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Predicting road safety behavior with implicit attitudes and the Theory of Planned Behavior

Rubén D. Ledesma, [a,b,*] Jeremías D. Tosi, [a,b] Carlos M. Díaz-Lázaro, [c] Fernando M. Poó [a,b]

[a] IPSIBAT, Universidad Nacional de Mar del Plata, Argentina
[b] Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina
[c] Walden University, United States of America

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ABSTRACT

Introduction The Theory of Planned Behavior (TPB) is one of the most widely used psychological models when it comes to explaining road safety behaviors. Recently, studies have also been conducted from the perspective of dual-process models. However, the present is the first study on road safety behaviors that integrates both perspectives. The study evaluates the roles of both implicit attitudes and TPB constructs in the prediction of seatbelt use. *Method* A sample of 100 drivers completed: (1) a self-reporting instrument on seatbelt use, (2) a questionnaire addressing TPB constructs, (3) an indirect measure of attitudes (Implicit Association Test), and (4) a social desirability scale. *Results* Results suggest that both types of attitudes make a significant and quite similar contribution to the explanation of seatbelt use. Interestingly, implicit attitudes were a better predictor than explicit attitudes among participants reporting inconsistent seatbelt use. In addition, path analysis models suggested that implicit attitudes appear to be relatively independent of TPB constructs and have a direct effect on seatbelt use. *Conclusion* The findings advance the idea of adding implicit attitudes to variables from the TPB model in order to increase the explanatory power of models used to predict road safety behaviors. *Practical applications* Potential use of implicit attitude measures in the education and training of drivers are discussed.

1. Introduction

The relationship between attitudes and risk behaviors continues to be a relevant topic of research in various health areas (Sheeran et al., 2015). A significant part of the research in this domain has been grounded in classic social psychology models (Wiers et al., 2010); in this respect, the theories of reasoned action (TRA) and planned behavior (TPB) have predominated (Fishbein & Ajzen, 2010). In recent years the field has been revitalized thanks to theoretical developments on implicit attitudes (Blair, Dasgupta, & Glaser, 2015; Sheeran et al., 2016). New questions, models, and methods have emerged from these developments. This article analyzes the role of implicit and explicit attitudes in road safety behaviors and is the first study in this field to integrate the contributions of both the more recent perspective on implicit attitudes and the classic TPB approach.

1.1. Implicit and explicit attitudes

Current research suggests that attitudes can exist at two mutually interacting levels that influence our behavior (Blair et al., 2015). On the one hand, attitudes take place at an *explicit* level, which is consciously accessible to the subject and thus assumed controllable. These attitudes can be evaluated through self-reporting methods such as surveys and Likert scales. On the other hand, there are also attitudes at an *implicit* level, which are more automatic, less consciously accessible, and thus not necessarily controllable. The evaluation of implicit attitudes requires indirect assessment measures capable of "activating" our attitudes toward a given object (Gawronski & Bodenhausen, 2011). The Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998) is one such indirect method. Based on its success, the IAT has generated one of the foremost research programs on implicit attitudes.

The IAT is a computer-based measure that evaluates the strength of automatic association between pairs of concepts (Greenwald et al., 1998). When measuring attitudes, the first pair of concepts refers to the attitude object (e.g. "seat-belt use" and "non-seat-belt use"), while the second pair corresponds to the attitudinal valence (e.g. "good" and

* Corresponding author at: Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) and Universidad Nacional de Mar del Plata, Funes 3350, Mar del Plata 7600, Argentina.
E-mail address: rdledesma@conicet.gob.ar (R.D. Ledesma).

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"bad" or "pleasant" and "unpleasant"). The task consists of quickly classifying stimuli corresponding to the four concepts under two basic conditions: (1) a compatible block (e.g. with the same response-key used to classify stimuli from the categories "seat-belt" and "good," and another response key to categorize stimuli representing "non-seat-belt use" and "bad"); and (2) an incompatible block (pairings are inverted). The final score is the difference in reaction times between these two conditions (i.e., compatible and incompatible). The IAT rests on the assumption that the categorization task should be easier, and thus quicker, when the two concepts paired with the same response key are "implicitly" associated for the participant. This simple procedure has been used in a variety of fields and has been the subject of numerous validity studies (Bar-Anan & Nosek, 2014; Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

A relevant finding is that the IAT is more robust than self-reporting measures in dealing with response biases (e.g., social desirability; Gawronski & De Houwer, 2014). These biases could be particularly relevant when evaluating attitudes toward behaviors that are sensitive to the participant and/or when involving norm violations. A previous study on helmet use, for example, showed an explicit attitude measure – but not an implicit one (IAT scores) – to be correlated with a social desirability measure (Ledesma, Tosi, Poo, Montes, & López, 2015). This supports the idea that implicit measures can be more robust when exploring socially unacceptable behaviors (Greenwald et al., 2009). In the case of road behavior, this finding is particularly relevant considering that risky behaviors generally involve violations of traffic rules.

Even if implicit and explicit attitudes originate from qualitatively different processes, these are assumed to be associated in a different way, with the strength of the relationship changing according to the attitude object (Bar-Anan & Nosek, 2014; Greenwald et al., 2009; Hofmann, Gschwendner, Nosek, & Schmitt, 2005; Nosek, 2005). In the case of road safety behaviors, results vary considerably from study to study. Fernandes, Hatfield, and Job (2006) analyzed the relationship between implicit attitudes and constructs from the *Health Belief Model*, and considered various behaviors (speeding, drunk driving, driving while fatigued, and not wearing a seatbelt). Non-significant associations were found in most of these cases. In two other studies weak to moderate correlations were found between implicit and explicit attitudes toward speeding (Hatfield, Fernandes, Faunce, & Job, 2008; Rusu, Sârbescu, Moza, & Stancu, 2017). Lastly, a study on helmet use (Ledesma et al., 2015) found moderate correlations between implicit attitudes and the emotional component of explicit attitudes. These inconsistent results could be explained by the presence of factors acting as moderators on the implicit–explicit relationship (Blair et al., 2015; Hofmann et al., 2005; Nosek, 2007). Such moderators could be methodological (e.g. type of stimuli used) or conceptual (e.g. attitude dimensionality; Greenwald et al., 2009).

Another key research topic has been the predictive ability of measures such as the IAT. Particularly, there has been great interest in its incremental predictive validity with respect to explicit measures (Greenwald et al., 2009). Previous research suggests that when evaluating sensitive research topics (e.g. racial prejudice) implicit attitudes have a greater predictive power than their explicit counterparts. In addition, in these cases there is a tendency to find low correlations between both types of attitudes. Conversely, when dealing with topics less influenced by social desirability (e.g., consumer or political preferences) stronger associations are observed and explicit attitudes show better predictive validity (Ajzen & Dasgupta, 2015; Fazio & Towles-Schwen, 1999). In any case, it is particularly relevant that explicit and implicit measures appear to have incremental validity over each other, which could indicate that they predict different aspects of criterion behavior (Greenwald et al., 2009). For this reason, it becomes important to consider the combined use of implicit and explicit measures in applied psychology research.

1.2. Implicit attitudes and the TPB

Jaccard and Blanton (2007) have criticized the manner in which researchers have addressed the incremental validity of implicit attitude measures. The problem is that researchers have failed to take into consideration that the attitude–behavior relationship in classic models is analyzed by including other fundamental theoretical constructs in addition to attitudes. Fig. 1 represents the TPB constructs and their relationships. Briefly, behavior is explained by the *behavioral intention* (i.e., disposition to carry out the behavior) and the perceived *behavioral control* (i.e., perception of internal and external factors capable of providing control over the behavior). At the same time the intention is affected by the *attitude* (i.e., favorable or unfavorable evaluation toward the behavior), the *subjective norm* (i.e., perceived social pressure to carry out the behavior) and the perceived behavioral control. It is indeed the case that research that provides evidence of the incremental validity of implicit measures seldom integrates these important theoretical concepts.

Furthermore, Jaccard and Blanton (2007) state that it is difficult to imagine implicit attitudes as independent of the TPB constructs. These authors suggest various possibilities to conceptualize the relationship between implicit attitudes and the TPB. For example, they posit that implicit attitudes could function as distal variables in the model, associating them with the beliefs that form the attitudes, subjective norms, and perceived behavioral control. They also suggest that implicit attitudes could act as moderator variables between the different TPB constructs (e.g., moderating the relationship between explicit attitudes and intention). Fishbein and Ajzen (2010) have also analyzed the possibility of connecting implicit attitudes with the TPB. For example, they propose that implicit attitudes could be part of background factors, in that we are dealing with general attitudes "assumed to be mediated by more proximal behavior-specific dispositions" (p. 273). In any case, research has not advanced sufficiently as to integrate both perspectives; in part this is because these are two quite distinct theoretical traditions (Jaccard & Blanton, 2007).

Even so, some studies have evaluated health behaviors by integrating implicit and TPB measures. Millar (2011), in a study on dental flossing behavior, found that implicit attitudes increased the predictive power of the TPB. Warfel (2013) studied attitudes toward blood donation and found very low to non-existent correlations between TPB and implicit attitudes. In this particular case, the implicit measure did not show incremental validity over the explicit attitudes. Another study, this time on healthy eating behaviors (Ackermann & Palmer, 2014), concluded that implicit attitudes did not increase the explanatory power of the TPB. Finally, Chevance, Caudroit, Romain, and Boiché (2016) found that implicit attitudes contributed significantly to the prediction of physical activity in persons with obesity, but not in the general population. In summary, the research appears to indicate that implicit measures contribute little or not at all when the full TPB model (as opposed to only explicit attitudes) is taken into account.

1.3. The present study

In this study we analyze implicit and explicit attitudes toward a specific road safety behavior: seatbelt use. Although considered a key road safety behavior, seatbelt use in many countries continues to be low (WHO, 2015). Interestingly, seatbelt use is associated with more general unsafe driving behaviors (e.g., driving errors and violations; Okamura, Fujita, Kihira, Kosuge, & Mitsui, 2012) and even with other health related behaviors (e.g., healthy diet, regular walking, and adequate sleep; Şimşekoğlu & Lajunen, 2009). For this reason, seatbelt use has been seen as reflecting a general safety orientation. Some prior studies have analyzed this behavior by appealing to the TPB in its classic and/or extended version (Ali, Haidar, Ali, & Maryam, 2011; Brijs, Daniels, Brijs, & Wets, 2011; Okamura et al., 2012; Şimşekoğlu & Lajunen, 2008; Tavafian, Aghamolaei, Gregory, & Madani, 2011;

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