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Impulsivity and driver behaviors, offences and accident involvement: A systematic review [☆]

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ABSTRACT

The present literature review study investigated the relationship between impulsivity and driver behaviors, offences and road traffic accidents through the lenses of characterological perspective. The studies published from 1970 to 2014 that examined and reported a relationship between impulsivity and at least one driving related outcome (e.g., a self-report measure of driver behavior) were included. The relevant 38 out of 288 studies are presented in four sections based on the driving related outcomes as; (i) aberrant driver behaviors and driving anger/aggression, (ii) driving under the influence, (iii) traffic offences and accidents, (iv) other. The vast majority of the studies reported significant relationships between impulsivity and the driving outcomes. The general findings of the studies in the literature, suggestions including a new definition of impulsivity in driving context, and future directions are discussed in the scope of a proposed integrative conceptual framework.

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1. Introduction

1.1. Definition of impulsivity

Impulsivity is probably one of the most important constructs in almost all models of personality (Whiteside & Lynam, 2001). There is a high volume of research on this construct. There still remains, however, a disagreement about the definition of impulsivity (Evenden, 1999). It can still be, on the one hand, broadly defined as the “tendency to act with little forethought, without deliberation and evaluation of consequences” (Caci, Nadalet, Baylé, Robert, & Boyer, 2003, p. 34). There are also different conceptualizations regarding the components and factor structure of the construct, i.e. whether it has one dimension or it is made up of many different traits or behavioral patterns (Evenden, 1999). For example, a wide variety of “seemingly unrelated” maladaptive behaviors such as inability to wait, difficulty in withholding responses and an insensitivity to negative or delayed responses have been termed as “impulsivity” (De Wit, 2009). Behavioral inhibition and impaired decision making have been most commonly identified processes underlying impulsivity (De Wit, 2009). In the most general terms, on the other hand, impulsivity is defined as the inability to delay gratification or the inverse of self-control (Monterosso & Ainslie, 1999). It seems that different definitions of impulsivity are the reflections of different theoretical perspectives of impulsivity to some extent.

[☆] This study is a part of the PhD dissertation of the corresponding author.

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1.2. Three theoretical perspectives

It can be claimed that impulsivity has been studied in the realm of three different perspectives; cognitive, behavioral and characterological (Arce & Santisteban, 2006). From the cognitive perspective, impulsivity is defined as the inability to consider the consequences of immediate and future events and therefore, delay gratification. Behavioral (or motor) impulsivity is mostly related to response inhibition and measured by experimental tasks such as the go/no-go and stop tasks. The third one, characterological perspective to investigate impulsivity, which is also the focus of the present paper, is mostly measured by self-report instruments based on different personality models.

1.2.1. Characterological perspective

One of the earliest conceptualizations of impulsivity is Buss and Plomin's (1975) "lack of inhibitory control", involving three dimensions; decision time, which is the tendency to consider alternatives and consequences before making a decision; persistence, that is the ability to continue a task by resisting competing temptations; and sensation seeking, which is the tendency to become bored and need to seek novel stimuli. Another model involving impulsivity as a personality variable is Eysenck's biological model (Eysenck & Eysenck, 1985) in which impulsivity is hypothesized to be a combination of narrow impulsivity, non-planning, liveliness and risk taking. Based on Eysenck's theory, other biological theories of personality, namely Gray's (1987), Cloninger's (1987), and Zuckerman's (1984) models were developed (Acton, 2003; Arce & Santisteban, 2006).

In Gray's neuropsychologically based model, impulsivity is based on an appetitive behavioral approach system which is closely related to Eysenck's extraversion (Acton, 2003). In an attempt to explain the pathways leading to impulsive responding based on Gray's model, Newman and his colleagues suggested three distinct pathways leading to impulsivity. The first one, normal impulsivity, results in over-responsivity to rewards based on dominance of the behavioral approach system over the behavioral inhibition system. The second one is characterized as anxious impulsivity, stemming from a dominance of the behavioral inhibition system. The third pathway is named as the deficient P(psychopathic)-constraint involving the difficulty to incorporate feedback from the environment and utilize the information coming from the environment to modify his/her responses in the process of reward seeking (Newman & Wallace, 1993; Wallace, Newman, & Bachorowski, 1991).

In Cloninger's three dimensional model of personality, there are three genetically independent dimensions of personality, namely harm avoidance, reward dependence, and novelty seeking. Various traits are made up of the different combinations of these dimensions and impulsivity is characterized as high novelty seeking combined with relatively low reward dependence and low harm avoidance.

Finally, Zuckerman, Kuhlman, and Camac (1988) included impulsivity in a general framework of personality. Based on the factor analyses on items from many different scales measuring sensation seeking and impulsivity, they developed the five factor Zuckerman–Kuhlman Personality Questionnaire (ZKPQ-IIIR). Impulsive-sensation seeking (ImpSS) is one of these five factors, and it involves a tendency to act without thinking and a lack of planning. The items loading on this factor are tapping on the willingness to take risks for the sake of excitement or novel experience.

1.2.2. An integrative perspective

In a way, integrating the above mentioned three approaches in impulsivity research, namely behavioral, cognitive and characterological approaches, Barratt (1993), Gerbing, Ahadi, and Patton (1987), Patton, Stanford, and Barratt (1995) and Stanford and Barratt (1992) incorporated findings from research utilizing different measures such as self-report inventories, cognitive and behavioral tasks, and brain-behavior research with animals. Barratt and colleagues developed the Barratt Impulsiveness Scale (BIS) especially to differentiate impulsiveness from anxiety. Later, it has been clarified that the versions of the scale represents a three-component structure of impulsivity comprising of motor impulsiveness defined as acting without thinking; cognitive/attentional impulsiveness involving difficulty in focusing on the task at hand and making quick cognitive decisions; and non-planning, representing a present orientation or lack of future orientation (Patton et al., 1995).

1.3. Is impulsivity only dysfunctional?

In the conceptualizations of impulsivity listed above, it should be noted that, there is a common negative or maladaptive connotation in all. Dickman (1990) suggested that impulsivity may be differentiated as functional and dysfunctional. He investigated whether or not the factors causing people to respond quickly and inaccurately when this leads to some kind of difficulty are the same as those causing them to respond quickly and inaccurately when this is the optimal way of responding, that is, having positive consequences. He reasoned that if impulsive behavior was that pathological, it would not remained intact through our evolutionary history and that not all impulsive behavior is disadvantageous. He also argued that there may be two distinct traits associated with quick and inaccurate performance, one taking place when this is optimal and the other taking place when this is nonoptimal. He conceptualized the former as functional impulsivity and the latter as dysfunctional impulsivity.

Dickman (1990) developed a scale consisting of items written to tap functional and dysfunctional impulsivity and the factor analysis showed a clear picture of the differentiation of the two separate components of impulsivity, with a correlation of .07 between them. In addition, he investigated whether these two distinct constructs relates differentially to other traits that have been known to be associated with impulsivity and concluded that the two types of impulsivity have different patterns of correlations with other personality traits. For instance, it was found that enthusiasm, adventurousness and activity were

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