

INDIVIDUAL AND CONTEXTUAL FACTORS THAT MODERATE THE UTILITY OF ROAD SAFETY MEASURES: APPLYING THEORIES OF SELF REGULATION TO CHARACTERIZE FOUR RISK PROFILES

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Abstract - This paper presents a framework that applies models of self regulation, including personality system interaction theory and the concept of optimal self esteem, to augment the theory of planned behavior. This framework is used to characterize four clusters of individuals, each demonstrating a unique profile of risky behaviors and dispositional characteristics. First, some individuals primarily engage in behaviors that align with the norms of their peers. In contrast, other individuals ensure their behavior concords with their personal attitudes; their behavior is less contingent upon legal policies and enforcement. Third, some motorists deliberately engage in hazardous activities, primarily to foster positive affect. Finally, some individuals do not feel they can override habitual behaviors, such as exceeding speed limits. The dispositional characteristics that coincide with each cluster are also delineated. Furthermore, the leadership structures, marketing campaigns, and mentoring programs that should be directed towards each cluster are discussed.

Keywords: Leadership; Risky driving; Self esteem; Self regulation

INTRODUCTION

Many insightful, inventive, and effective psychological initiatives have been instituted to curb the incidence of risky behavior, with the goal of reducing road trauma (for recent discussions, see Asche & Aven, 2004; Elvik, 2004; Lu, 2006). These measures are intended to oblige or encourage road users to act carefully and cautiously. Implicit in this objective is the assumption that individuals must regulate their own behavior, overriding their occasional inclination to behave recklessly. Insight into the mechanisms that underpin self regulation, therefore, would enable practitioners to characterize the measures that will most likely encourage

suitable behavior. Yet, discourse on psychological safety measures are seldom informed by comprehensive theories of self regulation.

Within the road safety domain, some scholars and practitioners have invoked the theory of planned behavior to defend their recommendations (e.g., Bergen, 1994; Budd, North, & Spencer, 1984; Elliott & Armitage, 2006). This theory assumes that behavior is mediated by the intentions, or deliberate plans, of individuals (Ajzen, 1985, 1991). These intentions only partly reflect the personal attitudes of individuals—the extent to which they perceive this act favorably. Apart from attitudes, these intentions are also contingent upon the extent to which significant individuals, such as family or friends, would approve this act, called subjective norms (Ajzen, 1985, 1991). Furthermore, individuals will intend only to engage in acts they feel they are able to implement, referred to as perceived behavioral control (Ajzen, 1991). To illustrate, Elliott, Armitage, and Baughan (2003) revealed the drivers were more likely to exceed the speed limit if they perceived this act as appropriate, presupposed that family or friends would sanction this behavior, and assumed they could maintain this speed safely.

The theory of planned behavior, however, does not explicate the motivational, affective, and cognitive mechanisms that underpin self regulation. Consequently, the factors that amplify or inhibit the effect of attitudes, norms, or perceived control on intentions and behavior, such as the mood of individuals or the policies of a society, have been explored sporadically (e.g., Conner, Povey, Sparks, James, & Shepherd, 2003; Conner, Sheeran, Norman, & Armitage, 2000; Fazio & Williams, 1986), but not delineated comprehensively (for a meta-analysis, see Cooke & Sheeran, 2004). To illustrate the importance of these factors, recent research implies that attitudes do not shape intentions or behavior in some contexts—especially when concrete incentives are offered to sway the decisions of individuals (e.g., Baumann, & Kuhl, 2005a), which limits the extent to which the theory of planned behavior is applicable to road safety issues.

To redress these shortfalls, this paper applies a comprehensive model of self regulation, called personality systems interaction (PSI) theory (Kuhl, 2000), to road safety. Julius Kuhl, who formulated, substantiated, and promulgated this theory with several collaborators (e.g., Baumann, Kaschel, & Kuhl, 2005; Bolte, Goschke, & Kuhl, 2003; Kazén, Baumann, & Kuhl, 2003), delineated four cognitive systems that operate in concert to regulate the emotions, motivation, cognition, and behavior of individuals. In this paper, excessive activation of each system will be argued to foster a specific profile of risky behaviors in drivers.

This paper will pursue three objectives. First, the constellation of risky behaviors that correspond to each system, as well as the proximal factors that promote these acts, will be specified. This discussion will uncover four clusters of individuals, each demonstrating a distinct profile of risky behavior. Second, the broader dispositional characteristics of each cluster will be delineated. This depiction will enable authorities and practitioners to identify these clusters and develop targeted initiatives. Third, for each cluster, the initiatives that are most likely to curb risky behavior will be described. Initiatives at the level of individuals, groups, organizations, and societies will be presented.

1. PERSONALITY SYSTEMS INTERACTION THEORY

According to PSI theory, two of the cognitive systems that underpin self regulation—*object recognition* and *extension memory*—inhibit one another (Baumann & Kuhl, 2005a). When individuals experience agitation, anxiety, or irritability—often referred to as negative affect—object recognition is activated (Kuhl, 2000; Kazén, Baumann, & Kuhl, 2003). These emotions imply that threats or problems might be looming in the environment. To detect and characterize these threats, the object recognition system distills patterns, such as verbal directives, from stimuli that impinge on the sense organs (Kuhl, 2000). These patterns preserve some of the physical properties of the immediate environment, but amplify any deviations from expectations, which may represent potential threats. When this system is activated, the behavior of individuals is partly or wholly governed by social expectations, including rules, policies, norms, and incentives, as well as other stimuli in the environment (Baumann, et al., 2005; Baumann & Kuhl, 2002, 2003).

When these negative emotions dissipate, extension memory is activated, and object recognition is inhibited. Extension memory can be conceptualized as an amalgam of unconscious or intuitive associations with the self (Kuhl, 2000). This vast network, in essence, represents core and enduring values, desires, intuitions, and inclinations (Kuhl, 2000)—inclinations that individuals, over time, have learnt will optimize success in similar contexts. When this system is activated, the behavior of individuals is more likely to align with their core, unconscious values, desires, and inclinations (Baumann, et al., 2005).

If individuals cannot temper their anxiety, agitation, or irritability—a tendency referred to as failure related state orientation (Kuhl, 1981; Kuhl & Beckman, 1994)—extension memory is often inhibited or obstructed. Hence, these individuals cannot utilize their vast network of unconscious inclinations and implicit knowledge to guide their behavior. Instead, tangible objects and social constructions, such as peer pressure or reward structures, are more likely to govern their choices and acts (Baumann & Kuhl, 2005a).

Many studies have been conducted to differentiate object recognition and extension memory as well as to verify the purported role of negative affect (e.g., Baumann & Kuhl, 2002; Bolte et al., 2003). One series of studies, conducted by Bolte et al. (2003) for example, demonstrated that individuals can more readily apply their intuition to solve word puzzles—a capacity that presumably reflects extension memory—as negative affect abates. In particular, participants received three words that correspond to the same theme. This theme, however, was not specified explicitly. The task was to guess whether a fourth term was related to this theme. Participants in a negative mood did not perform this task proficiently. As their adverse emotions dissipated, however, even participants who could not verbalize the common theme performed this task effectively. Conceivably, as the mood of these participants improved, they could more readily access the unconscious network of associations that corresponds to extension memory, enabling these individuals to intuit whether or not the set of words was related to a common theme.

The other two systems that underpin self regulation—*intention memory* and *intuitive behavioral control*—also inhibit each other (Kuhl, 2000). These two systems were originally formulated to accommodate the established observation that depression enhances the memory, but thwarts the execution, of intentions (Kuhl, 2000). When individuals experience feelings of dejection and gloom, often called low positive affect, intention memory is activated. These emotions imply that individuals have not fulfilled their hopes or aspirations (Higgins, 1987) and, hence, must change their behavior and override their natural inclinations. Intention memory is utilized to formulate and to store plans that override these natural sequences of behaviors (Goschke & Kuhl, 1993; Kuhl & Kazen, 1999). This system is manifested as reflective, rather than impulsive, behavior.

If these intentions or plans seem plausible, individuals feel they might fulfill their aspirations. Positive affect, manifested as cheerful enthusiasm (Higgins, 1987), is thus experienced. As positive affect rises and individuals feel more enthusiastic and inspired, intention memory is inhibited and intuitive behavioral control is activated instead. Intuitive behavioral control executes the intentions that were formed, initiating automatic sequences of sensory, verbal, and motor processes that do not need to be regulated consciously (Kuhl, 2000). These automatic sequences are utilized to integrate multiple sources of information and coordinate complex responses. Individuals who cannot foster this positive affect—a tendency referred to as dynamic related state orientation (Kuhl, 1981; Kuhl & Beckman, 1994)—cannot readily initiate these plans (Kuhl & Kazen, 1999).

Recent studies have demonstrated the relationship between intention memory and intuitive behavioral control, underscoring the role of positive affect. In one illuminating study, positive affect was shown to eliminate Stroop interference under some conditions (e.g., Kazen & Kuhl, 2005). According to PSI theory, positive affect inhibits intention memory and activates intuitive behavioral control, enabling individuals to execute their intention to name the colors rather than read the words (Kazen & Kuhl, 2005).

Finally, intention memory also inhibits extension memory (Kuhl, 2000), and hence the formulation of complex plans can also obstruct access to core inclinations. Nevertheless, more than one system can be active at any one time, at least to some extent. Furthermore, the pattern of activation across these systems can vary rapidly over time.

2. SELF DISCREPANCY THEORY

According to PSI theory, negative and positive affect activate and inhibit various cognitive systems. Self discrepancy theory, propounded by Higgins (1987), has not been integrated with PSI theory in past research but nevertheless provides an insight into the source of these affective states, providing a vital insight into the factors that moderate the systems of self regulation (see also Higgins, 1989, 1999; Higgins, Klein, & Strauman, 1985; for a related theory, see Carver & Scheier, 1990, 1998).

Self discrepancy theory depicts the development of cognitive processes that underpin negative and positive affect. This theory begins with the assumption that children learn the duties and responsibilities they must satisfy to elude punishment, defined as sudden adverse events, including the scolding of a parent. As they develop, these insights evolve to form an abstracted set of principles or standards, called an *ought self guide*. If individuals feel they have violated these principles, and thus failed to satisfy this guide, they experience an impending sense of punishment, manifested as a sense of agitation and anxiety (Higgins, 1987; Strauman, 1989;

Strauman & Higgins, 1987), corresponding to the concept of negative affect (Watson, Clark, & Tellegen, 1988; Watson & Tellegen, 1985).

At the same time as they develop this ought self guide, children also learn the achievements and aspirations they must realize to secure approval, love, affection, and other rewards. As they mature, these principles are abstracted and refined to form a set of standards called the *ideal self guide*. When individuals feel they have not fulfilled these aspirations, they anticipate a gradual withdrawal of this approval, love, or affection. This mounting sense of loss is manifested as a feeling of dejection, disappointment, and dissatisfaction (Higgins, 1987; Strauman, 1989; Strauman & Higgins, 1987)—comparable to a decline in positive affect (Watson et al., 1988; Watson & Tellegen, 1985). Consistent with these premises, a variety of correlational (e.g., Burke & Harrod, 2005; Higgins, Bond, Klein, & Strauman, 1986; Higgins et al., 1985) and experimental (e.g., Higgins et al., 1986; for reviews, see Boldero & Francis, 1999; Higgins, 1999) studies have shown that agitation, rather than dejection, is most likely to ensue when individuals feel they have not satisfied their duties and responsibilities. In contrast, dejection prevails when individuals feel they have not fulfilled their achievements and aspirations (see Boldero, Moretti, Bell, & Francis, 2005, for some statistical caveats).

Significant figures in the lives of children, such as parents or teachers, can apply punitive actions or withdrawal rewards to moderate the behavior of children. If these authority figures rely on punishment, the children evolve to become more driven to satisfy their ought rather than ideal self guide, called a *prevention focus* (Higgins, 1997, 1998). Individuals who adopt a prevention focus strive to satisfy duties, focusing primarily on avoiding errors or redressing shortfalls rather than pursuing aspirations or facilitating growth (Higgins, 1997, 1998). If authority figures instead rely on the withdrawal of affection, these children evolve to become more inspired to pursue their ideal rather than ought self guide, called a *promotion focus* (Higgins, 1997, 1998). They pursue their hopes and aspirations, focusing their attention on future growth rather than immediate shortfalls. The relative activation of the ought and ideal self guide, referred to as regulatory focus, does not only depend on these developmental processes but can vary across contexts. Regulatory focus, for example, depends on whether individuals are instructed to consider their duties or aspirations (e.g., Forster, Higgins, & Idson, 1998; Freitas, Liberman, & Higgins, 2002).

3. OPTIMAL SELF ESTEEM

Self discrepancy theory depicts the origin of negative and positive affect, and these mood states activate or inhibit the cognitive systems that underpin self regulation. Kuhl (2000), however, also contends that some other factors, apart from mood states, can also affect the level at which these cognitive systems are activated.

The notion of optimal self esteem, proposed by Kernis (2003), characterizes some of the developmental pathways, contextual forces, and individual characteristics that activate or inhibit access to extension memory. This theory begins with the proposition that high self esteem can be either fragile or secure. If fragile rather than secure, the self esteem of individuals is primarily contingent upon their success or achievements in various domains (cf., Crocker, 2002; Crocker & Wolfe, 2001; Deci & Ryan, 1985, 1995). The self esteem of these fragile individuals, therefore, can plummet if they fail to realize important goals. Accordingly, their self esteem can vary appreciably across time (Kernis, Greenier, Herlocker, Whisenhunt, & Abend, 1997; Kernis, Jadrach, Stoner, & Sun, 1996; Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000). When self esteem is unstable, individuals are less certain of their virtues and vices; they are unsure of whether they are proficient or deficient in a particular domain (Campbell, 1990; see also Bui & Pelham, 1999). Because of this uncertainty, they can more readily distort their self concept; they can bias their memory, attention, and appraisals to inflate their qualities and trivialize their shortcomings (Kernis, 2003).

When the self esteem of individuals is variable (Kernis et al., 1997) or the self concept is distorted—divergent from their actual experiences and competencies (Jordan, Spencer, & Zanna, 2003; Kernis, Abend, Goldman, Shrira, Paradise, & Hampton, 2005)—responses to threats tend to be defensive. That is, individuals become especially irritated, frustrated, or agitated in response to negative feedback, such as criticism, or other threats and demands, such as an escalation in responsibilities. These responses indicate the individuals cannot regulate their negative affective states effectively, which represents a failure related state orientation (Kuhl, 1981; Kuhl & Beckman, 1994), and thus diminishes access to extension memory (Kuhl, 2000).

Kernis (2003) posits four contexts or factors that promote an optimal self esteem—and thus facilitate access to extension memory. The first three factors seem to increase the sensitivity of individuals to their intuitive or emotional inclinations—inclinations that are represented in extension memory (Kuhl, 2000). Specifically, in some work contexts, individuals are granted opportunities to pursue their core values or to express the emotions and feelings they would usually conceal. These opportunities encourage individuals to access the unconscious

networks in which these core values and private emotions are represented. In other contexts, however, individuals might be obliged to disregard their core values and follow prescribed routines or conventions. Likewise, they might feel compelled to conceal, rather than reveal, their private emotions and concerns. These individuals eventually disengage from their intuitive inclinations, becoming less inclined to demonstrate *private self consciousness*—the tendency to reflect upon subjective experiences and mental states (Fenigstein, Scheier, & Buss, 1975).

Kernis (2003) does not explicitly apply the term extension memory to describe these intuitive inclinations. He does, however, contend that autonomy, emotional disclosure, and private self consciousness facilitate access to unconscious values, desires, and needs—all features of extension memory.

Apart from the forces that facilitate access to these intuitive inclinations, Kernis (2003) also posits another factor that precludes biased processes: an impartial, flexible cognitive style (e.g., Baron, 1985), sometimes referred to as decontextualized thinking (see Sa, West, & Stanovich, 1999; Stanovich, 1999; Stanovich & West, 1997, 1998a, 1998b, 1999). Specifically, some individuals are inclined to question their assumptions rather than maintain their preconceptions. In many environments, however, conviction and certainty are rewarded, and thus individuals feel less motivated to challenge their beliefs and assumptions (Stanovich & West, 1997). These individuals are more likely to remain oblivious to their biases. These individuals, therefore, can readily subjugate intuitive doubts about themselves, to boost their self esteem (e.g., Kernis, 2003; Vaillant, 1992). Hence, they often experience a divergence between their positive conceptualization of themselves and their negative experiences, which provokes fragile, defensive behavior (Kernis, 2003). In short, this framework implies that autonomy, emotional disclosure, private self consciousness, and unbiased cognitive styles all promote or reflect privileged access to extension memory.

4. OBJECT RECOGNITION

PSI theory, when assimilated with self discrepancy theory and the concept of optimal self esteem, implies that four cognitive systems underpin self regulation. When individuals feel they have not satisfied their duties or responsibilities, negative affect escalates, and object recognition is activated. When individuals feel they have not fulfilled their hopes and aspirations, positive affect dissipates, intention memory is activated, and intuitive behavioral control is inhibited. Furthermore, autonomy, emotional disclosure, private self consciousness, and unbiased cognitive styles all promote or reflect privileged access to extension memory. The following sections derive hypotheses from PSI theory, self discrepancy theory, and optimal self esteem that could inform and improve road safety countermeasures.

4.1. Risk profile that corresponds to object recognition

Intense activation of a particular system will most likely generate a specific profile of risk behavior in the driving domain. For example, excessive activation of object recognition will tend to amplify susceptibility to peer pressure. To demonstrate, recent studies indicate that persistent activation of object recognition fosters an inclination in individuals to follow social expectations and neglect core needs. In one study conducted by Baumann and Kuhl (2005a), for example, participants were encouraged to complete a monotonous task. Half the participants were promised a reward if they completed this activity diligently. The other participants were instead told the task was germane to the progress of society, an appeal that was intended to relate this activity to the core values of individuals. In addition, participants were asked to evaluate the extent to which they can regulate negative affect. The prospect of rewards was more likely to facilitate concentration, but only in participants who cannot temper negative affect, an inclination that reflects undue activation of object recognition. These findings indicate that object recognition fosters sensitivity to social constructions, such as tangible rewards, to the detriment of core values.

Individuals who adhere to social expectations, conventions, and pressures might often feel more obliged to follow enforced regulations. Nevertheless, these individuals are also more susceptible to the expectations and demands of their peers. They become increasingly likely to violate their legal obligations if these infringements are sanctioned or encouraged by their peers. In this context, peers represent the members of any social collective with which individuals identify at that time—colleagues in a workgroup or teammates in a sporting club, for example (cf., Tajfel & Turner, 1979). These violations might not always compromise road safety but, nevertheless, might undermine the capacity of authorities to regulate the behavior of drivers. Accordingly:

Proposition 1. Individuals should be more likely to breach traffic regulations if their peers approve, rather than condemn, these violations, especially when the system of object recognition is activated persistently.

4.2. Dispositional characteristics that correspond to object recognition

To curb the vulnerability to peer pressure, practitioners need to identify populations in which object recognition is activated persistently or intensely. To identify these populations, some overt characteristics that manifest object recognition must be delineated. These characteristics can be readily derived from PSI theory (Kuhl, 2000), at least when coupled with self discrepancy theory (Higgins, 1987) and the concept of optimal self esteem (Kernis, 2003). First, Kuhl (2000) argues that object recognition tends to coincide with negative affect. Thus:

Proposition 2. Anxiety, agitation, and irritability should be more pronounced when object recognition is activated. Accordingly, when these mood states are frequent or pronounced, individuals should be especially likely to breach traffic regulations if their peers approve, rather than condemn, these violations.

Second, the factors that impede access to extension memory, as delineated by Kernis (2003), also reflect activation of object recognition. Autonomy, emotional disclosure, private self consciousness, or impartial cognitive styles should curb fragility and activate extension memory, which in turn tends to inhibit object recognition (Kuhl, 2000). Any decline in autonomy, emotional disclosure, private self consciousness, or impartial cognition, therefore, will coincide with more intense activation of object recognition.

Nevertheless, factors that impede access to extension memory might primarily activate intention memory rather than object recognition. In particular, inhibition of extension memory will most likely activate intention memory when individuals adopt a promotion focus. In these instances, individuals strive to comply with the ideal self guide (Higgins, 1997). Failures will, therefore, tend to curb positive affect (Higgins, 1987)—a mood state that activates intention memory (Kuhl, 2000; Kuhl & Kazen-Saad, 1988). In contrast, inhibition of extension memory will most likely activate object recognition when individuals adopt a prevention focus. In these circumstances, individuals attempt to satisfy their ought self guide (Higgins, 1987, 1997), and failures will provoke negative affect and thus activate object recognition (Kuhl, 2000). Thus:

Proposition 3. Autonomy, emotional disclosure, private self consciousness, and impartial cognition should be inversely related to the activation of object recognition, especially if individuals adopt a prevention focus. Hence, when autonomy, emotional disclosure, private self consciousness, and impartial cognition are pronounced, individuals should be especially likely to breach traffic regulations if their peers approve, rather than condemn, these violations.

4.3. Pertinent initiatives when object recognition is activated excessively

The previous section characterized the factors that reflect object recognition and, thus, amplify sensitivity to peer pressure. To redress these risks, authorities might introduce programs that are intended to curtail peer pressure or offset the optimism bias. Individuals who detach themselves from their peers might experience negative affect (see also Leary, 1990). They will become less inclined to feel they have satisfied their duties and responsibilities, provoking agitation and anxiety (Higgins, 1987). These mood states will merely amplify object recognition and exacerbate the concomitant risk factors (Kuhl, 2000).

Instead, authorities and practitioners should attempt to institute practices or programs that facilitate access to extension memory and thus inhibit object recognition. They should consider the four factors, as posited by Kernis (2003), that facilitate this access to extension memory: the pursuit of core values, emotional disclosure, private self consciousness, and impartial cognition. These factors, however, cannot be readily cultivated in organizations and societies that champion the importance of incentive schemes, emotional resilience, and unmitigated conviction. Arguably, only the most potent leaders could curb these values.

A recent model of exemplary leadership, expounded by Rafferty and Griffin (2004), characterizes some of the behaviors that could promote factors that inhibit object recognition. This model depicts the behavior of transformational leaders—leaders who inspire employees to pursue goals that transcend egocentric interests but instead emphasize collective values and future objectives (see Bass, 1985; Bass & Avolio, 1994, 1997, 2000). Rafferty and Griffin delineate five clusters of behaviors that transformational leaders demonstrate. First, these leaders promulgate an inspiring, unifying direction for the future, called *vision*. Second, they exhibit an understanding and appreciation of the concerns, needs, and hopes of employees, designated as *supportive leadership*. Third, these leaders encourage employees to challenge traditional processes, procedures, and assumptions and instead to consider creative, original solutions, called *intellectual stimulation*. Furthermore, these

leaders underscore the strengths and virtues of their employees to instill a sense of pride, called *inspirational communication*, as well as extol excellent work, referred to as *personal recognition*.

Visionary leaders are likely to encourage employees to pursue their core values. These leaders emphasize the moral significance of the goals and objectives they promulgate (Bass, 1985). Baumann and Kuhl (2005a) revealed that authorities who underscore the broader societal and ethical implications of goals activate extension memory and inhibit object recognition. Consistent with this argument, charismatic leaders have been shown to foster a state of self concordance (Bono & Judge, 2003) in which individuals feel the tasks they undertake align with their core values (Sheldon & Elliott, 1998, 1999).

In addition, supportive leaders are likely to promote emotional disclosure. Specifically, these leaders will tend to cultivate the trust that is necessary to encourage emotional expression in employees (Rafferty & Griffin, 2004), and this emotional expression facilitates access to intuitive inclinations (Kernis, 2003), activates extension memory, and inhibits object recognition (Kuhl, 2000). Recent findings, indeed, imply that leaders who divulge their own emotions might foster similar disclosures in their employees (e.g., Curci & Bellelli, 2006).

Finally, leaders who engage in intellectual stimulation are likely to foster impartial, unbiased thinking styles. These leaders encourage employees to challenge their assumptions and question their beliefs (Bass, 1985; Rafferty & Griffin, 2004). This practice corresponds to the cognitive style that minimizes the incidence of cognitive bias (Sa et al., 1999; Stanovich & West, 1997). As these biases dissipate, fragility subsides, ultimately enhancing access to extension memory (Kernis, 2003).

In short, practitioners and authorities need to cultivate optimal leadership practices in corporate bodies, government agencies, community associations, sporting organizations, and other societal structures. Leaders who promulgate an inspiring vision, offer emotional support, and encourage followers to challenge extant practices are likely to inhibit object recognition and curb the corresponding risk behaviors. The inhibition of object recognition, and the concomitant activation of extension memory, tends to amplify many other desirable characteristics as well, such as flexibility (Baumann & Kuhl, 2005b), creativity (Bolte et al., 2003), and judicious decision making (Baumann & Kuhl, 2003)—and thus is beneficial in many domains outside the driving context.

Proposition 4. When leaders are visionary, supportive, and intellectually stimulating, individuals should be especially likely to breach traffic regulations if their peers approve, rather than condemn, these violations.

Proposition 5. Visionary, supportive, and intellectually stimulating leadership should be inversely related to the level of anxiety, agitation, and irritability in followers.

5. EXTENSION MEMORY

5.1. Risk profile that corresponds to extension memory

The previous section advocated a series of initiatives that could facilitate access to extension memory. As a consequence of this access, fragility abates, resilience thus improves, resistance to criticism diminishes, openness to change escalates, and anger or aggression dissipates (Kernis, 2003). Furthermore, when extension memory is activated, individuals strive to fulfill their core goals and values. Acts that compromise the health and safety of these individuals, therefore, will tend to be shunned (see Baumann, et al., 2005).

Nevertheless, persistent activation of extension memory and inhibition of object recognition can provoke some complications. In this state, the behavior of individuals is relatively impervious to tangible reward structures and social constructions (Baumann & Kuhl, 2005a). Legislative amendments, policy changes, and enforcement practices are unlikely to impinge significantly on the behavior of these individuals in the driving domain. Instead, when extension memory is activated persistently and intensely, behavior is mostly governed by the personal attitudes of individuals and not the norms that pervade the environment. Individuals who feel that safety regulations are superfluous, therefore, are likely to breach these rules. Accordingly:

Proposition 6. Individuals are more likely to breach traffic regulations if they adopt unfavorable, rather than favorable, attitudes towards these rules, especially when extension memory is activated intensely.

5.2. Dispositional characteristics that correspond to extension memory

Authorities and practitioners in the domain of road safety need to ensure that individuals who rely on extension memory to govern their behavior adopt favorable attitudes towards safety practices. These practitioners, therefore, must be cognizant of the characteristics that manifest extension memory. According to the concept of optimal self esteem, autonomy, emotional disclosure, private self consciousness, and impartial cognition facilitate access to the core, intuitive inclinations that epitomize extension memory (Kernis, 2003). Thus:

Proposition 7. Autonomy, emotional disclosure, private self consciousness, and impartial cognition should be positively related to the activation of extension memory. Hence, when these factors are pronounced, individuals should be especially likely to breach traffic regulations if they adopt unfavorable, rather than favorable, attitudes towards these rules.

5.3. Pertinent initiatives when extension memory is activated excessively

When extension memory is activated, practitioners need to ensure that individuals adopt favorable attitudes towards traffic regulations. That is, they need to ensure that individuals genuinely regard safe practices as important. The perceived importance of traffic regulations and policies does not always align with more objective indices of utility. Practitioners must, therefore, implement practices that inflate the perceived importance of specific safety measures.

According to the concept of regulatory fit (Higgins, 2000), the perceived importance of some activity, such as a safety measure, is partly a function of whether individuals are encouraged to adopt an eager or vigilance orientation to pursue this goal. Using the nomenclature of signal detection theory, eagerness refers to a focus on hits or gains rather than false alarms or losses (Crowe & Higgins, 1997). The message “You could accumulate \$500 a year if you reduced your driving speed”, for example, emphasizes potential gains. Vigilance refers to a focus on false alarms or losses instead (Crowe & Higgins, 1997). The message “You could avoid the loss of \$500 a year if you reduced your driving speed”, for example, emphasizes attempts to curb losses rather than secure gains.

If individuals adopt a promotion focus, they experience a sense of congruence, called *regulatory fit*, when eagerness is encouraged (Higgins, 2000). If individuals adopt a prevention focus, however, they experience regulatory fit when vigilance is encouraged (Higgins, 2000). This affective experience bestows a sense of importance, even morality (Camacho, Higgins, & Luger, 2003), upon the message or goal (see Freitas, et al., 2002; Higgins, Idson, Freitas, Spiegel, & Molden, 2003). Thus:

Proposition 8. Safety messages that emphasize practices that secure gains, rather than curb losses, are especially likely to be evaluated favorably when individuals adopt a promotion focus.

Proposition 9. Safety messages that emphasize practices that curb losses, rather than secure gains, are especially likely to be evaluated favorably when individuals adopt a prevention focus.

The utility of regulatory fit has been demonstrated in several studies (e.g., Freitas et al., 2002; Higgins et al., 2003; Moss, Ritossa, & Ng, 2006). Recent work has extended this concept of fit to other traits. For example, the benefits of collective pronouns (e.g. “we”) rather than personal pronouns (e.g. “I”) in messages depends on the self construal of individuals (Agrawal, & Maheswaran, 2005). Individuals who conceptualize themselves as attached to a broader social identity are more likely to embrace messages that use collective pronouns (Agrawal, & Maheswaran, 2005). Individuals who conceptualize themselves as autonomous—detached from their social context—are more likely to embrace messages that use personal pronouns (Agrawal, & Maheswaran, 2005).

6.0 INTENTION MEMORY

6.1. Risk profile that corresponds to intention memory

According to Kuhl (2000), the relative activation of extension memory and object recognition primarily depends on the level of negative affect that individuals experience. In contrast, the relative activation of intention memory and intuitive behavioral control primarily depends on positive affect. As positive affect dwindles, intention memory is activated. Individuals become more reflective and considered, generating complex plans and intentions.

During this process, individuals might construct a mental image of themselves in the future. According to self discrepancy theory, this image, if aligned to the hopes, aspirations, and ideals of the individual, will temper

positive affect (Higgins 1987), activate intuitive behavioral control, and execute the intentions (Kuhl, 2000). In some instances, however, individuals do not feel confident they can implement these plans. Their perception of themselves continues to diverge from their aspirations. Their sense of gloom, dejection, or dissatisfaction persists (Higgins, 1987), and intention memory remains activated (Kuhl, 2000).

This enduring activation of intention memory, which coincides with diminished levels of positive affect, could amplify risks in particular driving situations. First, some of these individuals will resign themselves to an enduring sense of dejection. This mood state inhibits intuitive behavioral control and thus impairs the capacity of individuals to monitor, process, and integrate multiple sources of stimuli and to generate suitable responses (Kuhl, 2000). The performance of drivers deteriorates, especially when many signals and objects in the environment need to be considered.

This decrement should be especially pronounced in drivers who are not experienced or skilled. In these drivers, complex and coordinated sequences of automatic action tendencies have not been developed extensively. These drivers, thus, must formulate many explicit intentions to coordinate their motor responses. The inability to execute these intentions, therefore, should disproportionately impair the driving performance of unskilled motorists. Hence:

Proposition 10. The performance of drivers deteriorates in complex, relative to simple, environments, especially when intention memory is activated and drivers are unskilled.

Not all individuals, however, will resign themselves to an enduring sense of dejection (Kuhl, 1981). Nevertheless, if these individuals are not confident in their capacity to fulfill their aspirations—the principal source of dejection—few avenues are available to overcome this mood state. A low state self-esteem (Leary, 1990), which is assumed to reflect a perceived inability to realize hopes and aspirations (Endo, 1992; Higgins, 1987), will thus correspond to persistent gloom and dejection (Higgins, 1987).

Personality systems interaction theory, however, does stipulate one option that individuals could pursue to improve their mood. In particular, Kuhl (2000) contends that intuitive behavioral control can foster positive affect. Individuals who are somehow able to activate this system, despite their dejection, will experience an increasing sense of elation. To activate intuitive behavioral control, individuals must embroil themselves in situations that demand this system. Situations in which individuals must rapidly process and assimilate many sources of information, as well as execute complex responses, are likely to invoke intuitive behavioral control and thus foster positive affect (Kuhl, 2000). Hazardous activities, such as exceeding the speed limit by 20 km per hour, will tend to demand the integration of multiple signals during a confined duration, thereby activating intuitive behavioral control and promoting positive affect. Hence:

Proposition 11. When the state self-esteem of individuals, as defined by Leary (1990), is low rather than high, individuals will subsequently be more likely to demonstrate sensation seeking behavior.

6.2. Dispositional characteristics that correspond to intention memory

Several characteristics are likely to reflect disproportionate activation of intention memory. First, as Kuhl (2000) maintains, intention memory coincides with limited levels of positive affect, which in turn corresponds to a low self-esteem (Endo, 1992; Higgins, 1987). Accordingly:

Proposition 12. Dejection, disappointment, and dissatisfaction should be more pronounced—and state self-esteem should be diminished—when intention memory is activated. Therefore, the performance of drivers should deteriorate in complex, relative to simple, environments especially in motorists who often endure dejection and report a low self-esteem. In addition, sensation seeking should be more prevalent in these motorists.

Furthermore, as Kernis (2003) posited, autonomy, emotional disclosure, private self-consciousness, and impartial cognitive styles should curb fragility and thus activate extension memory. As extension memory prevails, intention memory tends to be inhibited (Kuhl, 2000). Intention memory, therefore, is more likely to be activated when autonomy, emotional disclosure, private self-consciousness, or impartial cognition decline.

Inhibition of extension memory is especially likely to activate intention memory when individuals adopt a promotion focus. When these individuals fail to achieve their ideal self-guide—the standard that corresponds to a promotion focus (Higgins, 1997)—they experience dejection rather than agitation (Higgins, 1987). This mood state activates intention memory (Kuhl, 2000), and thus:

Proposition 13. Autonomy, emotional disclosure, private self-consciousness, and impartial cognition should be inversely related to the activation of intention memory, especially if individuals adopt a promotion focus.

Hence, these factors should reduce the extent to which complexity compromises driving performance. In addition, these factors should reduce the inclination to engage in sensation seeking.

6.3. Pertinent initiatives when intention memory is activated excessively

To curb the activation of intention memory, the dejection or depression that individuals endure must be alleviated. Rather than engage in hazardous acts, however, the extent to which individuals feel they have realized their aspirations and ideals must be escalated. Two broad avenues can be explored.

First, the self concept of these individuals can be improved (Higgins, 1987). Attempts to improve the self concept of individuals, however, should not entail the denial or suppression of doubts and limitations. Individuals should not, for example, be encouraged to perceive themselves as exemplary in all domains. The inclination to suppress deficiencies can provoke a rebound effect in which these doubts are eventually restored, often more intensely than before (see Wenzlaff & Bates, 1998; Wenzlaff & Wegner, 1998, 2000; Wenzlaff, Wegner, & Roper, 1988).

Fortunately, a variety of initiatives can be instituted to enhance the self concept of individuals. Apart from introducing measures, provisions, and opportunities that circumvent impediments and facilitate goal attainment, programs that enhance the perceived capacity of individuals to change are also likely to be effective. In particular, some individuals espouse an entity theory in which they conceptualize human competence, character, and morality as fixed (Dweck, Chui, & Hong, 1995a). Other individuals espouse an incremental theory in which they presuppose that human competence, character, and morality are malleable (Dweck, Chui, & Hong, 1995a). This perceived malleability augments their willingness and capacity to change, ultimately enhancing their self concept. Practices that are assumed to foster an incremental theory—such as the inclination of parents and teachers to impute errors to strategic errors rather than dispositional limitations (Dweck, Chui, & Hong, 1995b)—are thus likely to boost the self concept of these individuals.

Second, the aspirations and ideals of individuals should not be too lofty. In particular, individuals should receive approval, praise, and other rewards even when they fulfill only moderate goals. Over time, individuals recognize they do not need to realize unrealistic goals to secure approval; the ideal self guide becomes more achievable and thus dejection begins to dissipate (cf., Higgins, 1987). These recommendations imply the psychosocial profile of individuals, outside the driving domain, might impinge on road safety.

7 INTUITIVE BEHAVIORAL CONTROL

7.1. Risk profile and dispositions that corresponds to intuitive behavioral control

The previous section outlined measures that activate intuitive behavioral control. Persistent activation of this cognitive system fosters positive affect, but can nevertheless forge a specific profile of risky behaviors in the driving domain. In particular, undue activation of this system inhibits intention memory and, therefore, precludes the formation of complex plans or the capacity to override automatic routines (Kuhl, 2000)—sequences of processes that have been practiced extensively but cannot be regulated effectively. These individuals, hence, feel unable to inhibit habitual behaviors. They might, for example, not be able to override the inclination to speed while driving. Their perceived capacity to control their behavior, a key dimension in the theory of planned behavior (Ajzen, 1991), will diminish. Thus:

Proposition 14. Persistent activation of intuitive behavioral control should be inversely related to the capacity to override habitual tendencies.

Activation of this mechanism will tend to coincide with extraversion. That is, even when individuals merely demonstrate the characteristic tendencies of extraverts—by acting talkatively, gregariously, assertively, and boldly—positive affective states tend to transpire (McNiel & Fleeson, 2006). These positive affective states, according to Kuhl, tend to activate intuitive behavioral control.

Proposition 15. Extraversion will be positively related to activation of intuitive behavioral control. Therefore, extraversion should be inversely related to the capacity to override habitual tendencies.

7.2. Pertinent initiatives when intuitive behavioral control is activated excessively

To inhibit intuitive behavioral control, and thus augment perceived behavioral control, positive affect needs to be tempered. Sad, moving images, memories, or accounts have been shown to moderate positive affect (e.g., Forgas & Moylan, 1987). Accordingly, campaigns that are intended to promote the inhibition of undesirable,

habitual tendencies should include gloomy images. An advertisement that highlights the capacity of individuals to curb their alcohol use, for example, could portray a despondent, dejected protagonist who regrets their inappropriate behavior.

Scenes, images, or accounts that highlight the mortality of individuals, however, might not be suitable. According to terror management theory (e.g., Greenberg, Pyszczynski, Solomon, Rosenblatt, Veeder, Kirkland, & Lyon, 1990), individuals experience a form of existential anxiety when they reflect upon their own mortality. To override this anxiety, they attempt to conceptualize themselves as one constituent of a broader, immortal entity (Pyszczynski, Greenberg, & Solomon, 1999). In particular, they espouse a cultural worldview in which they regard their social collective as coherent, predictable, and uniform (Jonas, Greenberg, & Frey, 2003). All members of this social collective are assumed to share the same values and principles (Jonas et al., 2003). In addition, they strive to fulfill these shared values, embedding themselves within this broader collective (Greenberg, Solomon, & Pyszczynski, 1997; Solomon, Greenberg, & Pyszczynski, 1991).

In some instances, individuals will curb their risk after they consider their mortality (cf., Ben-Ari, Florian, & Mikulincer, 2000). Individuals who feel that peers in their immediate social environment, such as their classmates, value caution and vigilance will behave more responsibly. In contrast, individuals who feel their peers respect adventure or rebellion might become less inclined to drive safely after they contemplate their own mortality. Therefore:

Proposition 16. After—compared to before—individuals watch an advertisement that portrays a fatal incident, individuals should be especially likely to breach traffic regulations if their peers approve, rather than condemn, these violations.

8.0. CONCLUSION

This paper has applied personality systems interaction theory (Kuhl, 2000), self discrepancy theory (Higgins, 1987), the concept of optimal self esteem (Kernis, 2003), and the theory of planned behavior (Ajzen, 1985, 1991) to characterize four clusters of individuals who might demonstrate a specific profile of risky behaviors in the driving domain. This paper also specifies how each cluster is likely to respond to particular countermeasures and interventions. The first cluster of individuals, who tend to adopt a prevention focus and exhibit limited self awareness, will often align their behavior to the expectations and norms of their peers. The second cluster comprises individuals who exhibit considerable self awareness and engage in behaviors that align with their personal attitudes, but appear relatively insensitive to legal policies and enforcement. The third cluster of individuals, who often adopt a promotion focus and report a low self esteem, might not drive proficiently in complex environments. Alternatively, these individuals might deliberately contrive situations that demand the integration of many distinct, but key, sources of information. The final cluster includes individuals who report high levels of extraversion but do not feel they can override habitual behaviors, such as exceeding the speed limit.

Future research needs to characterize the demographics of each cluster. Pertinent campaigns and initiatives can then be directed towards the appropriate cluster, the utility of which awaits further research. Directed initiatives are essential; otherwise, some campaigns might exacerbate, rather than ameliorate, risky behavior. Advertisements that are intended to justify the benefits of a specific policy, for instance, are futile if object recognition is activated. Likewise, sad and moving images directed at individuals who rely on intention memory could compromise their driving performance. These considerations, therefore, underscore the importance of differentiating various clusters of the driving population.

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