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Anxiety and moral judgment: The shared deontological tendency of the behavioral inhibition system and the unique utilitarian tendency of trait anxiety

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ABSTRACT

The present study investigated the effects of induced anxiety on moral judgment in both the switch and the footbridge dilemmas. Specifically, the study examined whether the predisposed trait and behavioral motivation dimensions of induced anxiety affected people's goodness rating of the utilitarian options. Participants ($N = 160$) were randomly assigned to either of the anxiety or the control conditions. Results showed consistency with the existing literature in that most people judged as morally good the utilitarian option in the switch dilemma but as morally bad the utilitarian option in the footbridge dilemma, no matter whether people were anxious or not. More important, results demonstrated that the BIS was negatively related to goodness rating in both dilemmas (i.e., a shared deontological tendency) and that trait anxiety was positively correlated to goodness rating specifically in the footbridge dilemma (i.e., the utilitarian tendency). The psychological implications of these findings were discussed from the perspective of risk or uncertainty perception.

Moral judgment focuses on judging rightness or wrongness of actions which inevitably cause harm to innocent individuals for the greater good of a larger group (Decety & Cowell, 2015). To contemporary moral psychologists, a well-known moral dilemma is the trolley dilemma. It has two versions: the switch and the footbridge dilemmas. In the switch dilemma, people have to judge whether it is morally acceptable to turn a trolley to another track in order to kill one for saving five people; and in the footbridge dilemma, people have to judge whether it is morally acceptable to push a neighboring large person onto the track in order to stop the trolley from killing five people (Thomson, 1986). The acceptance to sacrifice one for overall greater benefit is called utilitarian while the acceptance to reject treating a person as a means to maximize collective benefit is called deontological (Decety & Cowell, 2015). From the utilitarian perspective, sacrificing one person to save more people increases the interests of the collective; but from the deontological perspective, treating an innocent life as a means to save more lives violates individual rights (Lucas & Galinsky, 2015).

People typically judge morally acceptable the utilitarian option in the switch dilemma but morally unacceptable the utilitarian option in the footbridge dilemma, though the consequences of actions in both conditions are the same (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). Greene et al. (2001) found evidence suggesting that brain areas associated with emotion processing were more active in solving personal moral dilemmas (i.e., the footbridge-type dilemmas) than solving impersonal moral dilemmas (i.e., the switch-type dilemmas) and non-moral dilemmas.

More recently, studies further provided evidence that moral judgment is also susceptible to influence from incidental emotions which are induced by sources irrelevant to the moral dilemmas under consideration (Strohminger, Lewis, & Meyer, 2011; Valdesolo & DeSteno, 2006). For example, Valdesolo and DeSteno (2006) found that positive mood (i.e., induced by watching a comedy clip) promoted participants' tendency to judge appropriate the utilitarian option in the footbridge dilemma but did not influence judgment of appropriateness of the utilitarian option in the switch dilemma. A study by Strohminger et al. (2011) further supported that mirth (i.e., the positive emotion associated with humor) increased participants' permissibility rating of the utilitarian option in personal moral dilemmas (e.g., the footbridge dilemma) while elevation (i.e., the positive emotion which is elicited by actions showing high moral standards, and motivates people to behave in a more noble, saint-like way) decreased participants' permissibility rating. The authors reasoned that it was not the shared emotional valence but the specific social functions of positive emotions that influenced moral rating of the utilitarian option in personal moral dilemmas. Therefore, it may be worth investigating which dimensions of a specific incidental emotion influence moral judgment of action that directly or indirectly hurt other people.

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In the present study, we attempted to examine whether the predisposed trait and behavioral motivation dimensions of induced anxiety affected people's goodness judgment of the utilitarian option in both the switch and the footbridge dilemmas. Specifically, we focused on trait anxiety and the behavioral inhibition motivation system proposed by Gray (1987) and Gray and McNaughton (2000). We were interested in these two dimensions because they are biological-based individual difference factors closely related to anxiety, which might produce consistent long-term effects underlying how anxiety influences judgment and decision making (Corr, 2009).

According to Gray's original Reinforcement Sensitivity Theory (RST, 1982), there are two conceptual biological-based behavioral motivation systems: the behavioral approach system (BAS) and the behavioral inhibition system (BIS). The BAS reacts to positive stimuli, facilitates appetitive behavior, and generates positive affect (e.g., happiness, elation, and hope). The BIS reacts to negative stimuli, facilitates aversive behavior, and generates negative affect (e.g., fear, anxiety, and frustration). The revised RST (Gray & McNaughton, 2000) added the third behavioral motivation system (i.e., FFFS-fear) and substantially made changes on the functions of the BIS. The BIS is responsible for solving goal conflicts including approach–avoidance (i.e., BAS–FFFS), approach–approach (i.e., BAS–BAS), and avoidance–avoidance (i.e., FFFS–FFFS) conflicts. More specifically, the BIS inhibits ongoing conflicting behaviors, engages in risk assessment, and attends to aspects of the environment and to memories which might help resolution of goal conflicts (Corr, 2009).

Based on the behavioral effects of anxiolytic drugs on animals, anti-anxiety drugs specifically impairing the BIS activity, Gray (1987) argued that the BIS is the basis of trait anxiety. Previous studies have provided evidence on the relationship between the BIS and trait anxiety. For example, trait anxiety was shown to be positively correlated to the BIS scores assessed by BIS/BAS scales (Carver & White, 1994), which is designed to assess sensitivity and reactivity of the behavioral inhibition system and the behavioral approach system (Muller & Wytykowska, 2005).

Perkins et al. (2013) investigated the effects of lorazepam, an anti-anxiety drug, on judgment of appropriateness of the utilitarian option in moral dilemmas. They found that lorazepam significantly promoted moral acceptance of the utilitarian option in personal moral dilemmas but not in impersonal moral dilemmas. Based on the findings, the authors reasoned that anxiety might be an emotion elicited from solving personal moral dilemmas and has a general inhibitory effect on actions involving direct harm to other people. Since anxiolytic studies have shown that anti-anxiety drugs hamper the BIS functions (e.g., weakening passive avoidance tendency) (Gray, 1987; Corr, 2009), we further speculated that the BIS might be the underlying psychological mechanism inhibiting people in an anxious state from judging the appropriateness of the utilitarian option.

Personality traits show stable tendencies to react in particular affective ways to a variety of events across time and situations (Frijda, 1994). Thus, the effects of induced anxiety on moral rating of the utilitarian option in moral dilemmas might not be independent of trait anxiety. The influence of trait anxiety on judgment and decision-making has attracted much interest (Eisenberg, Baron, & Seligman, 1998; Peng, Xiao, Yang, Wu, & Miao, 2014; Maner et al., 2007). For example, Peng et al. (2014) found that people in the high trait anxiety group (i.e., one standard deviation above the mean anxiety score) showed a risk aversive tendency to construct their self-frame and to choose risky plans in the domain of gain compared to people in the low trait anxiety group (i.e., one standard deviation below the mean anxiety score).

However, the impact of trait anxiety on moral judgment has not been a focus of attention. For the following reasons, we speculated that people with higher trait anxiety might judge morally better the utilitarian option in moral dilemmas (i.e., more risk-taking) when anxiety was manipulated. First, Lucas and Galinsky (2015) proposed that the utilitarian option in moral dilemmas is risky due to the same factors (e.g., psychopathology, incidental positive affect, and ventromedial prefrontal cortex brain lesions) that lead to both the utilitarian preference in moral judgment and preference on a risky choice in decision making under uncertainty. Second, negative moods with high arousal, such as anger and anxiety, might led to risky behaviors (Leith & Baumeister, 1996). Third, trait anxiety is positively related to state anxiety (Endler & Kocovski, 2001).

Taken together, therefore, we formulated the following hypotheses. H1: Consistent with the extant literature, people would rate the utilitarian option in the switch dilemma morally better than in the footbridge dilemma, independent of being in an anxious state. H2: People in a temporarily anxious state would rate the utilitarian option in both the switch and the footbridge dilemmas morally worse compared to their non-anxious controls. H3: For people in a temporarily anxious state, those with higher BIS scores would tend to rate the utilitarian option in both the switch and the footbridge dilemmas morally worse than those with lower BIS scores. H4: For people in a temporarily anxious state, those with higher scores on trait anxiety would tend to rate the utilitarian option in both the switch and the footbridge dilemmas morally better than those with lower scores on trait anxiety.

1. Methods

1.1. Participants

Undergraduate students ($N = 160$; 98 females, 62 males) were recruited via an online psychological experiment system. They received one course credit for participation. Students were eligible to participate if they had no known diagnosed mental disorders. Participants were randomly assigned to one of the two conditions: the anxiety condition and the control condition.

1.2. Materials

1.2.1. State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)

The STAI consists of both the trait and state anxiety questionnaires, each with the same 20 questions. Example questions are “I feel upset” and “I feel strained.” A revised 6-point scale was employed for participants to rate how anxious they felt at that moment (i.e., assessing state anxiety) and how often they felt anxious in their everyday life (i.e., assessing trait anxiety) from 1 (*never*) to 6 (*always*). The original STAI adopts a 4-point scale. The STAI has good reliability (i.e. between .86 and .95) and has been widely used to assess state or/and trait anxiety in research (Peng et al., 2014; Zhao, Cheng, Harris, & Vigo, 2015).

As Blanton and Jaccard (2006) pointed out, scales are not strictly continuous because of the coarseness of a scale and the collapsing of individuals with different true scores into the same category. For example, all individuals with scores around 3 are assigned a 3. However, differences might exist between these individuals' true scores (e.g., 2.6 vs. 3.4). Thus, a 6-point scale might be more sensitive and accurate than a 4-point scale to assess state anxiety induced by a non-intrusive manipulation. In addition, the correlation between trait and state anxiety ($r = .635$) is similar as the correlation ($r = .518$) in Zhao et al. (2015) in which the original STAI questionnaires were employed. ($\alpha = .909$ for trait anxiety; $\alpha = .912$ for state anxiety).

1.2.2. BIS/BAS scales (Carver & White, 1994)

Consisting of 24 items, the BIS/BAS scales were designed to assess individual variability in sensitivity of two motivational systems: the Behavioral Inhibition (avoidance) System (BIS) and the Behavioral Approach (activation) System (BAS). Each item of this questionnaire is a statement that a person may either agree with or disagree with. A revised 6-point scale is used from 1 (*very true for me*) to 6 (*very false for me*). The original questionnaire adopts a 4-point scale. There are 7 BIS