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Attachment as a Predictor of Driving Performance

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Running Head: PERSONALITY, ATTENTION, AND DRIVING PERFORMANCE

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Abstract

The current study focuses on the value of attachment style—a personality trait most commonly associated with close relationships and affect regulation, but also with cognitive performance—as predictor of both reported real-world driving and actual driving in a simulator. Participants completed a battery of self-report measures, including driving experience and violations (e.g., traffic violations, crashes), a cognitive task, and four driving scenarios where speeding, collisions, and lane violations were monitored. Attachment style, as well as driving style and performance on the cognitive task, were found to predict driving performance. The findings highlight the complex associations between personality, attention, and driving performance. Specifically, these results support the inclusion of personality variables such as attachment style in the study of driving performance or when planning interventions to improve driving. (128 words)

Keywords: Personality, attachment style, attention, driving behavior, simulated driving

1. Introduction

Car crashes are one of the most common causes of injuries and death among adolescents and young adults (DeAngelo & Hansen, 2014; Williams, 2013). For many years, researchers have focused on predictors such as inattention to explain poor driving performance and driving-related crashes (Brookhuis, de Vries, & de Waard, 1991; Lemerrier et al., 2014). In a relatively recent review of the literature on driving performance, however, Nichols and colleagues (Nichols, Classen, McPeck, & Breiner, 2012) urged researchers to consider other potential predictors—specifically, personality traits—to gain a fuller understanding of driving performance (see also Gadbois & Dugan, 2015; and Winfred, Gerald, & Ralph, 1991 for a review). Following this proposition, in the current paper we examined the contribution of attachment style, a well-studied personality trait (for extensive reviews see Cassidy & Shaver, 2008; Mikulincer & Shaver, 2007), to the understanding of driving performance.

Numerous studies have already demonstrated the importance of personality dimensions for the understanding of driving performance and outcomes. Traits such as the Big Five personality dimensions (Dahlen & White, 2006; Gadbois & Dugan, 2015), sensation seeking, and impulsivity (e.g., Jonah, 1997; Moan, Norström, & Storvoll, 2012) were shown to reliably predict outcomes such as accidents, risky driving, and driving citations (being reliable does not mean that personality traits are always strong predictors). Despite the many studies on personality and driving, and the known importance of relationships to the understanding of human behavior (e.g., Berscheid, 2004; Gillath, Adams, & Kunkel, 2012), relatively little work has been done on the role relational variables play in driving performance and outcomes.

Attachment theory incorporates evolutionary, developmental, and cognitive (e.g., attention and regulation) processes into one cohesive explanatory model of close relationships. According to the theory, people exhibit individual differences in their relational approaches (thoughts, emotions, expectations), termed *attachment styles* (e.g., Ainsworth et al., 1978), which shape people's perceptions of themselves, others, and relationships in general (Simpson & Rholes, 2015). Attachment style is conceptualized as two dimensions of interpersonal insecurity—anxiety and avoidance. People high on attachment anxiety are preoccupied with thoughts about rejection and abandonment, and when under threat or stress, tend to be overwhelmed by emotions (e.g., Gillath, Bunge, Shaver, Wendelken, & Mikulincer, 2005). Conversely, people high on attachment avoidance, tend to avoid closeness and intimacy to-, and dependence on- close others, are compulsively self-reliant, and tend to downplay emotions and their importance (e.g., Collins & Feeney, 2004). Attachment anxiety and avoidance were found in numerous studies to successfully predict a variety of outcomes, including relationship-related and affect-regulation-related variables (Cassidy & Shaver, 2008; Mikulincer & Shaver, 2007).

Recent findings, however, show that beyond its relevance to close relationships, attachment style is also a reliable predictor of cognitive processes and specifically attention (e.g., Gillath, Giesbrecht, & Shaver, 2009; Fraley, Garner, & Shaver, 2000). As driving involves attention, this raises the possibility that attachment style could also be a useful predictor of driving-related performance.

1.1 Attachment, Attention, and Driving-Related Outcomes

A few lines of research support the idea that attachment style can be a useful predictor of driving performance. First, in a series of studies, Gillath and colleagues

(Edelstein & Gillath, 2008; Gillath et al., 2009) have found that attachment avoidance is associated with better performance on attention-related tasks. Avoidant individuals perform better because they can suppress task-irrelevant distracters or ignore interference and focus on the task at hand as compared with their non-avoidant counterparts.

Attachment anxiety associates with hyper-sensitivity, and a lower ability to disengage from distracters. Although attachment anxiety does not predict performance on general cognitive tasks, anxiously attached people do tend to show cognitive biases in tasks involving stress, threats, or relational material (e.g., Mikulincer et al., 2002). In such tasks, anxiously attached people are thought to become preoccupied with negative emotions and thoughts about rejection and abandonment, and experience emotional flooding or be overwhelmed by negative thoughts and emotions. Together these findings support the expected associations between attachment, cognition, and attention.

1.2 Attachment and reckless behavior.

Further indirect support for the idea that attachment style is important for the understanding of driving-related outcomes originates from research showing that attachment insecurity is associated with reckless or dangerous behavior. For example, the constant concerns regarding the availability and acceptance of close others make anxiously attached individuals more likely to engage in reckless sexual behavior (e.g., engaging in unprotected sex; Davis, Shaver, & Vernon, 2004). Likewise, avoidantly attached individuals are more likely to cheat (both academically and relationally; Gillath, Sesko, Shaver, & Chun, 2010), and try to poach partnered people without considering the consequences (Schachner & Shaver, 2002). In general, insecurity seems to be a precursor of engagement in reckless behavior (Bell, Forthun, & Sun, 2000; Elgar, Knight, Worrall

& Sherman, 2003). Similar findings were obtained and are reviewed below with regard to attachment and driving.

1.3 Attachment and driving.

Taubman-Ben-Ari and colleagues (e.g., Taubman-Ben-Ari & Mikulincer, 2007; Taubman-Ben-Ari, Mikulincer, & Gillath, 2004; 2005) have provided initial evidence to show that attachment style, and specifically attachment anxiety, is positively related to reckless driving. Reckless or dangerous driving is defined as a mental state in which the driver displays a disregard for the rules of the road. Taubman-Ben-Ari and Mikulincer (2007) have found that anxiously attached people were more likely to report engaging in reckless driving behaviors.

Although in line with our general proposition that attachment style is predictive of driving performance, Taubman-Ben-Ari and Mikulincer (2007) had little to say about the role attachment style might play in actual driving behavior. Their work focused mainly on risky driving rather than on driving performance in general. Thus, the scope of their study was relatively narrow, as it focused mainly on reported reckless driving and not actual reckless driving or general driving performance. The current research extends this earlier work by examining the associations between attachment style, attention, and driving performance.

1.4 Current Study

In the study described below, we integrated different methods to improve the understanding of the associations between personality, attention, and driving performance. In addition to examining the associations between attachment style and driving, we used a cognitive task to directly examine people's attention and its

associations with driving performance, and investigate whether attachment style predicts driving performance above and beyond attentional biases. Furthermore, based on previous work (Taubman-Ben-Ari et al., 2004; 2005) we examined the associations between people's self-reported *driving style* and driving performance, and again examined whether attachment style predicts driving performance when these associations are controlled for.

Driving style refers to the way people choose to drive, or to their customary driving mode. It is comprised of components such as driving speed, headway distance, and habitual level of attentiveness and assertiveness. It has been suggested that driving style is influenced by attitudes and beliefs regarding driving, as well as by more general needs and values (Elander, West, & French, 1993). Taubman-Ben-Ari and colleagues (2004) have developed an extensive self-report measure to assess driving style, and found parent-child and partner-partner differences and similarities using the measure (Taubman-Ben-Ari et al., 2005). They also found scores on the measure to be associated with reported driving behavior. Here we will assess the ability of the driving style measure to predict both reported and simulated driving performance.

That said, we are interested in the role that attachment style plays as a basic human tendency or a general personality variable that is broader than driving style. Driving style, which could be considered a personality trait, or a habit, has not been validated in the personality literature to the same extent as attachment style. In the current paper we assessed the contribution of attachment style as the broader construct above and beyond scores on the driving style measure.

1.5 Hypotheses

We hypothesized that scores on attachment style, driving styles, and attention task measures will predict reported real-world driving behavior (traffic violations and crashes) and simulated driving behavior (speeding, collisions, lane violations). Specifically, we expected that insecurely attached people will report worse real-world driving behavior (infractions and crashes) and exhibit worse simulated driving performance (speeding, collisions, lane violations). We also expected attachment style to predict driving performance above and beyond driving style and attentional biases.

2. Method

Data collection was completed for 84 participants (mean age of 19.4, 46 males, mean driving experience 4.2 years) recruited from the Department of Psychology's participant pool.

2.1 Materials and procedure.

Each participant completed a self-report measures battery, cognitive task (dot-probe), and a driving simulator session (4 scenarios) while also providing information on her or his driving experience and traffic violations. The self-report measures included an adult attachment style scale, a driving style scale, and an extended demographic scale.

2.1.1. Adult attachment.

We used the Experience in Close Relationships (ECR; Brennan, Clark, & Shaver, 1998), a widely used 36-item self-report measure, to assess attachment style. Eighteen items tap attachment-related anxiety (e.g., "I worry about being rejected or abandoned") and eighteen items tap attachment-related avoidance (e.g., "I prefer not to show others how I feel deep down"). Participants rated the items on a 7-point scale ranging from 1

(*disagree strongly*) to 7 (*agree strongly*). Cronbach alphas were .89 and .90, for anxiety and avoidance, respectively, and the two scales were positively correlated, $r = .34$, $p < .01$.

2.1.2. Driving style.

The Multidimensional Driving Inventory (Taubman-Ben-Ari et al., 2004; Taubman-Ben-Ari, 2006), a 44-item scale, was used to assess driving style. The scale assesses four broad domains of driving styles: (1) Reckless and careless driving style—11 items relating to risky and high-speed driving. The items tap the tendency to seek stimulation, sensation, and risk during driving, to take risky driving decisions, and to engage in risky or careless driving. They also refer to the tendency to drive fast and to display signs of time pressure while driving. (2) Anxious driving style—9 items, tapping anxious, dissociative, and distress reduction driving. The items relate to the tendency to feel distressed when driving, to display signs of anxiety and fear in given driving situations, to express doubt and lack of driving confidence, to commit driving errors as a result of being easily distracted, to display cognitive gaps and dissociation during driving, and to engage in emotion-focused coping activities in order to reduce distress and achieve relaxation and calm while driving. (3) Angry and hostile driving style—5 items relating to the tendency to be hostile toward other drivers, to behave aggressively, and to feel intense anger when driving. (4) Patient and careful driving style—9 items assess the tendency to be polite toward other drivers, to feel no time pressure and display patience while driving, to drive carefully, to plan an effective route, and to adopt a problem-solving attitude toward driving-related problems and obstacles.

Participants were asked to rate the extent to which each item fits their feelings, thoughts, and behavior during driving, using a 1 (*not at all*) to 7 (*very much*) response scale. Cronbach's alphas for the four factors ranged from .71 to .78. Angry and Reckless styles were positively correlated, $r = .64, p < .01$; and Patient style was negatively correlated with Reckless, Anxious, and Angry driving style, $r_s -.24, -.23, -.18$, respectively (p s for first two $< .05$ for the last one $p = .13$).

Demographic scale. Finally participants provided demographics including age, gender, driving history, crashes, accidents (self/other fault), and traffic violations history. Participants were asked to report the total number of events throughout their life (without limiting it to only registered ones). For example "How many times have you been involved in a car accident?"

2.1.3. Cognitive task.

We used a modified version of the dot-probe task (MacLeod, Mathews, & Tata, 1986), which included emotion-provoking as well as neutral words. The task was programmed and presented using DirectRT software, and the words were used in previous studies (e.g., Edelstein & Gillath, 2008). Participants completed a series of trials, in which a pair of words (either one emotion-related and one neutral, or two neutral) appeared simultaneously on the screen in two different spatial locations (1/3 of the screen to the left or the right of the vertical center (see Figure 1). This display was immediately followed by a dot in the center of the space just occupied by one of the two words. Participants were asked to indicate the location of the dot using predetermined button presses (left arrow when the dot appeared instead of the word on the left, and right when it appeared on the right).

The dot probe task assesses the effects of context-related interference or distraction on one's attention. The participant's task is to detect the location of a dot presented at one of two locations on the screen as soon as possible. Sustaining attention on emotion-provoking words makes responses to the dot quicker when the dot occupies the space where the emotion-provoking word was before (congruent), and slower when the dot occupies the space where a neutral word appeared before (incongruent). If, however, a participant is motivated (perhaps implicitly or unconsciously) to avoid emotions or emotion-related words (such as the case for avoidantly attached people), responses should be slower to the dot when it replaces an emotion word (congruent) and faster when it replaces a neutral word (incongruent).

Participants completed 120 trials of the dot-probe task in the current study (40 neutral; 20 each of congruent positive, congruent negative, incongruent positive, incongruent negative). Each trial consisted of the following sequence: (a) a fixation cross was displayed in the center of the screen for 500 ms; (b) two words appeared simultaneously, one on the left side and one on the right side of the screen for 500 ms; (c) the two words disappeared from the screen; and (d) a dot appeared at the center of the area on the screen where one of the words had been. The dot remained on the screen until the participant made a response on the keyboard to indicate which position the probe was occupying (left or right). We defined four scores based on the identification of the dot: (a) when it followed the positive emotional word—positive congruent, (b) when it followed the neutral word paired with a positive word—positive incongruent, (c) when it followed a negative emotional word—negative congruent, and (d) when it followed the neutral word paired with a negative emotional word—negative incongruent.

We used reaction times (RTs) as our indexes to detect the dot during the congruent and incongruent emotion (positive and negative) trials. Quicker RTs during congruent (either positive or negative) trials indicate greater attention focused on the emotional stimuli. Longer RTs during incongruent (positive or negative) trials indicate an inability to disengage from emotional stimuli. Thus, there are four RT variables: positive congruent, positive incongruent, negative congruent, negative incongruent.

2.1.4. Driving task.

The simulated driving task consisted of four driving scenarios designed to assess attention and driving behaviors. The scenarios were programmed using STISIM Drive 2.08.02, Driving Simulator Program. A fixed-base cockpit with force-feedback steering and pedals was used. The vehicle was set on automatic transmission. Drivers viewed the scenario on a single 20 inch LCD display, giving a 45° field of view. The first scenario was a leisurely drive with the purpose of getting the participant acquainted with the simulator. It had a total distance of 6000 ft., and consisted of a drive through countryside roads (no marked speed limit; average time for completion was 74.63 seconds). The second scenario was a brief drive (2505 ft. with a marked speed of 55mph, took participants 57.79 seconds on average) in which participants drove through a construction site. As they drove, a vehicle pulled out in front of them in a way that was likely to cause them to collide with it. Participants were able to see the other vehicle from a distance of 1000 ft. with the vehicle's movement being triggered by the distance of the participant. Thus, based on the participant's driving speed, when the participant was 2.5 seconds away from the vehicle it pulled out. The scenario was programmed in a way that would force most people to collide. In this scenario we were mainly interested in the driving

behavior before the collision, and our ability to predict it using attachment orientation, driving style, and attention measures.

The third scenario involved a drive through a neighborhood which was 10005 ft. long, with marked speed of 25mph and on average took participants approximately 100.89 seconds (see Figure 2 below). The participant was instructed to look for a specific street while driving. This request was expected to increase the cognitive load on the information processing carried out by the participant, simulating a realistic driving situation where maintaining driving-related attention is taxed by an additional task such as navigating. Before the participant came upon the designated street we programmed a parked car to pull out in front of them, to further test their driving behavior. Although participants might have already expected events like cars pulling out in front of them, the added load (looking for the address), was meant to maintain a level of complexity. The fourth scenario (16005 ft., with marked speed of 55 mph took 198.52 seconds on average) was another leisurely drive with minimal traffic and distractions, and was meant to assess sustained attention (e.g., how many lane violations took place through this relatively boring drive?).

Participants were instructed to drive as they would normally drive in their own vehicle. Data included speed, lane violations (or time outside the lane), crashes, and speeding, which was defined as driving more than 5 miles over the speed limit (posted as a sign near the beginning of the scenario). Speeding ranged from 0 to 82 percent of driving-time, with the mean being 57% overall. For example, 94% of participants sped at least once in Scenario 3; however, not all of them sped to the same extent.

3. Results

To examine our hypotheses we ran regression analyses to predict each of the driving outcomes. Below we organize the report by the type of outcome, starting with self-reported history including traffic violations and crashes (non-lethal and non-injury), followed by the results for the simulated driving scenarios. Hierarchical regression was conducted in order to examine the predictive value of attachment style beyond all other variables in a full model, in addition to being able to investigate driving styles alone if no variables in the full model were significant. The first step in each regression analysis consisted of the four driving styles (Reckless Driving Style (DS); Anxious DS; Angry DS; and Patient DS), the second step had the four scores from the dot probe task [positive congruent, positive incongruent, negative congruent, or negative incongruent], and the last step had attachment anxiety and avoidance as predictors. Variables predicting the outcome at a significance level of $p < .05$ are reported. Reported results are from the full models.

3.1. Self-reported driving history.

We ran separate regression analyses for traffic violations and for crashes.

3.1.1. Traffic violations.

We analyzed two different indexes with regard to traffic violations, an overall one (includes all the times one has been pulled over, received a warning, received a ticket, or been arrested) and one that focused only on traffic tickets and driving related arrests. We thought that the latter information (tickets and arrests) would be easier to recall as opposed to general traffic violations and hence more reliable. The regression analysis predicting total number of traffic violations revealed a main effect for Reckless DS

controlling for all other variables, $\beta = .34$, $p = .037$, model $R^2 = .17$. This suggests that people with a tendency to seek stimulation, sensation, and risk during driving, make risky driving decisions, and engage in risky driving (e.g., drive fast and display signs of time pressure while driving) tend to have more traffic violations (according to their own report). Attention-related RTs for positive congruent trials also had a main effect, $\beta = -.61$, $p = .012$, such that people who pay more attention to positive words had more traffic violations.

These results suggest that focusing on positive information (thus paying less attention to more emotionally neutral information) may be associated with ignoring or having less focus on relevant rules of driving that are not emotionally engaging (e.g., speeding due to greater focus on an engaging conversation or fun song rather than on posted speed limit signs or the speedometer), resulting in more traffic violations. Including gender in the analysis resulted in similar findings.

In a follow-up regression analysis, we predicted only the number of traffic tickets and driving-related arrests people reported (range from 0 to 22, $M = 2.75$). This regression revealed, in addition to the main effect for attention-related RTs for positive congruent trials, a main effect for attachment anxiety, $\beta = .25$, $p = .03$, such that the higher one's anxiety the more likely he or she was to report having tickets or driving-related arrests. The model explained a significant amount of the variance, $R^2 = .25$, $p = .02$. This is in line with the findings of Taubman-Ben-Ari and Mikulincer (2007).

3.1.2. Crashes.

Like with traffic violations we had two different indexes for crashes, one for total number of crashes and one focusing on crashes that had serious consequences, such as an

injury, and were the driver's fault. First we examined the prediction of total number of accidents while driving. The regression revealed only a main effect for attention-related RTs for negative congruent trials, $\beta = .58$, $p = .012$, model $R^2 = .15$, such that people who pay more attention to negative words had more accidents. These results suggest that focusing on negative information (thus paying less attention to more emotionally neutral information) may be associated with ignoring or having less focus on driving, resulting in more accidents. Alternatively it may mean that people who tend to focus on negative information remember more negative information, including their accidents (i.e., similar cognitive bias in attention and recall).

We followed this with a regression predicting number of crashes that were the participant's fault and resulted with severe outcome such as an injury. The regression revealed a main effect for attachment avoidance, $\beta = .33$, $p = .009$, model $R^2 = .18$, such that higher avoidance was associated with reporting more crashes due to the participant's own fault.

3.2 Simulated driving scenarios.

We analyzed the data only from scenarios 2-4, while focusing on different indexes: in scenarios 2 and 3 we focused on collisions and speeding, whereas in scenario 4 we focused on lane violation.

3.2.1. Second Scenario (construction site with obstacles).

First we examined the number of collisions in the second scenario. There were no significant effects, probably due to the small variance in this variable (97% of the participants collided with the vehicle in this scenario). The regression predicting the percentage of time spent speeding revealed a main effect for positive congruent trials, $\beta =$

$-.55, p = .025$, model $R^2 = .15$, such that paying greater attention to positive cues (quicker RTs when the dot replaced the positive word) was associated with more speeding, as suggested by the self-report data.

3.2.2. Third Scenario (urban drive with load).

The regression analysis predicting collisions in the third scenario (only 28% of the participants collided with the backing car) did not meet significance for positive congruent trials, $\beta = -.44, p = .084$, but reflected a trend that paying greater attention to positive cues (quicker RTs when the dot replaced the positive word) was associated with more collisions. Although not significant, this tendency in results, conforms to our theoretical expectations. The regression analysis predicting speeding revealed a main effect for the patient driving style, $\beta = -.33, p = .028$, model $R^2 = .09$, such that being more patient was associated with less speeding.

3.2.3. Fourth Scenario (leisurely drive in the country).

Finally we examined sustained attention in the fourth scenario (the ability to stay in the lane in a 3-mile drive; ranged from 0-23 sec, with 74% of our participants staying in lane all the time). The regression analysis predicting lane violations revealed a main effect for attachment anxiety, $\beta = .27, p = .025$, model $R^2 = .19$; such that being high on attachment anxiety was associated with more lane violations (see Table 1 for betas and p values).

3.3. Summary of main results.

The current study focused on the role individual differences in attachment style—operationalized as levels of attachment anxiety and avoidance—play in reported and simulated driving performance, above and beyond driving style and cognitive biases

related to attention. As predicted, attachment style was related to some of the aspects of driving experience and behavior. Attachment anxiety predicted more lane violations in the simulator and getting more tickets or being arrested in real life. Attachment avoidance was associated with reporting more self-fault crashes. All of these results were obtained while the contribution of driving style and cognitive biases was partialled out from the analysis.

4. Discussion

The results for attachment anxiety are in line with previous work on attachment and risky driving, in which anxiously attached drivers were found to report more risky behavior. We found anxiously attached people to report more driving-related arrests and traffic tickets and also have more lane violations when driving a long drive. These findings are also similar to the behavior of drivers high in general anxiety, who have been shown to engage in various behaviors that can be construed as reckless, inappropriate, or dangerous (e.g., Matthews, Quinn, & Mitchell, 1998; Taylor, Deane, & Podd, 2007). Importantly though, our results are about relationship-related anxiety, rather than general anxiety, and hence offer new interventions as we discuss below.

Attachment avoidance predicted more (self-reported) crashes, and specifically crashes that were the driver's fault (as opposed to a crash due to something out of the drivers control) and resulted with severe outcomes—someone got injured. Potentially, this correlation may be the result of avoidant people caring less about others and hence getting into more car crashes. It may also be the case that avoidants do not care as much about what people think about them and therefore tend to report more about accidents that are their fault. This is an interesting finding, as avoidant people tend to have positive

views of themselves and avoid or suppress information that threaten them or their sense of self (Gillath, Karantzas, & Fraley, 2016). For example, Cassidy, Shaver, Mikulincer, and Lavy (2009) showed that people high on avoidance tend to dismiss hurtful events and inhibit expressions of distress. Mikulincer and Shaver (2005) further claim that avoidance is associated with a tendency to discourage acknowledgment of personal faults.

Nevertheless, avoidance was associated with reporting more crashes that were one's own fault, suggesting the report is not due to an avoidance-related bias in memory.

Scores on the driving style scale were associated with traffic violations (reckless DS), and the tendency to speed less in the simulator (marginally so in the third scenario). Scores on the dot probe task, and especially RTs on the positive congruent trials, were associated with the number of traffic violations, speeding (scenario 2), and collisions (scenario 3). Reported crashes were associated with RTs in the negative congruent trials.

Having more bias toward positive emotional information might suggest more focus on “fun/engaging” things rather than on what are perceived as “boring” driving rules. This in turn can explain why some drivers have more traffic violations and tend to speed. One may predict that emphasizing enjoyable, non-driving tasks could also lead to crashes, like rear-ending someone due to paying attention to the radio or phone instead of the road. However, it was mainly the attention to negative information that predicted crashes rather than attention to positive information, and as we mentioned earlier this might represent a cognitive bias related to both attention and memory.

The three different scenarios we utilized in the current study allowed us to test different aspects of driving. The second scenario allowed us to predict speeding, the third one, collision and speeding, and the fourth, lane violations. Furthermore, driving behavior

in each one of the scenarios was predicted by a different factor (although attention to positive cues came up in both the second and third [as a trend] scenarios). This suggests that particular driving scenarios may be best suited to assess different aspects of driving or personality variables of interest.

4.1. Application of the current work

The current results support the potential usefulness of personality and specifically attachment style for the study of driving performance. As noted in the introduction, personality variables have subtle but wide-ranging effects on basic cognitive and attentional processes that underlie driving performance. However, many of these effects, while reliable and detectable, are attenuated by other variables such as task demands. In the current work, we used a large set of measures, including reported driving history, self-report measures of personality dimensions, attention measures, and a driving simulator to better understand how these factors relate to one another.

While the current study has some strengths, there are limitations that should be considered when interpreting the results. Many of the variables included in the analysis were from self-report measures and may be subject to recall inaccuracy or bias. We also did not include a measure of time spent driving or usual mileage, which may contribute to driving-related outcomes (e.g., more time driving leading to more likelihood of accidents). Lastly, the amount of explained variance was rather small in the analyses implying that some important variables may be missing or that perhaps (some of the) driving scenarios were not optimally suited in eliciting personality-driven driving behaviors.

Despite these limitations, driver decision-making is the weak link in traffic safety. To fully understand the association between decision-making and driving performance, one should understand the contribution of personality variables on driving-related decisions. For example, work on the reasons underlying distracted driving (Atchley, Atwood, & Boulton, 2011; Nelson, Atchley, & Little, 2009) shows that people are not “rational actors” when it comes to decisions about engaging in behaviors they know to be dangerous. Recent research demonstrates that drivers rate driving while distracted by a cellular phone as being extremely dangerous, and they even say a driver who crashes because of distraction is more responsible for the crash than a drunk driver (Atchley, Hadlock & Lane, 2012). However, at the same time people engage in such behavior themselves at an alarmingly high rate. Understanding these behaviors and attributions requires that we better understand drivers' personalities and the role personality dimensions play in irrationality, driving performance, and negative outcomes such as reckless driving and poor driving performance. Our findings suggest that attachment style may be one key to understanding these issues.

The importance of understanding driver personality has implications not just for the prediction of driving performance, but also for safety campaigns. The work of Ulleberg (2001) demonstrates that drivers' personality style affects drivers' reaction to messages about traffic safety. Whereas many safety campaigns focus on attitudes—as attitudes being one of the most significant predictors of driving behavior (e.g., Iversen, 2004)—research shows that the highest crash risk group has personality traits that result in the least favorable reactions to traffic safety appeals (Ulleberg & Rundmo, 2003). Learning how to best design appeals requires a more thorough understanding of how

strategic communication campaigns will be perceived by drivers with different personalities, or as shown here, different attachment styles.

For example, people high on attachment anxiety, who were found to have more lane violations, tend to focus their attention on emotional or relationship-related content. Safety campaigns can take advantage of that and relay a message in a way that would be appealing to these people. Recent marketing work by Vlachos and colleagues (2010) suggests that tailoring messages toward decreasing attachment anxiety may be an effective way to reach consumers (see also work Williams, 2013). Thus, safety campaigns that use images and concepts that focus on improving relationship security (e.g., a happy family driving safely in a car) may increase attitude change and driving performance among the risky drivers. Showing drivers how their choices can improve the security of their family and friends, may be more effective than campaigns that rely upon appealing to their own personal security. Future work is needed to examine whether such strategies can produce gains in pro-safety attitudes.

4.2 Conclusion

Overall, the current work was quite successful at identifying predictors of detrimental driving behavior by drawing associations with specific personality styles and cognitive strategies involving attentional bias. While the results were encouraging, one must keep in mind that they represent only a small subset of possible variables. Other factors such as memory, motor control, and multitasking frequency might add additional explanatory and predictive power. That said, the current study showed that using self-reports of well-validated personality traits such as attachment style combined with a cognitive task, provided means to assess driving behavior, in a way that is easy and

inexpensive to administer, relatively easy to interpret, and can have meaningful and practical implications .

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Figure captions

Figure 1 (a and b): Screen capture of the cognitive task.

Figure 2: Screen Shot of Scenario 3 in the simulator

Figure 1a: The words “intimate” and “table” presented for 500ms.

Figure 1b: The dot replaces the word “intimate”

Figure 2: Screen Shot of Scenario 3 – Neighborhood Drive

Table 1: Predictors of Speeding and Lane Violations in Scenarios 2-4

DV Predictor	Scenario 2 % time speeding		Scenario 3 % time speeding		Scenario 4 lane violations	
	β	p	β	p	β	p
Step 1						
(Constant)		.957		.002		.420
RecklessDS	-.011	.947	-.134	.408	.012	.939
AnxiousDS	.167	.140	-.014	.896	.185	.091
AngryDS	.003	.985	-.025	.856	-.089	.512
PatientDS	-.024	.874	-.329	.028	-.261	.074
Step 2						
(Constant)		.325		.020		.483
RecklessDS	-.014	.933	-.144	.385	.019	.906
AnxiousDS	.127	.280	-.050	.676	.192	.105
AngryDS	.054	.706	.009	.953	-.090	.529
PatientDS	.042	.777	-.309	.045	-.237	.114
PosIncongruent	.237	.270	.019	.930	.008	.972
PosCongruent	-.551	.025	-.153	.538	-.247	.308
NegIncongruent	.181	.390	-.048	.824	.250	.235
NegCongruent	.301	.187	.232	.318	-.033	.884
Step 3						
(Constant)		.362		.023		.477
RecklessDS	-.031	.849	-.157	.350	.059	.712
AnxiousDS	.141	.266	-.025	.847	.118	.340
AngryDS	.063	.663	.012	.934	-.101	.470
PatientDS	.030	.845	-.326	.040	-.188	.205
PosIncongruent	.225	.299	.019	.932	.009	.967
PosCongruent	-.539	.030	-.140	.576	-.284	.233
NegIncongruent	.170	.422	-.050	.818	.258	.211
NegCongruent	.304	.187	.226	.339	-.014	.950
Anxiety	-.138	.250	-.089	.471	.266	.025
Avoidance	.067	.595	-.002	.988	.002	.987

DS=driving style (self-reported); Reaction time to dot-probe task:

PosIncongruent=incongruent trials with positive emotion word; PosCongruent=congruent trials with positive emotion word; NegIncongruent=incongruent trials with negative emotion word; NegCongruent=congruent trials with negative emotion word; Anxiety/Avoidance=self-reported attachment anxiety and avoidance