

The results define the scale as having one-factor structure, with all items falling precisely into one factor. The total dispersion explained is 45.46%, and the intrinsic significance is 4.67. All items on the scale have acceptable factor weights that range between 0.550 and 0.772. These results indicate that there is very good consistency between the scale and the construct definition, which confirms the validity of the scale constructed.

The results thus indicate that the scale for measuring anger possesses high levels of reliability and validity.

#### 4. CONCLUSION

The theoretical and empirical analysis that we have presented here identified seven personal characteristics related to risky driving behavior and investigated the possibility of developing a multicomponent method for measuring them. The results of both a pilot study and an actual study were presented in connection with the process of constructing and validating the method we constructed. Seven scales were designed in order to examine the personal characteristics in question – Emotional Stability, Anxiety, Locus of Control, Sensation Seeking, Risk Taking, Aggressive Driving Behavior, and Anger.

The results of the pilot study displayed good and very good values of Cronbach's alpha for almost all scales, but the values for certain other scales were not adequate. This required substantial modification of elements of the method. In respect to the results of the actual study, the values of Cronbach's alpha, of the KMO and Bartlett's test of sphericity, and of the factor analyses confirmed the validity of the method constructed and of its constituent scales and subscales.

The successful construction of a multidimensional method for assessing personality characteristics related to risky driving behavior provides a solid foundation for studying the behavior of Bulgarian drivers. This will make possible thorough and in-depth research in the field of transport psychology, thereby providing a scientific perspective concerning the growing problem of road safety.

#### REFERENCES

- Arnett, J.** 1994. "Sensation Seeking: A New Conceptualization and a New Scale." *Personality and Individual Differences* 16(2):289-296. DOI: 10.1016/0191-8869(94)90165-1.
- Arnett, J. J., D. Offer, and M. A. Fine.** 1997. "Reckless Driving in Adolescence: 'State' and 'Trait' Factors." *Accident Analysis and Prevention* 29(1):57-63.
- Arthur, W. and D. Doverspike.** 1992. "Locus of Control and Auditory Selective Attention as Predictors of Driving Accident Involvement: A Comparative Longitudinal Investigation." *Journal of Safety Research* 23(2):73-80.
- Blais, A.-R. and E. U. Weber.** 2006. "A Domain-Specific Risk-Taking (DOSPERT) Scale for Adult Populations." *Judgment and Decision Making* 1(1):33-47. DOI: 10.1037/t13084-000.
- Brandau, H., F. Daghofer, M. Hofmann and P. Spitzer.** 2011. "Personality Subtypes of Young Moped Drivers, Their Relationship to Risk-taking Behavior and Involvement in Road Crashes in an Austrian Sample." *Accident Analysis and Prevention* 43(5):1713-1719.
- Breckenridge, R.** 1991. "Locus of Control and Alcohol Placebo Effects on Performance in a Driving Simulator." *Perceptual and Motor Skills* 72(3):751-756.
- Brill, J. C., M. Mouloua, E. Shirkey and P. Alberti.** 2009. "Predictive Validity of the Aggressive Driver Behavior Questionnaire (ADBQ) in a Simulated Environment." *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 53(18):1334-1337. DOI: 10.1177/154193120905301836.
- Britt, T. and M. Garrity.** 2006. "Attributions and Personality as Predictors of the Road Rage Response." *British Journal of Social Psychology* 45(1):127-147.
- Brown, I. D. and J. A. Groeger.** 1988. "Risk Perception and Decision Taking during the Transition between Novice and Experienced Driver Status." *Ergonomics* 31(4):585-597.
- Carver, Ch. and T. White.** 1994. "Behavioral Inhibition, Behavioral Activation, and Affective Responses to Impending Reward and Punishment: The BIS/BAS Scales." *Journal of Personality and Social Psychology* 67(2):319-333. DOI: 10.1037/0022-3514.67.2.319.
- Cavaiola, A. and E. Desordi.** 2000. "Locus of Control in Drinking Driving Offenders and Non-Offenders." *Alcoholism Treatment Quarterly* 18(4): 63-73.

- Cattell, R. B.** 1956. "Validation and Intensification of the Sixteen Personality Factor Questionnaire." *Journal of Clinical Psychology* 12(3):205-214. DOI:10.1002/1097-4679(195607)12:3<205::AID-JCLP2270120302>3.0.CO;2-0.
- Clapp, J. D., S. A. Olsen, J. G. Beck, S. A. Palyo, D. M. Grant, B. Gudmundsdottir and L. Marquesa.** 2011. "The Driving Behavior Survey: Scale Construction and Validation." *Journal of Anxiety Disorders* 25(1):96-105. DOI: 10.1016/j.janxdis.2010.08.008.
- Cloninger, C. R., D. M. Svrakic, T. R. Przybeck.** 1993. "A Psychobiological Model of Temperament and Character." *Archives of General Psychiatry* 50(12):975-990. DOI 10.1001/archpsyc.1993.01820240059008.
- Costa, P. and R. R. McCrae.** 1992. *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Model (NEO-FFI)*. Professional Manual. Odesa, FL: Psychological Assessment Center.
- Dahlen, E. and R. White.** 2006. "The Big Five Factors, Sensation Seeking, and Driving Anger in the Prediction of Unsafe Driving." *Personality and Individual Differences* 41(5):903-915.
- Dahlen, E., B. Edwards, T. Tubré, M. Zyphur and C. Warren.** 2012. "Taking a Look behind the Wheel: An Investigation into the Personality Predictors of Aggressive Driving." *Accident Analysis and Prevention* 45:1-9.
- Deffenbacher, J. L., R. S. Lynch, E. R. Oetting and R. C. Swaim.** 2002. "The Driving Anger Expression Inventory: A Measure of How People Express Their Anger on the Road." *Behaviour Research and Therapy* 40(6):717-737.
- Deffenbacher, J., E. Oetting and R. Lynch.** 1994. "Development of a Driving Anger Scale." *Psychological Reports* 74(1):83-91.
- DeYoung, C. G., L. C. Quilty and J. B. Peterson.** 2007. "Between Facets and Domains: 10 Aspects of the Big Five." *Journal of Personality and Social Psychology* 93(5):880-896.
- Donovan, J. E. and R. Jessor.** 1985. "Structure of Problem Behavior in Adolescence and Young Adulthood." *Journal of Consulting and Clinical Psychology* 53(6):890-904.
- Dula, C. and E. Geller.** 2003. "Risky, Aggressive, or Emotional Driving: Addressing the Need for Consistent Communication in Research." *Journal of Safety Research* 34(5):559-566.
- Dula, C. S. and M. E. Ballard.** 2003. "Correlates of Aggressive, Risky, and Emotional Driving." *Journal of Applied Social Psychology* 33:263-282.
- Goldberg, L. R.** (1992). "The Development of Markers for the Big-Five Factor Structure." *Psychological Assessment* 4(1):26-42. DOI: 10.1037/1040-3590.4.1.26.
- Harre, N.** 2000. "Risk Evaluation, Driving, and Adolescents: A Typology." *Developmental Review* 20(2):206-226.
- Hennessy, D. and D. Wiesenthal.** 2002. "The Relationship between Driver Aggression, Violence, and Vengeance." *Violence and Victims* 17(6):707-718.
- Hilakivi, I., J. Veilahti, P. Asplund, J. Sinivuo, L. Laitinen and K. Koskenvuo.** 1989. "A Sixteen-factor Personality Test for Predicting Automobile Driving Accidents of Young Drivers." *Accident Analysis and Prevention* 21(5):413-418.
- Horwarth, I.** 1988. "The Relationship between Objective Risk, Subjective Risk and Behavior." *Ergonomics* 31(4):527-535.
- Houston, J. M., P. B. Harris and M. Norman.** 2003. "The Aggressive Driving Behavior Scale: Developing a Self-Report Measure of Unsafe Driving Practices." *North American Journal of Psychology* 5(2):269-278.
- Hoyle, R. H., M. T. Stephenson, P. Palmgreen, E. P. Lorch and R. L. Donohew.** 2002. "Reliability and Validity of a Brief Measure of Sensation Seeking." *Personality and Individual Differences* 32:401-414. DOI:10.1016/s0191-8869(01)00032-0.
- Hristova, A. and K. Krumova.** 2019. "A Complex Method for the Study of Socio-Psychological Factors in Risky Behavior on the Road." *Psychological Research* (in print).
- Hoyt, M. F.** 1973. "Internal-External Control and Beliefs about Automobile Travel." *Journal of Research in Personality* 7(3):288-293.
- Iversen, H. and T. Rundmo.** 2002. "Personality, Risky Driving and Accident Involvement among Norwegian Drivers." *Personality and Individual Differences* 33(8):1251-1263.
- Iversen, H.** 2014. "Risk-Taking Attitudes and Risky Driving Behaviour." *Transportation Research Part F: Traffic Psychology and Behaviour* 7(3):135-150.
- James, W. H.** 1973. "A Restandardization and Factor Analytic Study of the Likert Method of Measuring Locus of Control." *Proceedings of the 81st Annual American Psychological Association Meetings* 8:19-20.
- James, L. and D. Nahl.** 2000. "Aggressive Driving is Emotionally Impaired Driving." Global Web Conference on Aggressive Driving. Toronto: Ontario Ministry of Transportation.
- Jonah, B. A.** 1997. "Sensation Seeking and Risky Driving: A Review and Synthesis of the Literature." *Accident Analysis and Prevention* 29(5):651-665.

- Jonah, B. A., R. Thiessen and E. Au-Yeung.** 2001. "Sensation Seeking, Risky Driving and Behavioral Adaptation." *Accident Analysis and Prevention* 33(5):679-684.
- King, Y. and D. Parker.** 2008. "Driving Violations, Aggression and Perceived Consensus." *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology* 58(1):43-49.
- Krahé, B.** 2005. "Predictors of Women's Aggressive Driving Behavior." *Aggressive Behavior* 31(6):537-546.
- Krahé, B. and I. Fenske.** 2002. "Predicting Aggressive Driving Behavior: The Role of Macho Personality, Age, and Power of Car." *Aggressive Behavior* 28(1):21-29. DOI: 10.1002/ab.90003.
- Lajunen T. and D. Parker.** 2001. "Are Aggressive People Aggressive Drivers? A Study of the Relationship between Self-reported General Aggressiveness, Driver Anger and Aggressive Driving." *Accident Analysis and Prevention* 33(2):243-255.
- Lajunen, T. and H. Summala.** 1995. "Driving Experience, Personality, and Skill and Safety-motive Dimensions in Drivers' Self-assessments." *Personality and Individual Differences* 19(3):307-318.
- Lee, K. and M. C. Ashton.** 2004. "Psychometric Properties of the HEXACO Personality Inventory." *Multivariate Behavioral Research* 39(2):329-358.
- Levenson, H.** 1973. "Multidimensional Locus of Control in Psychiatric Patients." *Journal of Consulting and Clinical Psychology* 41:397-404.
- Măirean, C., G. M. Havârneanu, S. A. Popușoi and C. E. Havârneanu.** 2017. "Traffic Locus of Control Scale – Romanian Version: Psychometric Properties and Relations to the Driver's Personality, Risk Perception, and Driving Behavior." *Transportation Research Part F: Traffic Psychology and Behaviour* 45(45):131-146.
- Maxwell, J., S. Grant and S. Lipkin.** 2005. "Further Validation of the Propensity for Angry Driving Scale in British Drivers." *Personality and Individual Differences* 38(1):213-224.
- Miles, D. E. and G. L. Johnson.** 2003. "Aggressive Driving Behaviors: Are There Psychological and Attitudinal Predictors?" *Transportation Research Part F: Traffic Psychology and Behaviour* 6(2):147-161. DOI: 10.1016/S1369-8478(03)00022-6.
- Montag, I. and A. L. Comrey.** 1987. "Internality and Externality as Correlates of Involvement in Fatal Driving Accidents." *Journal of Applied Psychology* 72(3):339-343.
- Nicholson, N., E. Soane, M. Fenton-O'Creevy and P. Willman.** 2005. "Personality and Domain-Specific Risk Taking." *Journal of Risk Research* 8(2):157-176.
- Nowicki, S. & Strickland, B.** (1973). A locus of control scale for children, *Journal of Consulting and Clinical Psychology* 40 (1), 148-154
- Oltedal, S. and T. Rundmo.** 2006. "The Effects of Personality and Gender on Risky Driving Behaviour and Accident Involvement." *Safety Science* 44(7):621-628.
- Özkan, T. and T. Lajunen.** 2005. "Multidimensional Traffic Locus of Control Scale (T-LOC): Factor Structure and Relationship to Risky Driving." *Personality and Individual Differences* 38(3):533-545.
- Panek, P. E., E. E. Wagner, G. V. Barrett and R. A. Alexander.** 1978. "Selected Hand Test Variables Related to Accidents in Female Drivers." *Journal of Personality Assessment* 42(2):355-357.
- Reid, D. and E. E. Ware.** 1974. "Multidimensionality of Internal versus External Control: Addition of a Third Dimension and Non-Distinction of Self versus Others. Canadian Journal of Behavioural Science." *Revue canadienne des sciences du comportement* 6(2):131-142. DOI: 10.1037/h0081862.
- Riccio-Howe, L. A.** 1991. "Health Values, Locus of Control, and Cues to Action as Predictors of Adolescent Safety Belt Use." *Journal of Adolescent Health* 12(3):256-262.
- Rosenbloom, T.** 2003. "Sensation Seeking and Risk Taking in Mortality Salience." *Personality and Individual Differences* 35(8):1809-1819.
- Rohrmann, B.** 1997/2001. *Risk Orientation Questionnaire (ROQ): Attitudes towards Risk Decisions*. <http://www.rohrmannresearch.net/rac-roq.pdf>.
- Rotter, J. B.** 1966. "Generalized Expectancies for Internal versus External Control of Reinforcement." *Psychological Monographs* 80(1):1-28.
- Rudin-Brown, C. M. and H. A. Parker.** 2004. "Behavioural Adaptation to Adaptive Cruise Control (ACC): Implications for Preventive Strategies." *Transportation Research Part F: Traffic Psychology and Behaviour* 7(2):59-76.
- Saucier, G.** 1997. "Effects of Variable Selection on the Factor Structure of Person Descriptors." *Journal of Personality and Social Psychology* 73:1296-1312. DOI:10.1207/s15327752jpa7002\_6.
- Schüssler, N. and K. W. Axhausen.** 2011. "Psychometric Scales for Risk Propensity, Environmentalism and Variety Seeking." Presentation, 9th International Conference on Transport Survey Methods (ISCTSC 2011), Termas de Puyehue, Chile, November 14-18, 2011. DOI: 10.3929/ethz-a-006689653.

- Schwebel, D. C., J. Severson, K. K. Ball and M. Rizzo.** 2006. "Individual Difference Factors in Risky Driving: The Roles of Anger/Hostility, Conscientiousness, and Sensation-Seeking." *Accident Analysis and Prevention* 38(4):801-810.
- Signori, E. K. and R. G. Brown.** 1974. "On the Study of Personality Factors in Research in Driving Behavior." *Perceptual and Motor Skills* 38:1067-1076.
- Simms, L. J., L. R. Goldberg, J. E. Roberts, D. Watson, J. Welte and J. H. Rotterman.** 2011. "Computerized Adaptive Assessment of Personality Disorder: Introducing the CAT-PD Project." *Journal of Personality Assessment* 93(4):380-389. DOI: 10.1080/00223891.2011.577475.
- Smith, D. and R. Kirkham.** 2011. "Relationship between Some Personality Characteristics and Driving Record." *British Journal of Social Psychology* 20(4):229-231.
- Spielberger, C. D.** 1988. *State-Trait Anger Expression Inventory*, 1st edition. Odessa, FL: Psychological Assessment Resources.
- Taubman-Ben-Ari, O. and D. Yehiel, D.** 2012. "Driving Styles and Their Associations with Personality and Motivation." *Accident Analysis and Prevention* 45:416-422.
- Totkova, Z. and R. Racheva.** 2018. "Lichnostni karakteristiki, svarzani s riskovoto povedenie na patya" [Personality Characteristics Related to Risky Driving Behavior]. *Psihologicheski izsledvaniya* [Psychological Research] 21(2):171-194.
- Ulleberg, P.** 2002. "Personality Subtypes of Young Drivers. Relationship to Risk-Taking Preferences, Accident Involvement, and Response to Traffic Safety Campaign." *Transportation Research Part F: Traffic Psychology and Behavior* 4(4):279-297.
- Ulleberg, P. and T. Rundmo.** 2003. "Personality, Attitudes and Risk Perception as Predictors of Risky Driving Behaviour among Young Drivers." *Safety Science* 41(5):427-443.
- Underwood, G., P. Chapman, S. Wright and D. Crundall.** 1999. "Anger while Driving." *Transportation Research Part F: Traffic Psychology and Behaviour* 2(1):55-68.
- Weber, E. U., A.-R. Blais and E. U. Betz.** 2002. "A Domain-Specific Risk-Attitude Scale: Measuring Risk Perceptions and Risk Behaviors." *Journal of Behavioral Decision Making* 15:263-290.
- West, R. and J. Hall.** 1997. "The Role of Personality and Attitudes in Traffic Accident Risk." *Applied Psychology* 46(3):253-264.
- Yagil, D.** 2001. "Reasoned Action and Irrational Motives: A Prediction of Drivers' Intention to Violate Traffic Laws." *Journal of Applied Social Psychology* 31(4):720-739.
- Zuckerman, M.** 1971. "Dimensions of Sensation Seeking." *Journal of Consulting and Clinical Psychology* 36(1):45-52. DOI: 10.1037/h0030478.
- Zuckerman, M., S. Eysenck, and H. Eysenck.** 1978. "Sensation Seeking in England and America: Cross-Cultural, Age, and Sex Comparisons." *Journal of Consulting and Clinical Psychology* 46(1):139-149. DOI: 10.1037/0022-006X.46.1.139.

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