alexithymia and utilitarian judgments in sacrificial moral dilemmas. It is a replication of prior work. Using a multinomial modeling approach (ie, CNI model; Gawronski et al),[36] study 2 further quantified the determinants of moral dilemma judgments by disentangling sensitivity to consequences (*C*) for the greater good, sensitivity to moral norms (*N*), and general preference for inaction over action irrespective of norms and consequences (*I*). The study constitutes an exploratory attempt to resolve the ambiguities described above.

Study 1: Conventional Dilemma Analyses

Method

Participants

A total of 1298 undergraduate students were recruited in this study. We excluded 37 participants who failed to complete all questionnaires, leaving a final sample of 1261 (686 females, 575 males, age range 17–26 years, M_{age} = 19.81 years, SD_{age} = 1.61). A sensitivity analysis conducted in G*Power 3.1 (Faul, et al)[37] showed that the final sample of 1261 provided 95% power (1–β = 0.95) in detecting a correlation with a small effect size of ρ = 0.101 (two-tailed). The local ethics committee approved the study. All participants read and signed informed consent forms. The participants received a fee of 10 RMB for their participation.

Materials and Procedure

The participants completed all the measures online. First, the participants were asked to complete a demographic information questionnaire. They then completed a validated Chinese version of the Toronto Alexithymia Scale-20 (TAS-20, Bagby et al;[1] Chinese version: Yi et al).[38] The TAS-20 is the most widely used measure of alexithymia with sound reliability, validity, and broad generalizability.[39] It is a 20-item measure designed to detect the three distinct facets of alexithymia: difficulty describing feelings (DDF), difficulty identifying feelings (DIF), and externally oriented thinking (EOT). Items are rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Of the 20 items, five are scored in reverse. The aggregate scores range from 20 to 100, with a higher aggregate score indicating higher levels of alexithymia. In the current study, Cronbach's alpha was 0.81.

Finally, the participants responded to seven traditional moral dilemmas (ie, Transplant, Sophie's Choice, Vaccine Test, Footbridge, Standard Trolley, Standard Fumes, Crying Baby) developed by Greene et al.[40] The participants were required to indicate whether the described action in each dilemma was acceptable or unacceptable ("yes, this is acceptable" or "no, this is unacceptable"). Participants received instructions before they were presented with the dilemmas. Utilitarian

judgments corresponded to the proportion of times that the participants indicated that harmful actions were acceptable in moral dilemmas, with higher scores denoting a preference for utilitarian responses.[41]

Results

Using hierarchical multiple regression analysis, we examined whether participants with high alexithymia exhibited a stronger preference for utilitarian over deontological responses. Utilitarian judgments were treated as the dependent variable, gender and age were entered into the first model as control variables, and alexithymia was entered into the second model (see Table 1). This analysis revealed that alexithymia could still significantly predict utilitarian judgments in a positive direction after controlling for the effects of gender and age, $\beta = 0.272$, $p < 0.001$. Individuals with high alexithymia exhibited a greater preference for utilitarian responses.

Furthermore, we differentiated between instrumental harm dilemmas (where harming an individual is an intended means to save more individuals;[42] ie, Transplant, Sophie's Choice, Vaccine Test, Footbridge, Crying Baby) and incidental harm dilemmas (where harming an individual is a foreseen but unintended consequence of the action aimed at saving more individuals;[42] ie, Standard Trolley, Standard Fumes) when conducting the analysis. The results revealed that alexithymia could still significantly predict utilitarian judgments in instrumental harm dilemmas in a positive direction after controlling for the effects of gender and age, $\beta = 0.228$, $p < 0.001$. Similarly, alexithymia could still significantly predict utilitarian judgments in incidental harm dilemmas in a positive direction after controlling for the effects of gender and age, $\beta = 0.170$, $p < 0.001$. Thus, individuals with high alexithymia exhibit a greater preference for utilitarian choices in both instrumental and incidental harm dilemmas.

In addition, we examined the contributions of the three facets of alexithymia (ie, Difficulty identifying feelings, DIF; Difficulty describing feelings, DDF; Externally oriented thinking, EOT) to the prediction of utilitarian judgments. Age and gender were entered into the first model as control variables, and the three facets of alexithymia were entered into the second model (see Table 2). The analysis revealed that DIF contributed the most to the prediction of utilitarian judgments ($\beta = 0.186$, $p < 0.001$). EOT also showed unique contribution to the prediction ($\beta = 0.087$, $p = 0.003$). The contribution of DDF to the prediction was smaller ($\beta = 0.062$, $p = 0.085$).

Discussion

This study found that individuals with high alexithymia exhibited a greater preference for utilitarian judgments, and this pattern was observed in both instrumental and incidental harm dilemmas. One important critique of the current findings is that utilitarian judgments are confounded with a preference for action, whereas deontological responses are confounded with a preference for inaction.[34] These confounds make it difficult to determine whether the current findings are driven by differences in sensitivity to moral norms, differences in sensitivity to consequences for the greater good, or differences in general action tendencies. Thus, study 2 sought to resolve these confounds between general action tendencies and the two moral principles to eliminate the spurious effects of alexithymia on moral decision-making in sacrificial dilemmas.

Table 1 Summary of Hierarchical Multiple Regression Analysis for Predicting Utilitarian Judgments

Variables	Model 1	Model 2
	β	β
Age	− 0.020	− 0.019
Gender	0.003	− 0.004
Alexithymia		0.272***
R^2	0.0004	0.074
ΔR^2		0.072***

Notes: N = 1261. ***$p < 0.001$. The standardized regression coefficients are presented.

Table 2 Summary of the Contribution of Three Sub-Dimensions of Alexithymia to Predicting Utilitarian Judgments

Variables	Model 1	Model 2
	β	β
Age	−0.020	−0.017
Gender	0.003	−0.005
Difficulty identifying feelings		0.186***
Difficulty describing feelings		0.062
Externally oriented thinking		0.087**
R^2	0.0004	0.075
ΔR^2		0.072***

Notes: N = 1261. **p < 0.01, ***p < 0.001. The standardized regression coefficients are presented.

Study 2: CNI

Method

Participants

A total of 1399 undergraduate students were recruited to complete the questionnaires online. We excluded 44 participants who failed to complete the questionnaires, leaving a final sample of 1355 (724 females; age range 17–25 years, M_{age} = 19.37 years, SD_{age} = 1.53). On the basis of the median split of participants' scores on the TAS-20 (median = 50; Cronbach's alpha was 0.81 in this study), participants who scored higher than the median were assigned to the high alexithymia group (n = 634; 349 females; M_{age} = 19.30 years, SD_{age} = 1.50), and those who scored lower than or equal to the median were assigned to the low alexithymia group (n = 721; 375 females; M_{age} = 19.43 years, SD_{age} = 1.55). There were no significant differences between the two groups in terms of age, t (1353) = 1.66, p = 0.10, Cohen's d = 0.09, or gender, χ^2 (1, N = 1355) = 1.25, p = 0.26. A sensitivity analysis conducted in G*Power 3.1 (Faul et al)[37] showed that the final sample of 1355 provided 95% power (1 – β = 0.95) in detecting a between-participants t-tests difference in mean values with a small effect size of d = 0.20 (two-tailed). The local ethics committee approved the study. All participants read and signed informed consent forms. The participants received a fee of 20 RMB for their participation.

Materials and Procedure

First, the participants completed the Chinese version of the TAS-20 (Bagby et al;[1] Chinese version: Yi et al).[38] They were then asked to read an instruction carefully. Finally, they responded to a validated set of 24 moral dilemmas presented in a fixed random order (see Gawronski et al,[36] available at https://osf.io/xt66w/). These moral dilemmas included four parallel versions of six fundamental situations that varied in terms of whether (1) the dilemmas involved prescriptive norms that prescribed actions or proscriptive norms that prohibited actions and (2) the benefits of the described actions for aggregate wellbeing were either smaller or greater than the costs for aggregate wellbeing.[16,36] Participants were required to indicate whether they would implement the described actions with yes or no responses.

A multinomial model (ie, CNI model) was used to quantify the strength of specific response patterns in individuals' decisions across moral dilemmas.[36] By measuring individuals' responses to the four parallel versions of dilemmas across six situations, the CNI model quantified three determinants of moral dilemma judgments: sensitivity to moral norms, sensitivity to consequences for the greater good, and general preference for inaction over action irrespective of norms and consequences.[16] Sensitivity to moral norms and sensitivity to consequences for the greater good signified the essential aspects of deontology and utilitarianism, respectively.[18] General preference for inaction is closely linked to omission bias, which refers to the finding that harm caused by action is often considered to be worse than the same amount of harm caused by inaction.[16,43]

Sensitivity to consequences was reflected by the CNI model's C parameter, with greater values indicating a higher sensitivity to consequences for the greater good. Sensitivity to moral norms was reflected by the model's N parameter,

with greater values indicating a higher sensitivity to moral norms and duties. General preference for inaction versus action was reflected by the model's *I* parameter, with greater values indicating a stronger general tendency toward inaction and smaller values indicating a stronger general tendency toward action regardless of moral norms and consequences.[16,19] For the *N* and *C* parameters, the neutral reference point was zero, and thus values significantly greater than zero indicated that participants' responses were driven by moral norms or consequences, respectively.[18] For the *I* parameter, the neutral reference point was 0.5, and thus values greater than 0.5 reflected a general tendency toward inaction and values less than 0.5 reflected a general tendency toward action.[18] The modeling analyses used a fixed estimation algorithm with two replications, random start values, and a maximum of 90,000 iterations.[36] Our model had a total of eight free categories (ie, four types of dilemmas for each of the high and low alexithymia groups) and a total of six parameters (ie, three parameters estimated for each of the two groups), resulting in a difference of two for the degrees of freedom of the model. Because the mathematical underpinnings of the CNI model were explained in detail by Gawronski et al,[36] we have only described the key aspects of the CNI model (for more details, see Gawronski et al).[36]

Results

Conventional Analysis

Moral dilemma judgments were aggregated by calculating the sum of the action choices (ie, yes choices) for the four versions of moral dilemmas. With a total of six situations for each dilemma version, the aggregate scores ranged from 0 to 6. Conventional analysis was limited to moral dilemmas implicating proscriptive norms that prohibited actions in cases where the benefits of actions outweighed their costs to well-being.[36] A greater preference for action over inaction in this version of dilemma is normally believed to indicate a greater preference for utilitarian over deontological judgments (see Greene et al).[41] Participants in the high alexithymia group (M = 2.93, SD = 1.39) exhibited a significantly greater preference for action in this version of dilemma than those in the low alexithymia group (M = 2.78, SD = 1.44), t (1353) = 2.04, p = 0.04, Cohen's d = 0.11, 95% CI [−0.218, −0.004]. In terms of the conventional analysis, this finding indicates that individuals with high alexithymia show a greater preference for utilitarian over deontological choices than do those with low alexithymia.

CNI Model

The CNI model analysis was conducted by using multiTree software,[44] with the multiTree template file for the CNI model analysis provided by Gawronski et al.[36] The data from the total sample were analyzed without considering participants' alexithymia. This analysis revealed that the CNI model fit the data well, $G^2(1) = 2.15$, $p = 0.142$ (G^2 denotes the statistics for model fit, indicating whether the probabilities predicted by the model were significantly different from the empirically observed probabilities. If $p > 0.05$, it denotes a good model fit for the data). More specifically, both the *C* parameter (M = 0.16, 95% CI [0.145, 0.166]) and *N* parameter (M = 0.24, 95% CI [0.223, 0.248]) were significantly greater than zero, $\Delta G^2(1) = 824.49$, $p < 0.001$ for the *C* parameter and $\Delta G^2(1) = 1324.32$, $p < 0.001$ for the *N* parameter (ΔG^2 denotes the extent to which the estimates for a given parameter significantly differ from a reference value or are significantly different across conditions. If $p < 0.05$, the parameter estimates are significantly different from a reference value or across conditions), indicating that individuals were highly sensitive to both moral norms and consequences when they responded to the moral dilemmas. Moreover, the *I* parameter (M = 0.51, 95% CI [0.504, 0.520]) was significantly greater than its neutral reference point of 0.5, $\Delta G^2(1) = 8.81$, $p = 0.003$, indicating that the participants had a stronger general preference for inaction over action.

The CNI model also fit the data well when parameter values were estimated separately for the high and low alexithymia groups, $G^2(2) = 2.20$, $p = 0.332$, which provided more nuanced insights into whether there were differences in the *C, N*, and *I* parameters between the high and low alexithymia groups (see Table 3). The analysis revealed that the *N* parameter was significantly lower in the high alexithymia group compared to the low alexithymia group, $\Delta G^2(1) = 8.19$, $p = 0.004$, $d = 0.273$ (see Figure 1). However, there were no significant differences in the *C* and *I* parameters between the high and low alexithymia groups, $\Delta G^2(1) = 0.05$, $p = 0.818$, $d = 0.016$ for the *C* parameter and $\Delta G^2(1) = 2.27$, $p = 0.132$, $d = 0.144$ for the *I* parameter (see Figure 1). Together, these findings indicate that the differences in moral dilemma responses between the high and low alexithymia groups were due to a weaker sensitivity to norms in the

Table 3 Means and 95% Confidence Intervals of *C*, *N*, and *I* Parameters for High and Low Alexithymia Groups

Groups	*C* Parameter		*N* Parameter		*I* Parameter	
	M	95% CI	*M*	95% CI	*M*	95% CI
High alexithymia	0.16	[0.142, 0.172]	0.22	[0.197, 0.234]	0.51	[0.494, 0.517]
Low alexithymia	0.15	[0.140, 0.169]	0.25	[0.235, 0.270]	0.52	[0.507, 0.530]

high alexithymia group. There appeared to be no effects of alexithymia on the sensitivity to consequences for the greater good and general preference for inaction versus action.

Discussion

By disentangling general action tendencies from the genuine effects of moral norms and consequences, the current work resolves major ambiguities that deontological choices conflate sensitivity to moral norms with general preference for inaction, whereas utilitarian choices conflate sensitivity to consequences for the greater good with general preference for action. The current findings corroborate the conclusion that the effects of alexithymia on moral decision-making reflect a genuine shift in deontological tendencies rather than differences in utilitarian tendencies and general action tendencies irrespective of moral norms and consequences, which provides a more nuanced insight into the effects of alexithymia on moral decision-making in sacrificial dilemmas.

General Discussion

The current research systematically investigated the effects of alexithymia on moral decision-making in sacrificial dilemmas. Our findings suggest that alexithymia influences moral decision-making not through increased deliberative

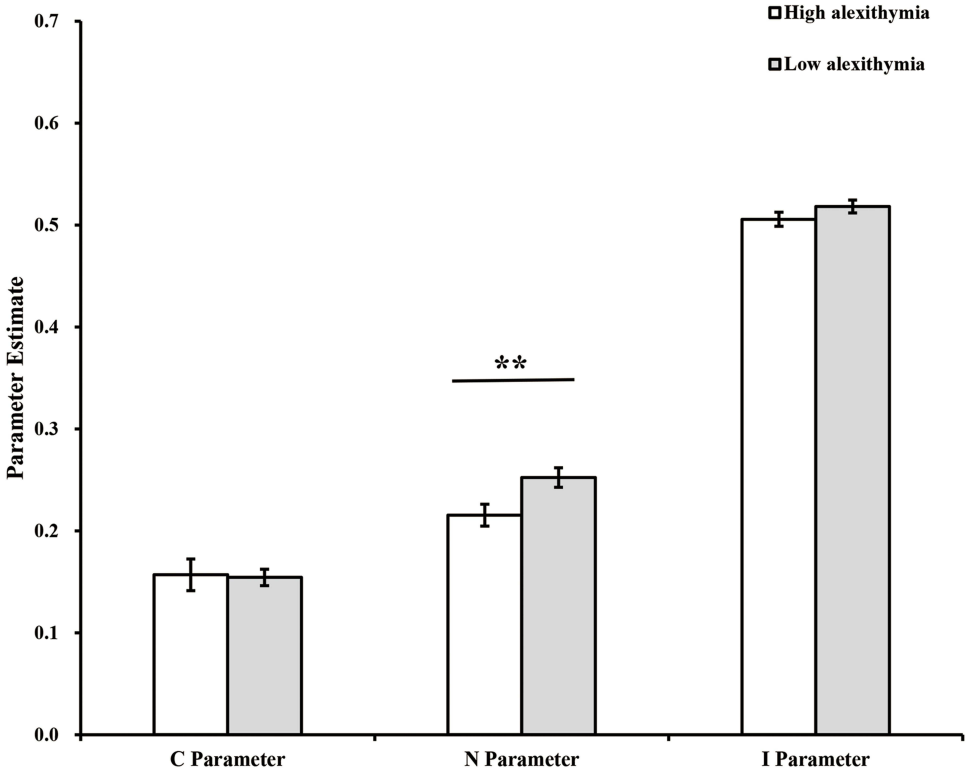

Figure 1 Parameter estimates of sensitivity to consequences for the greater good (*C*), sensitivity to moral norms (*N*), and general preference for inaction versus action (*I*) as a function of alexithymia (high vs low). Error bars depict 95% confidence intervals. $^{**}p < 0.01$.

cost–benefit reasoning and a general preference for inaction but by blunting emotional reactions to the violation of moral rules. This provides a deeper insight into the associations between alexithymia and moral decision-making and may help to broaden knowledge in the fields of moral and clinical psychology.

Alexithymia Influences Moral Decision-Making in Sacrificial Dilemmas

Using conventional approach to analyzing moral dilemma judgments, study 1 showed a robust link between alexithymia and utilitarian judgments. Similarly, the conventional analysis in study 2 revealed that individuals with high alexithymia exhibited a greater preference for utilitarian responses than those with low alexithymia. Our findings are consistent with those of several previous studies.[21,27,29,30] For instance, Patil and Silani[21] demonstrated that high alexithymia scores are linked to increased utilitarian responses to emotionally aversive personal (ie, sacrificial) moral dilemmas. However, Patil and Silani[21] employed only the traditional dilemma approach, which cannot distinguish genuine moral concerns about overall outcomes from decreased concerns about causing harm.[33] Thus, it was unclear whether individuals with high alexithymia were more concerned about maximizing good outcomes in moral dilemma judgments or less concerned about causing harm.

Using a more fine-grained model (ie, CNI model) to disentangle general action tendencies from the genuine effects of moral norms and consequences for the greater good, study 2 revealed that individuals with high alexithymia showed significantly lower sensitivity to moral norms than did those with low alexithymia, while there was no significant difference in general preference for inaction and sensitivity to consequences. Then, why do people with high alexithymia show lower sensitivity to moral norms than those with low alexithymia but not a lower sensitivity to consequences?

Individuals with high alexithymia have difficulty describing and identifying their own feelings.[1] They also have difficulty in recognizing and understanding others' emotions and mental states.[11] Understanding others' emotions is involved in moral judgments because it is a moral marker by means of which individuals learn that moral norms are being violated and are motivated to deem those actions morally wrong which result in harm.[21] Because individuals with high levels of alexithymia have been found to exhibit a weakened ability in understanding others' emotions, and we already know that understanding others' emotions is crucial for moral decision-making and prosocial behavior,[45,46] people with high alexithymia are believed to exhibit an atypical tendency in moral dilemma judgment. According to Greene's[20] dual-process theory of moral judgment, sensitivity to moral norms reflects the extent to which an action is favored when it is prescribed by a moral norm and opposed when it is prohibited by a moral norm.[15] Sensitivity to consequences reflects the extent to which an action is favored when it creates greater benefits than costs and opposed when it creates smaller benefits than costs.[15] Indeed, sensitivity to moral norms is rooted in emotional reactions to the thought of causing harm, whereas sensitivity to consequences is rooted in deliberative reasoning focused on overall outcomes.[36] Thus, impairment in understanding others' emotions diminishes the affective reaction to victims of harmful actions, which should also selectively weaken sensitivity to moral norms, while sensitivity to consequences remains unaffected. A recent study has shown that individuals with high alexithymia exhibit lower deontological inclinations than those with low alexithymia, whereas utilitarian inclinations do not vary between individuals with high alexithymia and those with low alexithymia.[31] Taken together, the current findings suggest that individuals with high alexithymia exhibit a greater preference for utilitarian judgments relative to those with low alexithymia, reflecting a reduced concern about causing harm (ie, weaker sensitivity to moral norms) rather than an increased concern about maximizing overall outcomes (ie, stronger sensitivity to consequences) and a general preference for inaction.

Implications

Using CNI models to quantify distinct determinants of moral dilemma judgments, the current findings have important implications for understanding the correlation between alexithymia and moral dilemma judgments. First, the traditional dilemma paradigm provides mixed evidence for this association (see Introduction). Although the mixed evidence could indicate that alexithymia is not reliably correlated with moral dilemma judgments, it is also possible that alexithymia exhibits a complicated pattern of discrepancies with multiple determinants of moral dilemma judgments. As these determinants are intermixed in the traditional dilemma paradigm, measurements of moral dilemma judgments may have been noisier in prior studies,[25] leading to mixed findings. Second, the current findings demonstrate that individuals

with high alexithymia exhibit a greater preference for utilitarian judgments, reflecting decreased concerns about causing harm rather than increased concerns about achieving the best aggregate consequences or a general preference for inaction. These findings resolve some ambiguities in past research using the traditional dilemma paradigm (see Introduction) and thus provide deeper insights into the associations between alexithymia and moral dilemma judgments.

In addition to contributing to the ongoing ambiguities, our findings may offer valuable insights into the nature of other psychological disorders. For example, past research using the CNI approach indicates that high levels of psychopathy correlate with a weaker sensitivity to consequences for the greater good, a weaker general preference for inaction rather than action, and a weaker sensitivity to moral norms (with the first two associations being weaker than the last).[24,35,36] Given that psychopathy and alexithymia are both believed to be associated with an impaired perception of one's own feelings, as well as with deficits in the processing of other people's emotions (for a review, see Burghart & Mier),[13] it is possible that the positive associations between psychopathy/alexithymia and the preference for utilitarian judgments reflect a common deficit in moral judgments (such as, a shared insensitivity to moral norms and duties) across disorders, although these relations are also driven by distinct determinants of moral dilemma judgments.

Limitations and Future Directions

Although the current findings provide convincing evidence for the effect of alexithymia on moral decision-making in sacrificial dilemmas, it seems appropriate to acknowledge several limitations. First, the current research found that higher levels of alexithymia are correlated with a greater preference for utilitarian judgments. An important question is whether this association reflects discrepancies in perceived societal or personal standards. It is possible that people with high alexithymia differ from those with low alexithymia in their understanding of what society considers morally wrong or right. Alternatively, another possibility is that individuals with low and high alexithymia exhibit a similar understanding of societal standards on wrong or right, but instead differ in their personal standards regarding the moral acceptability of a given action.[24] Future research is needed to investigate whether discrepancies in perceived societal standards and discrepancies in personal standards contribute to the associations between alexithymia and moral decision-making in sacrificial dilemmas. Second, the current research relied on a non-clinical population, which poses a potential question regarding the generalizability of the current findings to individuals with clinical levels of alexithymia. Thus, future work is needed to examine whether the patterns observed in our research can be replicated in populations meeting the criteria for clinical alexithymia. Third, given that empathy was not assessed in current studies and an increasing body of evidence suggests that individuals with high alexithymia exhibit a diminished capacity for empathy,[9,47,48] especially emotional empathy,[49] future research may help to provide deeper insights into whether individuals with high alexithymia showing weaker sensitivity to moral norms is associated with disruptions in empathy.

Conclusion

To summarize, the traditional dilemma approach indicated that higher levels of alexithymia are correlated with a greater preference for utilitarian judgments. Advanced analyses using the CNI model demonstrated that individuals with high alexithymia exhibit a greater preference for utilitarian judgments, reflecting a diminished concern about causing harm rather than increased concern about the greater good or a greater general preference for inaction. Together, the current findings suggest that alexithymia influences moral decision-making in sacrificial dilemmas not through increased deliberative cost–benefit reasoning and general preference for inaction but by blunting affective response to the violation of moral rules, which clarified the unavoidable ambiguities in interpreting results from the traditional dilemma approach.

Data Sharing Statement

We report all measures, all conditions, and all data exclusions. The data, analysis codes, and materials for all studies are available at https://doi.org/10.17605/OSF.IO/5MUBZ.

Ethics Approval and Informed Consent

All studies were approved by the Ethics Committee of Hunan Normal University and complied with the principles outlined in the Declaration of Helsinki. All participants read and signed the informed consent form.

Acknowledgments

The authors would like to thank the editors and reviewers for their valuable works.

Funding

These studies were supported by the National Natural Science Foundation of China (31900792), Hunan Provincial Natural Science Foundation of China (2020JJ5358), and Postgraduate Scientific Research Innovation Project of Hunan Province (CX20220487).

Disclosure

The authors declare no competing interests in this work.

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