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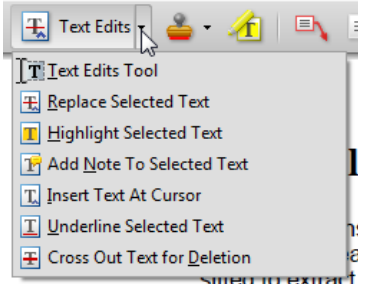

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COMMENTARY

Dissonance and distress

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Inzlicht, Tullett, and Good (IT&G) present a provocative model with supportive data suggesting that individuals who possess religious beliefs have lower distress in response to disruptions in meaning, as measured by lowered anterior cingulate cortex (ACC) activity to errors committed during a Stroop task. In this commentary, we consider their model and data from the perspective of cognitive dissonance theory.

IT&G suggest that when meaning or the "perceived coherence between one's beliefs, goals, and perceptions of the environment" is disrupted, individuals feel distressed; they note that this statement is consistent with the research of cognitive dissonance theory (Festinger, 1957). According to dissonance theory, inconsistency between important cognitions has the potential to cause dissonance, a psychologically uncomfortable state that motivates one to reduce the cognitive inconsistency.

Dissonance theory has been utilized in research on religion. Consider a little-known article by Burris, Harmon-Jones, and Tarpley (1997). In one study, religious individuals' beliefs were disconfirmed, by having them read a newspaper article that described the drive-by shooting death of an infant boy in his grandmother's arms as she and the child's father prayed for protection. The article highlighted the inconsistency between the tragic outcome and the belief that God answers prayers. After reading this article, participants completed a self-reported emotions scale and a measure of transcendence, which asked questions like *How often does God work in mysterious ways?* The emotions and transcendence questionnaires were completed in counter-balanced order, and participants who completed the transcendence questionnaire first experienced less distress the more they endorsed transcendence. These results supported the prediction that religious transcendence protects individuals from dissonance-related distress. A second experiment demonstrated that when religious participants completed religious belief measures after reading the article, dissonance-related negative affect decreased relative to two comparison conditions.

Thousands of studies have produced dissonance effects in humans, but it is less well known that the theory's predictions have been supported in research using rats (Lawrence & Festinger, 1962), monkeys (Egan, Bloom, & Santos, 2010), and perhaps dogs (Shenger-Krestovnika, 1921; reported in Gray, 1987). In this latter experiment, a dog was taught to discriminate between an ellipse and a circle on the basis of their shape. When the dog pointed its nose at the circle, it received food. In contrast, when the dog pointed its nose at the ellipse, it received nothing. Gradually, over a period of

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weeks, the ellipse was made more round, so that it became difficult for the dog to discriminate the ellipse from the circle. When this occurred, the dog began showing signs of distress, including whining and defecating. Pavlov considered this experimental neurosis, and we suggest that it could also be thought of as dissonance-related loss of meaning. The circle had lost its meaning as a guide for the dog's behavior and as a sign that food was forthcoming. These results indicate that disruptions of meaning can cause distress in non-human animals, suggesting that the process is relatively basic.

One variable found to influence the negative affect of dissonance is trivialization, a term coined by Simon, Greenberg, and Brehm (1995) to explain how priming individual's important values may make dissonance-evoking situations seem less important and hence produce less distress. Applied to the research of IT&G, religious beliefs or primes of religious beliefs may cause individuals to perceive the errors made in the Stroop task as less important and this reduction in importance may cause the reduction in ACC activity to the errors.

Along these lines, we also wonder whether religious individuals (or those primed with religion) would show lower ACC activity if the error involved something of more importance. We suspect that behavioral violations of a religious belief (e.g., "sinning") might instead cause greater ACC activity in religious than non-religious individuals. Thus, whether religious belief protects from, or increases, error-related anxiety might depend on the characteristics of the error. Similarly, research has found that individuals low in racial prejudice respond with increased ACC activity to errors indicating they might be racist but not to errors on standard cognitive tasks (Amodio, Devine, & Harmon-Jones, 2008).

As IT&G noted, religions often require costly, unpleasant behaviors of their adherents, such as fasting, tithing, and abstaining from sex. These behaviors are often so difficult to accomplish that many individuals violate the dictates of their religion. Violations such as these should lead to a loss of meaning, thereby increasing anxiety rather than buffering it. However, perhaps individuals use their religious beliefs to transcend their transgressions, as they transcend other events that violate the tenants of religious belief (Burris et al., 1997). The relationship between "sin," anxiety, and religious transcendence could provide a fruitful basis for future research.

We also wonder if the end result of the motivation to seek religion is to guide effective action. In our action-based model of dissonance, we proposed that cognitions have the power to create dissonance because those cognitions implicate actions (Harmon-Jones, Amodio, & Harmon-Jones, 2009). Conflict between cognitions is problematic because it has the potential to interfere with effective action. In our model, the proximal motive for discrepancy reduction is to reduce distress, whereas the distal result is to facilitate effective, unconflicted action. Religions often provide individuals with guides for behavior and these guides may be the pillars supporting the comforting meanings offered by religion.

We applaud IT&G for recognizing that religion's origins and effects are complex and unlikely to be related to a single outcome such as anxiety buffering. Future research might integrate religions' anxiety-buffering function with the hyperactive agency detection mechanism and prosociality functions. For example, the hyperactive agency detection model suggests that humans are motivated to develop religious beliefs when exposed to dangerous and uncertain circumstances, whereas the anxiety-buffering model suggests that religious beliefs successfully manage the anxiety evoked in such situations. Furthermore, the need to manage anxiety may

provide the proximal motivation for religion, whereas prosociality and group cohesion via costly signaling may be important distal, adaptive functions of the resulting religious behavior.

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