

A Multidimensional Intergenerational Model of Young Males' Driving Styles

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Abstract

This study examines the associations between fathers' driving styles, the family's general and driving-related atmosphere, and the young drivers' motivations, on one hand, and young males' driving styles, on the other. The 242 father and son pairs that participated in the study independently completed several self-report questionnaires at different points in time within the first year after licensure of the young drivers.

A structural equation model (SEM) was developed, in which the contribution of fathers' driving style and their sons' perceptions of the general family relations, the family climate for road safety (FCRS), and costs and benefits of driving, to the driving styles of the young male drivers was examined. The SEM estimation results show direct as well as indirect significant effects between the various dimensions. The FCRS factors of non-commitment and messages, and the cost of thrill, were found to be the strongest mediators between the fathers' driving style and the family cohesion, on one hand, and the driving style of the young driver, on the other. These results may be useful in pointing out directions for the development of interventions that could assist in reducing the involvement of youngsters in risky driving and car crashes, and encourage safe and considerate driving.

Key words: Young Drivers; Family climate for Road Safety; Driving Styles; Motivations.

1. Introduction

Young drivers all over the world are over-represented in road crashes, especially during their first year of unsupervised driving (e.g. Williams, 2003). This is partially due to their lack of skill and experience and their tendency for risky behavior (Simons-Morton et al., 2011). Over the years, various factors that affect the driving behavior of young drivers have been studied, looking at both internal factors, such as personality and motivations, and external factors such as the influence of parents and peers (OECD, 2006). Most studies have concentrated on one or two such predictors, and examined them at the same point in time. The current study takes a step further by examining the complex contributions of familial general and driving-specific variables, as well as the individual's motivations, to young drivers' driving styles. Moreover, it does so using two generations reporting independently, and a longitudinal research design measuring the predictors before the measurement of the outcome variable.

The term driving style refers to the way drivers choose to drive or to their habitual driving mode (Elander et al., 1993). Taubman – Ben-Ari et al. (2004) provided a multidimensional conceptualization of driving style, and designed a measurement tool called the Multidimensional Driving Style Inventory (MDSI). The MDSI consists of four broad driving styles: reckless and careless driving style – deliberate violations of traffic laws as well as seeking for sensation and thrill while driving; anxious driving style – alert, but tense driving; angry and hostile driving style – irritation, rage, and hostile attitudes and acts while driving; patient and careful driving style – planning ahead, patience, politeness, and keeping traffic rules. These driving styles were found to be significantly associated with actual driving, as measured by In Vehicle Driving Recorder (Taubman – Ben-Ari et al., 2016).

Young drivers are influenced by the perceived norms and behaviors of parents, their attitudes, involvement, and monitoring (Shope, 2006). Moreover, parents' driving seem to be reflected in that of their offspring (Simons-Morton and Hartos, 2003; Bianchi and

Summala, 2004; Lahatte and Le Pape, 2008; Prato et al., 2009; Taubman – Ben-Ari et al., 2005). More specifically, there seems to be an intergenerational gender link, in which fathers affect their sons' driving more than mothers (Lahatte and Le Pape, 2008; Miller and Taubman – Ben-Ari, 2010; Taubman – Ben-Ari et al., 2005). Parents influence the driving behavior of their children through modeling, training or supervision (Farmer et al., 2010).

Empirical findings also indicate that lower levels of involvement in risky driving, violations and crashes are associated with young drivers' experience of their families as having higher assets, such as cohesion and adaptability levels (Taubman – Ben-Ari and Katz – Ben-Ami, 2013). In this context, Taubman – Ben-Ari and Katz – Ben-Ami (2013) proposed the concept of family climate for road safety (FCRS), which refers to the views of young drivers regarding the values, perceptions, priorities, and practices of their parents or family related to safe driving. They found that young drivers who perceived their parents to deliver clearer messages, provide more feedback on safe driving, monitor and limit their behavior to a higher degree, and act more as role models themselves tended to report engaging less in reckless driving, and endorse patient and careful driving to a higher degree. As previous studies have shown a connection between general family relations and the specific FCRS on one hand, and associations between FCRS and driving styles (Taubman – Ben-Ari and Katz – Ben-Ami, 2012, 2013), one can argue that the FCRS dimensions may serve as mediators between parents' general characteristics and driving styles, and their offspring's driving style.

The familial general and driving-specific climate may also be reflected in the way young drivers perceive driving, and their various motivations. Motivations are internal factors that affect the driving style of a person, and commonly consist of benefits and costs (Caffray and Schneider, 2000). Benefits, also known as enhancement motivators, of risky behavior include the desires to show off, to achieve self-esteem, personal worth, control, and confidence, to gain a sense of competence and skill, to feel part of a group, and to experience thrill and sensation. Costs include the fear of harming

oneself, the concern for significant others, regret for one's behavior, and helplessness, as well as the potential social costs of embarrassment and failure (Taubman – Ben-Ari, 2008).

Taubman – Ben-Ari (2008) found among young drivers, that the perception of driving as an opportunity for thrills encourages reckless driving habits and increases involvement in car crashes; whereas the perceived cost of distress increases involvement in car crashes, the perceived cost of damage to self-image reduces such occurrences. In addition, the benefit of thrill and the cost of annoyance contribute positively to involvement in traffic violations. Thus, counterintuitively, the findings indicated that certain perceived costs of driving, i.e., distress and annoyance, might contribute to higher involvement in reckless driving. She concluded that costs, as well as benefits, may encourage youngsters to take risks when driving, because driving is a convenient outlet for their feelings, conflicts, and ambivalence toward the issues of life and death.

Using a sample with a broader age range, motivations were found to be related also to driving styles (Taubman – Ben-Ari and Yehiel, 2012). The reckless and careless style was predicted by the perceived costs of distress and risk to life, among those with higher education. The angry and hostile style was predicted by perceptions of both control and annoyance among more educated drivers. The anxious style was associated to a view of driving as a cause of distress and annoyance, and, among higher educated individuals, also as entailing more risk to life and as a potential damage to their self-image, whereas among less educated persons as providing more opportunities for impression management. The careful driving style was associated with higher pleasure (especially among younger drivers), but lower thrill seeking and worries about damage to self-esteem. However, to the best of our knowledge, no prior study has traced predictors of these motivations, thus looking at them as potential mediators.

The current study proposes and tests a multi-dimensional model of intergenerational associations between variables, which have previously all been found to be related to the driving styles of young drivers. A structural equation model is developed in order to study the associations between father's driving style and the family's cohesion, on one hand, and the young males' respective driving style, on the other, examining the mediating effects of the family climate for road safety and perceived benefits and costs of driving of the young driver. The hypothesized structure of the connections among these variables is shown in Figure 1. The model structure starts with the fathers' driving style and the family relations, which are assumed to be well established and stable long before the child begins to drive. Both these are assumed to affect the family climate for road safety that develops as the child turns into a driver. In turn, the family safety climate affects both the motivations for driving of the child and the driving style directly. The motivations, as reflected by the costs and benefits of driving are also directly related to the young driver's driving style. All the variables in this model are latent. They will be indicated by the responses to corresponding scales. We focused on male young drivers and their fathers due to the fact that young men are more involved in risky driving and in crashes compared to young women (e.g., Sagberg et al., 2015; Shinar and Compton, 2004) and that it has been shown, as noted above, that the association between the driving styles of these two is strongest within the family (Taubman – Ben-Ari et al., 2005; Miller and Taubman – Ben-Ari, 2010).

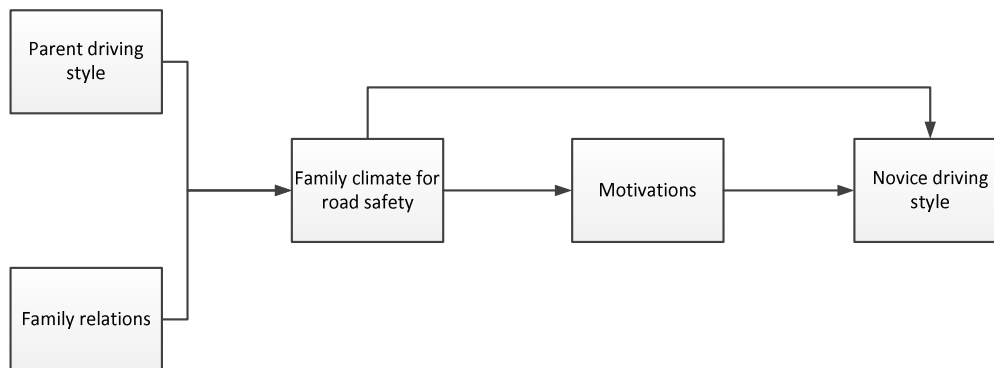


Figure 1 Theoretical model frame for the factors that affect young drivers' style

2. Method

2.1. Participants

The sample was drawn from participants in a larger longitudinal study (that included 12 months of data collection) of young male drivers and their families in Israel (for details, see Farah et al., 2013). Only participants that drove the family car (did not own or use another one) were included in the study. Two hundred and forty-two father-son pairs completed all questionnaires. The young drivers' ages ranged between 17 and 24 years (Mean age=18.0, SD=0.8), thus they were either high school pupils or serving in the Israeli Defense Forces. Fathers' ages ranged from 34 to 63 years (Mean age=50.6, SD=5.4). 61% of the fathers had an academic degree; 72% reported above average income, 23% average income, and 5% below average. It is worth noting that in Israel, an individual can receive a driving license at the age of 16 and 9 months.

2.2. Instruments and procedure

Data was collected over the course of twelve months for each participating family starting with licensure. This included the mandated initial three months of accompanied driving and nine months of teens' solo driving. The following questionnaires were used:

Multidimensional Driving Style Inventory (MDSI; Taubman – Ben-Ari et al., 2004) includes 44 items that describe feelings, thoughts, and behaviors while driving on a 6-point scale. It indicates on four broad driving styles: reckless and careless (11 items), anxious (19 items), angry and hostile (5 items), and patient and careful (9 items). These styles were found to correlate with self-reported crash records (Taubman – Ben-Ari et al., 2004; Taubman – Ben-Ari and Yehiel, 2012), as well as with performance measures collected in a simulator (i.e., driving speed, number of driving maneuvers, passing gaps; Farah et al., 2009). In the current study, Cronbach's alphas for the four styles of fathers and sons, respectively, were: reckless and careless 0.76, 0.81; anxious 0.83, 0.84; angry and hostile 0.76, 0.78; and patient and careful 0.80, 0.77.

Driving Costs and Benefits Questionnaire (DCBQ; Taubman – Ben-Ari, 2008), assesses subjective perceptions of the motivations, both costs and benefits, of driving. The questionnaire consists of two 21-item subscales, one assessing benefits and the other costs, and each relating to four factors. The driving benefits include impression management (7 items), pleasure (5 items), thrill (5 items), and sense of control (4 items). The driving costs consist of distress (7 items), damage to self-esteem (7 items), annoyance (4 items), and life endangerment (3 items). Participants were asked to rate the extent to which each item reflects their feelings and attitudes toward driving, using a 7-point scale. The Cronbach's alphas in the current study ranged from 0.70 to 0.82.

Family Adaptability and Cohesion Evaluation Scales II (FACES II; Olson et al., 1983), a 30-item scale that measures perceived family cohesiveness and ability to adapt to change. Respondents are asked to indicate the degree to which they agree, on a 5-point scale, with statements that describe behaviors in their family. Cronbach's alphas in the current study were 0.86 for cohesion (16 items), and 0.78 for adaptability (14 items).

Family Climate for Road Safety Scale (FCRSS; Taubman – Ben-Ari and Katz – Ben-Ami, 2012, 2013), consists of 54 items that relate to seven dimensions of the family's influence on teens' driving habits: modeling (11 items, Cronbach's alpha=0.86); feedback (5 items, Cronbach's alpha=0.94); communication (9 items, Cronbach's alpha=0.87); monitoring (7 items, Cronbach's alpha=0.84); non-commitment (8 items, Cronbach's alpha=0.70); messages (8 items, Cronbach's alpha=0.86); and limits (6 items, Cronbach's alpha=0.79). Responses were given on a 5-point scale.

For the current study, we used fathers' MDSI as completed at the beginning of the study, to reflect their habitual driving styles. The young drivers' FACES II and their reports on driving costs and benefits were also collected at the beginning of the study. The FCRSS was completed nine months later (six months into the solo driving phase). The young drivers' responses on the MDSI were completed twelve months from licensure. In all cases factor scores were computed by averaging the responses of the

relevant items, with higher scores reflecting greater endorsement or perception of presence of the specific behavior.

2.3. Data Analysis

The dimensions within the same questionnaire may be highly correlated with each other. This allows reducing the number of factors used in the main analysis. Otherwise, the results may be statistically unstable. Therefore, first, Pearson correlations were computed between the factors within scales. Then, a structural equation model (SEM) was developed in order to study the effects of the driving style of the father and selected factors associated with the young drivers' perceptions of the family relations and the family safety climate as well as his reported costs and benefits of driving, on the driving style of the young driver one year after licensure. The SEM was estimated using the statistical modeling software Mplus (Muthén and Muthén, 2010). The Measurement and structural equations were estimated jointly.

Table 1 and Table 2 present the correlations among the various factors collected within DCBQ and FCRSS of the young drivers, respectively. For FACES II the correlation between the cohesion and adaptability factors was 0.82 ($p < 0.001$). As expected, multiple dimensions in the same scales were highly correlated to one another. Thus, representative factors from each questionnaire were selected for the structural equation model based on these correlations, on their correlations with factors in other scales and on results of various model estimations attempts.

Table 1 Correlations among costs and benefits of driving of young drivers

| | Pleasure | Thrill | Sense of Control | Distress | Damage to Self-Esteem | Burden | Life Endangerment |
|-----------------------|----------|---------|------------------|----------|-----------------------|----------|-------------------|
| Impression Management | 0.65*** | 0.62*** | 0.56*** | 0.13 | 0.39*** | 0.03 | 0.18* |
| Pleasure | | 0.44*** | 0.88*** | -0.24** | -0.001 | -0.43*** | -0.02 |
| Thrill | | | 0.29*** | 0.27** | 0.65*** | 0.20 | 0.26** |
| Sense of Control | | | | -0.30** | -0.03 | -0.32*** | -0.05 |

| | | | | | | | |
|-----------------------|--|--|--|--|---------|---------|---------|
| Distress | | | | | 0.75*** | 0.78*** | 0.69*** |
| Damage to Self-Esteem | | | | | | 0.60*** | 0.53*** |
| Burden | | | | | | | 0.33** |

*p≤0.05; **p≤0.01; ***p≤0.001

Table 2 Correlations among young drivers' family climate for road safety factors

| | Feedback | Communication | Monitoring | Non-commitment | Messages | Limits |
|----------------|----------|---------------|------------|----------------|----------|----------|
| Modeling | 0.64*** | 0.71*** | 0.41*** | -0.94*** | 0.65*** | 0.55*** |
| Feedback | | 0.75*** | 0.45*** | -0.62*** | 0.42*** | 0.46*** |
| Communication | | | 0.53*** | -0.80*** | 0.61*** | 0.58*** |
| Monitoring | | | | -0.44*** | 0.39*** | 0.67*** |
| Non-commitment | | | | | -0.85*** | -0.60*** |
| Messages | | | | | | 0.50*** |

*p≤0.05; **p≤0.01; ***p≤0.001

3. Results

The proposed modeling framework was operationalized in models, which use the responses to the various scales that were collected as indicators on the latent variables. An iterative trial and error process was used to develop models. Selection among models was based on their fit (AIC). The final model and its estimates are shown in Figure 2. Dark bold arrows represent significant associations, and light thin arrows represent insignificant results. As noted above, in order to make the model tractable, its dimensionality was reduced by using a subset of the factors in each scale. In the final model, cohesion was used to represent family relations, monitoring, messages and non-commitment were used to capture family climate for road safety, thrill and distress were used to represent cost and benefit motivations for driving, respectively. All dimensions of the driving style of fathers and sons were retained in the model.

The loadings of the latent variables on the scale items in the measurement equations are not shown in order to simplify the presentation. These were estimated jointly with the parameters of the structural equation presented in the figure. The model measures of fit

are RMSEA=0.047; CFI=0.903; TLI=0.894; $\chi^2=5152.2$, (861 degrees of freedom, $p \leq 0.001$); SRMR=0.076.

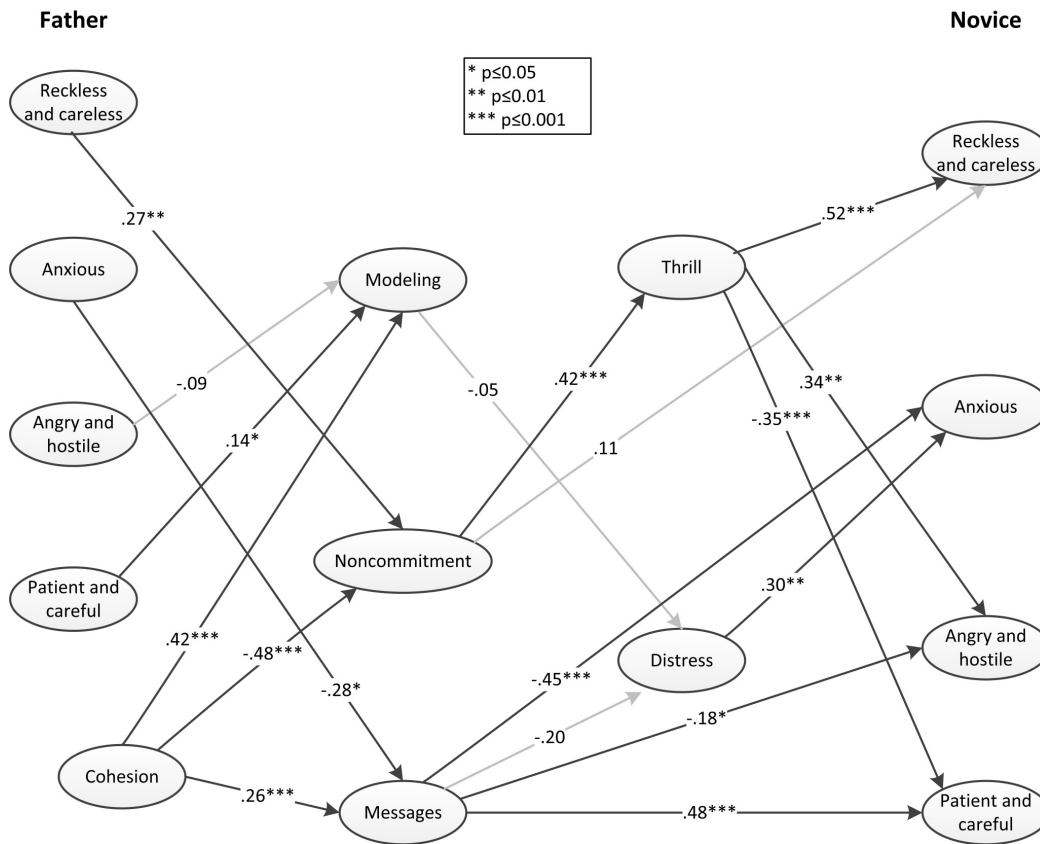


Figure 2 Estimation results of the structural relationships in the model

The estimation results are consistent with several hypothesized associations. Fathers' reckless and careless driving style is positively associated with FCRS non-commitment; fathers' anxious driving style is inversely related to FCRS messages; fathers' patient and careful driving style is positively associated with FCRS modeling. The family cohesion is positively related to both FCRS modeling and messages and inversely related to non-commitment. FCRS non-commitment is positively associated with the benefit of thrill. FCRS messages is inversely related to young drivers' anxious and angry and hostile styles and positively related to their patient and careful driving style. The benefit of

thrill is positively associated with the young drivers' reckless and careless and angry and hostile driving styles, and inversely associated with their patient and careful style. The cost of distress is positively related to young drivers' anxious driving style.

The results also show indirect effects of the fathers' driving style and the perceived family cohesion on the driving styles of the young driver. The reckless and careless, angry and hostile and patient and careful styles of the young driver are all associated with the fathers' reckless and careless driving style and the family's cohesion, through the mediators of FCRS non-commitment and the benefit of thrill. Fathers' reckless and careless driving style is positively associated with non-commitment, while family cohesion is negatively related to it. In turn, non-commitment is positively related to thrill seeking, which contributes to increased levels of reckless and careless and angry and hostile styles of the young drivers and reduces their patient and careful driving.

Another set of paths show the effect of fathers' anxious driving and cohesion on the anxious, angry and hostile and patient and careful styles of the young driver through the mediation of FCRS messages. Messages are negatively associated the father's anxious driving style and positively with the family's cohesion. In turn, the messages contribute to decrease anxious and angry and hostile styles of the young drivers and increase their patient and careful style.

4. Discussion

The results of this study attest to the importance of examining a multidimensional model of associations that considers two generations, in a longitudinal design, to improve our understanding of the dynamics contributing to young drivers' driving styles. Whereas past examinations found many direct correlations between factors that are associated with the driving mode of young drivers, they did not take into account the complexity and inter-correlations between the external and internal factors at once. This study designed a theoretical model to capture the complex associations between of the various factors. With the theoretical model and a SEM, both internal and external

factors could be analyzed together in a single model, expanding the studies conducted thus far, and improving our understanding.

The current findings provide a fuller, more complex picture, showing that the family's global atmosphere, as well as fathers' specific driving style, may affect the driving behavior of young drivers, through the youngsters' recognition of their family's climate for road safety, and their own perceived motivations for driving. Though some of the associations found here reflect previous ones (e.g., Taubman – Ben-Ari and Katz – Ben-Ami, 2013; Taubman – Ben-Ari, 2008), to the best of our knowledge, no other study has presented such associations in one comprehensive model.

Overall, the study indicates that fathers have an important role in the way their sons choose to drive. When families are less involved in each-other's lives, when fathers drive less safely, when they are less likely to be engaged and committed to the safety of driving, a young driver is more likely to adopt maladaptive driving styles. More specifically, higher endorsement of the reckless and careless driving style by fathers and a family relations characterized by lower cohesion were related to a greater perception of the family as uncommitted to safety by the young drivers, and then to a higher perception of driving as entailing thrill. Such a view on driving was associated to higher endorsement of reckless and careless and angry and hostile driving styles, and a lower preference for the patient and careful driving style on the part of the young drivers. In addition, lower endorsement of the anxious driving style by fathers and a family relations characterized by higher cohesion were related to a greater perception of the family's climate as endorsing safety messages by the young drivers. This in turn, was associated to lower reports of anxious and angry and hostile driving styles, and a higher preference for the patient and careful driving style on the part of the young drivers. The findings call for a comprehensive understanding of the interrelated family system factors along with youngsters' needs and motivations, which all together set the way they choose to actually behave.

The results of this study are valuable both on the individual and the community or social levels. These results expand our understanding in regard to the factors affecting the driving of young drivers, and once again point to the importance of the family as a shield against risky tendencies. However, working only on an individual level is not enough. Endowing such insights to communities, may help educators, social activists, and community leaders, to design effective safety messages and actions for parents and their young drivers to help decrease their involvement in car crashes.

Some limitation of the current study should be mentioned. First, it was based on self-reported questionnaires. In order for the model to be more practical, attempting to use behavioral measure such as real-life observations or a car simulator would be beneficial. In-vehicle data can be used as the measured variable to indicate real-life risky driving instead, or in addition to, self-reported driving styles. Second, the various measures and scales that are used to represent driving behavior and the associated factors are multi-dimensional. Representing these in one comprehensive model requires a very large sample size, which was not applicable currently. A study with a larger sample size can be used in the future to further the current investigation and examine a more complete set of dimensions. In addition, this study analyzed only the first time each questionnaire was answered, and did not look into changes over time. A longitudinal design, which allows the examination of the changes between the phases of driving, is recommended in future research.

Notwithstanding these limits, the current study joins attempts to help reduce the number of crashes young drivers are involved in and improve their safety. It does so by developing a theoretical framework taking into account a set of factors that were found in the past to affect the driving behavior of young drivers. But, with the understanding of the importance to present a complex model, it examines them together in one integrative model, taking into account both parents' and young drivers' reports on their perceptions and behaviors.

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