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A positive psychology framework for understanding teenage driving behaviors: Examining the role of life purpose and mindfulness

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ABSTRACT

Objective: The overwhelming majority of teenage driving research in the US is framed around characteristics associated with risk, rather than factors that promote safety. In this study, we examine the role of purpose in life and mindfulness as two factors that may be associated with safer driving behaviors.

Methods: Using survey responses from a nationally representative sample of teenagers (aged 16–19) we used structural equation modeling to construct three latent variables – sense of purpose, mindfulness, and risky driving—and evaluate the associations between these latent variables among teenage drivers. Risky driving was based on measures of self-reported distracted driving, drunk driving, driving under the influence of marijuana and other drugs, inconsistent seatbelt use, and riding with an impaired driver.

Results: We found that sense of purpose and mindfulness were associated with fewer risky driving behaviors. We also identified mindfulness as a mediator between sense of purpose and risky driving.

Conclusions: Purpose in life and mindfulness are associated with fewer risky driving behaviors among US teenagers. Driver education and training could include components related to purpose and mindfulness, in order to promote safer driving behaviors in this population.

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Mindfulness; sense of purpose; teenage driving; risky driving; structural equation modeling

Introduction

Motor vehicle crashes persist as a leading cause of death for adolescents in the United States. Conventional approaches to reducing teenage drivers' crash risk are yielding diminishing returns. In 2021, the latest year for which data are available, 2,116 young drivers aged 16–20-years-of-age died in traffic crashes, an 11-percent increase from 2020 (National Highway Traffic Safety Administration 2023). For over half a century, young driver safety has been framed through a risk lens or deficit model (Doll and Lyon 1998), where individual characteristics associated with elevated crash risk are identified and addressed through behavioral or policy interventions (Foss 2007; Winston et al. 2016). The focus on behaviors related to crashes, while understandable, has meant that factors related to safe driving behavior have been largely ignored.

The field of positive psychology emerged over the past two decades as a movement away from traditional problem-focused psychology. Positive psychology represents a shift in focus toward strengths and flourishing (Seligman and Csikszentmihalyi 2000; Gable and Haidt 2005). Constructs such as meaning, relationships, and purpose in life are hallmarks of this approach to understanding human behavior. Each of these elements has been shown to have

beneficial associations with a range of health outcomes (Park et al. 2016). For example, having a strong purpose has been associated with reduced mortality risk (Krause 2009; Kim et al. 2014). These findings suggest a possible extension that having a strong sense of meaning and purpose in life may motivate safer driving behaviors.

Literature review

An emerging literature is beginning to examine the association between applications of positive psychology constructs such as meaning and purpose in life to the driving behaviors of young people. The few studies conducted in this area indicate a strong association between meaning in life and self-reported engagement in safer driving behaviors (Taubman-Ben-Ari 2012; 2014; Isler and Newland 2017). For example, in a survey study conducted in New Zealand, Isler and colleagues found that university students (mean age 25.1 years) who reported higher levels of meaning in life had fewer self-reported driving violations in the prior 12 months. In a survey of young people in Israel (mean age of 19.1 years), Taubman-Ben-Ari found that higher levels of purpose in life was related to a safer driving behaviors

(Taubman-Ben-Ari 2014). In an experimental study, young people (mean age of 18.9 years) who were primed to think about meaning in life, reported a lower willingness to engage in risky driving (Taubman-Ben-Ari 2012).

An additional construct from the positive psychology framework that could be applied to driving behaviors is mindfulness. Mindfulness has been described as “the awareness that emerges through paying attention on purpose, [and] in the present moment” (Kabat-Zinn 2005). Mindfulness has relevance to driving (Murphy and Matvienko-Sikar 2019) and a sizeable body of research has been conducted examining the association between mindfulness and driving behaviors among adults (Koppel et al. 2019), yet the association between mindfulness and risky driving behaviors among teenagers remains underexplored.

Conceptual framework

The application of positive psychology constructs to understanding teenage driving behaviors is in its infancy. In this paper, we seek to advance the literature by examining the association between a sense of purpose and mindfulness on a range of driving behaviors. A distinctive contribution of this study lies in using a multidimensional measure of purpose that has been validated among teenagers in assessing three different dimensions of purpose: awareness of purpose, awakening to purpose, and altruistic purpose (Sharma and De Alba 2018; Sharma and Yukhymenko-Lescroart 2019). We hypothesized higher awareness of purpose and altruistic purpose, would lead to higher levels of mindfulness, and higher levels of mindfulness would in turn be associated with lower levels of self-reported risky driving behaviors. The two concepts of sense of purpose and mindfulness were evaluated both in terms of their independent and mediated effects on risky behavior.

Methods

We conducted a cross-sectional survey of a nationally representative sample of teenagers in the United States (ages 16–19). Participants were recruited from NORC’s AmeriSpeak platform, a probability-based panel of randomly sampled U.S. households representative of over 99% of U.S. households (Dennis 2019). Informed consent was provided by the respondents as part of their participation in the survey. The Johns Hopkins Bloomberg School of Public Health Institutional Review Board approved this study (IRB00019326). The survey was fielded between May 4th and June 10th, 2022; in both the English and Spanish languages.

Scales

Participants were administered the following scales.

The Mindful Attention Awareness Scale (MAAS), is a validated and reliable measure of mindfulness containing 15 items (Brown and Ryan 2003). Examples of items include “*I could be experiencing some emotion and not be conscious of it until some time later*” and “*I find it difficult to stay focused on what’s happening in the present.*”

The Revised Sense of Purpose scale (Sharma and Yukhymenko-Lescroart 2019) measures the dimensions of (1) awakening to purpose, (2) awareness of purpose, and (3) altruistic purpose. Examples of items include “*I am gaining clarity about my life’s purpose,*” “*my purpose in life is clear,*” and “*I aspire to make a positive difference in my community.*” The measure can be used as a single scale or analyzed using the subscales (Sharma and De Alba 2018; Yukhymenko-Lescroart and Sharma 2022; Sharma et al. 2023).

Risky driving behaviors were measured using survey items from two national surveys conducted in the United States. Five items were derived from the Youth Risk Behavior Survey; a survey conducted biennially since 1991 (Yellman et al. 2020). Respondents were asked if they drove in the last 30 days and if they engaged in five risky driving behaviors last 30 days. Behaviors included (1) not wearing a seatbelt while driving; (2) texting, emailing, or using social media while driving; (3) driving a car after drinking alcohol; (4) driving a car after using marijuana in any form; (5) driving a car after using any other drugs (besides alcohol or marijuana).

In addition, respondents were asked if they were a passenger in a vehicle in the last 30 days, and if they had been (6) a passenger in a car when the driver had been drinking alcohol. This item was adapted from the NEXT Generation Health Study, a longitudinal cohort study of US adults spanning seven years (Simons-Morton et al. 2017). Response options for all the items were “Never, Rarely, Sometimes, Most of the time, or Always.”

Analysis

We used structural equation modeling to assess the validity of our hypothesized conceptual framework relating positive psychology constructs with risk behaviors related to driving. Specifically, this methodology allowed us to determine associations between risky driving behavior, mindfulness and sense of purpose in life (lavaan 2012). Our hypothesized structural equation model used ten observed variables to construct three latent variables and assess relationships between the observed and latent variables. The hypothesized latent variables include:

- Mindfulness, as derived from the 15 items comprising the Mindful Attention Awareness Scale score.
- Purpose, as derived from the Sense of Purpose Scale’s three subscales: Awareness of Purpose, Awakening to Purpose, and Altruistic Purpose (Sharma and Yukhymenko-Lescroart 2019).
- Risky Behavior, as derived from the six behavioral measures listed above from the Youth Risk Behavior Survey and NEXT Generation Health Study.
- The criteria we used to assess model fit were the comparative fit index (CFI ≥ 0.90), standardized root mean square residual (SRMR ≤ 0.08) and a root mean square error of approximation (RMSEA ≤ 0.06) (Hu and Bentler 1999).

Results

The final analytic dataset included $N=220$ teens who reported driving in the last 30 days and had no missing data on the risky driving outcomes. Participants had a mean age of 17.2 years (range 16 to 19). Figure 1 illustrates the correlation between the observed variables.

The six risk behaviors were significantly positively correlated, ranging from 0.16 to 0.67. The strongest correlations were related to marijuana and other drug use and riding with an impaired driver. Mindfulness and the Sense of Purpose Subscales were negatively correlated with the risky driving behaviors and were positively correlated with each other. These findings confirm that the observed variables represent distinct information for the model.

Figure 2 illustrates the hypothesized framework evaluated using a structural equation model. Purpose was a latent variable comprised of three observed variables from the Sense of Purpose subscales—Awareness of purpose, Altruistic purpose, and Awakening to purpose. Purpose was evaluated in terms of its direct effect on risky behaviors and indirectly through mindfulness. Two of the observed variables in the purpose variable—Awareness of purpose and Altruistic purpose—were also evaluated in terms of their direct effect on risky driving behaviors. Mindfulness was a latent variable derived from a mindfulness scale.

Risky behavior—the key outcome—was a latent variable comprised of six behaviors as previously described and

included (1) not wearing a seatbelt while driving; (2) texting, emailing or using social media while driving; (3) driving a car after drinking alcohol; (4) driving a car after using marijuana in any form; (5) driving a car after using any other drugs (besides alcohol or marijuana) and if respondents had been (6) a passenger in a car when the driver had been drinking alcohol.

The resulting model had fit measures that suggest a reasonably good fit. Our chi-square statistic was 55.3 with 31 degrees of freedom. Further the root mean square error of approximation was 0.06, with a standardized root mean square residual of 0.051 and a comparative fit index of 0.966

Table 1 presents the measurement model results, including the factor loadings with a 95% confidence interval, as well as the associated p-value and R^2 value for each factor loading. Considering the Sense of Purpose construct, all three observed subscales were significant. Awareness of Purpose and Awakening to Purpose subscales contributed the most to this construct. For the risky behaviors construct, all observed variables were significant. The variables for marijuana use, other drug use, and riding with an impaired driver contributed the most; distraction contributed the least to this construct.

Table 2 presents the structural equation model results. We find that a Sense of Purpose had a significant positive effect on Mindfulness and a significant negative indirect effect on risky behaviors. The direct effect on risky behaviors was negative with an estimated effect size that was greater than the estimated indirect effect, but this finding was not statistically significant.

Mindfulness had a negative direct effect on risky behaviors that was statistically significant. In terms of the direct effect of Awareness of Purpose and Altruistic Purpose, both had a statistically significant effect on risky driving behaviors, but in opposite directions. Awareness of Purpose was estimated to have a positive effect on risky driving behaviors while Altruistic Purpose was estimated to have a negative effect. All arrows in Figure 2 present statistically significant relationships apart from the direct effect between purpose and risky behaviors.

Discussion

In this nationally representative sample of U.S. teenage drivers, we tested the association between two constructs from the field of positive psychology, (1) Sense of Purpose and (2) Mindfulness on a range of risky behaviors. We hypothesized that higher levels of Awareness of Purpose, and Altruistic Purpose (two subscales within the Sense of

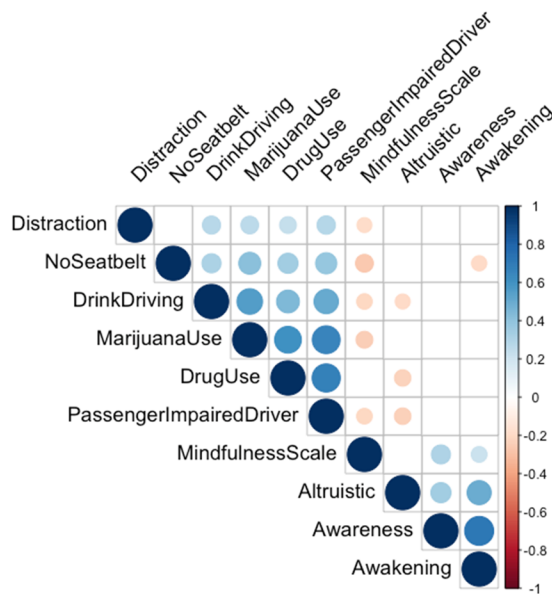


Figure 1. Correlation coefficients and standard deviations.

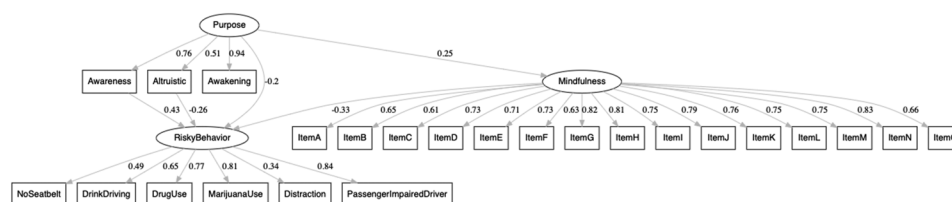


Figure 2. Structural equation model.

Table 1. Loadings of measurement model.

Latent variables	Measurement variables	Loadings	Confidence Interval	p-value	R ²	Cronbach's alpha
Purpose	Awareness	0.758	0.665–0.850	<.001	0.574	0.762
	Awakening	0.940	0.849–1.032	<.001	0.884	–
	Altruistic	0.513	0.403–0.623	<.001	0.263	–
Mindfulness	Item A	0.653	0.573–0.732	<.001	0.426	0.946
	Item B	0.608	0.521–0.695	<.001	0.370	–
	Item C	0.733	0.669–0.798	<.001	0.538	–
	Item D	0.709	0.640–0.778	<.001	0.503	–
	Item E	0.727	0.661–0.793	<.001	0.529	–
	Item F	0.628	0.544–0.712	<.001	0.394	–
	Item G	0.824	0.778–0.870	<.001	0.679	–
	Item H	0.807	0.757–0.857	<.001	0.651	–
	Item I	0.751	0.690–0.812	<.001	0.564	–
	Item J	0.792	0.739–0.845	<.001	0.628	–
	Item K	0.757	0.697–0.817	<.001	0.573	–
	Item L	0.751	0.690–0.812	<.001	0.564	–
	Item M	0.746	0.683–0.808	<.001	0.556	–
	Item N	0.832	0.787–0.876	<.001	0.691	–
	Item O	0.663	0.585–0.741	<.001	0.440	–
Risky Behaviors	No Seatbelt	0.488	0.378–0.598	<.001	0.239	0.805
	Drink Driving	0.646	0.559–0.733	<.001	0.418	–
	Drug Use	0.772	0.706–0.838	<.001	0.596	–
	Marijuana Use	0.807	0.747–0.867	<.001	0.650	–
	Distraction	0.344	0.219–0.470	<.001	0.119	–
	Passenger Impaired Driver	0.835	0.780–0.891	<.001	0.698	–

Table 2. Structural equation model results, with mediating effects.

Dependent variables	R ²	Independent variables	Effect Type	Coefficient [95% CI]	P-value
Mindfulness	0.065	Purpose	Direct	0.062 [0.026–0.098]	0.001
Risky Behaviors	0.239	Mindfulness	Direct	–0.068 [–0.102– –0.034]	<.001
–	–	Awareness	Direct	0.016 [0.007–0.025]	0.001
–	–	Altruistic	Direct	–0.014 [–0.024– –0.005]	0.002
–	–	Purpose	Direct	–0.010 [–0.023– –0.003]	0.137
–	–	Purpose	Indirect	–0.004 [–0.007– –0.001]	0.007

Purpose construct), would lead to higher levels of Mindfulness, and these would be associated with a lower risky behavior. Using structural equation modeling we found that a Sense of Purpose had a significant positive effect on Mindfulness and a significant negative indirect effect on risky behaviors. Mindfulness had a negative direct effect on risky behaviors that was statistically significant.

These findings make three distinct contributions to the literature on young driver safety. First, our study shows a direct association between mindfulness the risky behaviors in a young drivers' sample, which had not been previously tested. Second, our hypothesized model included multiple measures from positive psychology and tested their association in a model where Sense of Purpose would lead to greater Mindfulness, which would be associated with fewer unsafe behaviors was confirmed. This hierarchy or framework of relationships had not been previously tested. Third, our findings suggest that purpose in life alone is not necessarily associated with safer driving behaviors, but that the nature of that purpose matters.

Specifically, we found that the subscales of Awareness of Purpose and Altruistic Purpose, both had a statistically significant effect on risky behaviors, but in opposite directions. Awareness of Purpose was associated with more risky behaviors while Altruistic Purpose was associated with fewer risky behaviors. This intriguing finding builds on the work of Taubman-Ben-Ari that established an individual's purpose in life was associated with safer driving behaviors (Taubman-Ben-Ari 2014).

One plausible explanation for the positive association between risk behaviors and Awareness of Purpose could be that some individuals may have a strong sense of purpose that is centered on individual pleasure. For example, Isler and colleagues found that individuals who had a primarily hedonistic orientation of pleasure were more likely to have been involved in driving violations (Isler and Newland 2017). A life purpose that is orientated toward pleasure could result in a mindset which may put the individual and others at risk. In contrast, altruistic purpose, which was found to be associated with safer driving, may reflect a mindset or orientation where there is a greater compassion and an awareness of the impact of the individual's actions on others. Further exploration is needed to confirm these findings and to shed additional light on the mechanisms connecting aspects of purpose with driving behavior.

Limitations

Certain limitations of the present study should be noted. First, this research was based on a cross-sectional survey of self-reported driving behaviors, which may have been affected by social desirability and other biases. We did not collect behavioral data, such as observed driving behaviors or crash records. Future studies might attempt to replicate the findings using prospective behavioral measures as well as including observations or objective crash record reports.

Conclusion

In their landmark conceptual contribution published over twenty years ago, Hatakka and colleagues invited the driver education and training community to broaden the perspective to driving education by moving the emphasis from vehicle control to the higher goals for life, including individual values, purpose, and motivations (Hatakka et al. 2002). Since that time, little progress toward building an empirical basis for driver training and education approaches that address these fundamental questions. The findings of this study add further insight into how constructs such as purpose and mindfulness are related to risk behaviors among young drivers.

Disclosure statement

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