



Driving stimuli increases accessibility of aggression-related concepts in “angry” drivers

Kevin L. Blankenship^{a,*}, Sundé M. Nesbit^b

^a Department of Psychology, Iowa State University, W112 Lagomarcino Hall, Ames, IA 50011, United States

^b Department of Psychology, University of Northern Iowa, Baker 439, Cedar Falls, IA 50614, United States

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ABSTRACT

Stimuli present in aversive situations (even initially neutral stimuli) can become associated with aggressive feelings and thoughts become capable of acting as cues for aggressive thoughts. The present research examined whether driving stimuli can serve as triggers for aggression-related concepts for individuals predisposed to becoming angry while driving (i.e., high in self-reported trait driving anger). Using the General Aggression Model (Anderson & Bushman, 2002) as a guide, two studies demonstrated that participants high in trait driving anger responded more quickly to aggressive words when paired with driving than neutral stimuli. There were no differences in primes for nonaggressive words and nonwords. Study 2 also found that, for participants high in driving anger, increased accessibility of aggressive words following driving primes predicted self-reported anger in a provoking driving scenario.

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1. Introduction

Over 80% of Americans drive to work; those commuting spend over 50 min per day in their cars (U.S. Census Bureau, 2011). Unfortunately, this greater frequency of driving increases the likelihood of drivers becoming angry and aggressive while on the roadways. According to a U.S. News and World Report survey, over 90% of drivers surveyed reported that they had either witnessed another driver being angry or became angry themselves behind the wheel (Haupt, 2012).

One dispositional factor influencing driver aggression that has received some attention has been trait driving anger (i.e., the extent to which drivers chronically become angry behind the wheel; Deffenbacher, Lynch, Oetting, & Yingling, 2001). Indeed, individuals high in trait driving anger (as measured by the Driving Anger Scale; DAS; Deffenbacher, Oetting, & Lynch, 1994) have an increased likelihood of experiencing anger more frequently and intensely in driving-related situations as compared to those low in driving anger. Further, high-DAS individuals have a greater likelihood of engaging in aggressive driving behaviors despite driving the same amount of time and distances as low-DAS individuals (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003a).

James and Nahl (1998) have suggested that aggressive driving behaviors are a direct result of negative affective states (e.g.,

irritation), suggesting that aggressive driving acts similarly to other forms of anger. However, trait driving anger seems to be unique from other forms of anger, and only moderate correlations have been found between DAS and Trait Anger Scale (TAS) measures (Nesbit, Conger, & Conger, 2007). Specifically, trait driving anger seems context-specific and functions as a trait expressed within a driving context (Deffenbacher et al., 2003a). Therefore, we believe that the driving context may be responsible for activation of these aggression-related concepts for high-DAS individuals, independent of individuals' general trait anger.

1.1. Trait driving anger and thought accessibility

The General Aggression Model (GAM; Anderson & Bushman, 2002) suggests that specific dispositional (e.g., knowledge, individual differences) and situational factors can influence responses (e.g., arousal and angry mood), which can then produce specific conscious appraisals and aggressive behaviors. Exposure to and interactions between these classes of inputs can lead to increased accessibility and activation of aggression-related concepts, which then results in specific behavioral consequences (Berkowitz, 1990). Whereas little research to date has examined the role of accessible concepts in a driving context, researchers have begun to examine the relation between individual differences variables, such as trait driving anger, on conscious perceptions in the driving context and attributions of others. Deffenbacher, Petrioli, Lynch, Oetting, and Swaim (2003b) found that high-DAS participants

* Corresponding author. Tel.: +1 515 294 9270.

E-mail address: kevinb1@iastate.edu (K.L. Blankenship).

generated specific negative interpretations, which were also associated with more context-specific anger and arousal, and a greater propensity to report aggressive driving behavior. Similarly, Nesbit and Conger (2011) used a visual imagery paradigm to examine thoughts in reaction to a driving context. High-DAS participants reported greater amounts of magnification thoughts (i.e., overestimating the significance of the situation), and a reduced number of anger control statements (thoughts intended to control or neutralize one's anger) than low-DAS participants. Because Deffenbacher et al. (2003b) and Nesbit and Conger (2011) focused on conscious, self-reported appraisals in interpreting the driving situation, they may likely result from the activation of non-conscious knowledge structures in memory that are associated with aggression and hostility (Anderson & Bushman, 2002).

Theories of classical conditioning suggest that initially neutral stimuli can become valenced (i.e., good or bad) with enough pairings with valenced information (see also Olson & Fazio, 2001). Consistent with this, cognitive-neoassociationistic theory (Berkowitz, 1990) suggests that stimuli present in aversive social situations (even initially neutral stimuli) can become associated with aggressive feelings and thoughts. These stimuli are then capable of acting as cues for aggressive thoughts (Anderson & Bushman, 2002).

Based on theories of classical conditioning and the GAM, we believe that high-DAS individuals will have greater accessibility of aggressive knowledge concepts following exposure to driving-related stimuli than low-DAS individuals. These aggressive concepts, in turn, will influence the extent to which high-DAS individuals become angry in a simulated driving context. These effects may help explain why high-DAS individuals are more likely to feel more intense anger and negative effect, and consequently more likely to aggress when provoked; it may be because aggressive concepts are more accessible for these individuals.

Two studies implemented lexical decision task (LDT) methodology to examine whether driving stimuli can trigger aggression-related concepts for those predisposed to becoming angry while driving (i.e., high-DAS participants). In Study 1, we expected that participants high (rather than low) in trait driving anger will exhibit increased accessibility of aggressive words when exposed to driving-related stimuli rather than driving-unrelated stimuli as primes. However, accessibility of nonaggressive words and nonwords should not be influenced by exposure to driving stimuli. Study 2 examined whether the increased activation of aggressive knowledge structures for high-driving anger participants were related to anger responses within a provoking driving scenario.

A secondary goal was to explore the role of general trait anger (measured by the TAS) on the effect of driving-related primes. Parrot, Zeichner, and Evces (2005) found that exposure to anger-related words (e.g., furious) as primes facilitated responses in an LDT for high-TAS participants. While the procedure in Parrot et al. (2005) study and the studies presented here are similar, the primes utilized here are photos that vary in their relevance to a driving context, not words that vary in emotional evocation. Therefore, we expected that TAS scores would not moderate the effect of driving-related primes on participants' reaction times, suggesting that the priming effects are specific to driving anger rather than general anger.

2. Study 1

2.1. Participants and design

One hundred thirty-one introductory psychology students (66 female; $M_{age} = 19.45$, $SD = 2.04$) with driving experience averaging $M = 4.14$ years ($SD = 1.04$) participated in a 2(Prime: driving-

related vs. driving-unrelated) \times 3(String: aggressive vs. nonaggressive vs. nonword) \times Driving Anger Scale (DAS; continuous) mixed design with Prime and String as within-participants variables.

2.2. Procedure

Participants were seated at a computer where all measures and manipulations were administered. Participants completed a series of measures, including the DAS (Deffenbacher et al., 1994) and the TAS (Spielberger, 1999). Afterwards, participants completed the LDT, where they were asked to report whether a string of letters was a word. Participants were told they would see a picture prior to the letter string and that the purpose of the picture was to help focus their attention. The letter strings included a number of aggressive words, nonaggressive words, and nonwords. Letter strings were equated for length. Prior to each letter string, a black-and-white picture of either a driving-unrelated or driving-related stimulus was presented on the screen. Reaction times to the word/nonword judgment were recorded. Finally, participants completed a funnel debriefing and then excused.

2.3. Independent/predictor variables

2.3.1. Trait driving anger

Participants completed the DAS (Deffenbacher et al., 1994), a 14-item measure of the tendency to become angry while driving. Each item represented a problematic driving situation (e.g., someone honks at you about your driving), and participants were asked to rate their amount of anger for each item on a 5-point scale (from 1 = *not at all* to 5 = *very much*); $\alpha = .89$.

2.3.2. Trait anger

Participants also completed the TAS (Spielberger, 1999), a 10-item measure of an individual's general tendency to experience anger. Items represented various ways that people might describe themselves (e.g., I am a hotheaded person), and participants were asked to rate their agreement with the descriptor on a 4-point scale (from 1 = *almost never* to 4 = *almost always*); $\alpha = .85$. The TAS has been shown to be moderately correlated with the DAS ($.27 < r < .33$; Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000). The correlation between the two for this study was $.32$ ($p < .05$).

2.3.3. Prime

Prior to each letter string, participants were exposed to one of six photos of driving-related (e.g., gas pedal) or one of six photos of driving-unrelated stimuli (e.g., grasshopper) presented in the center of the screen for 1000 ms, with a stimulus onset asynchrony (SOA) of 100 ms (see Appendix A). Pretesting ($N = 63$) revealed that all stimuli were similar in eliciting low levels of negative emotion ($M_{driving-related} = 2.16$, $SD = 1.03$ vs. $M_{driving-unrelated} = 2.11$, $SD = .91$), $t(62) = .56$, $p = .58$, on 7-point scale, 1 = *no negative emotion at all*, 7 = *extreme negative emotion*), and positive emotion ($M_{driving-related} = 3.14$, $SD = 1.43$ vs. $M_{driving-unrelated} = 3.39$, $SD = 1.05$), $t(62) = -1.49$, $p = .14$, on 7-point scale, 1 = *no positive emotion at all*, 7 = *extreme positive emotion*).

2.3.4. String

The letter strings were 24 aggressive words (e.g., assault), 24 nonaggressive words (e.g., absorb), and 38 nonwords (e.g., bazy) adapted from Anderson, Benjamin, and Bartholow (1998; see Appendix B).

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