Differential moderating effect of personality variables on effect of driving experience in young male and female drivers

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Younger drivers

- Those aged 17 to 25 years represent 7% of license holders in the UK but are involved in 13% of injury accidents (RoSPA, 2007).

- Road crashes and traffic violations are approximately 60% higher in young and middle aged male drivers compared to their female counterparts (Kweon & Kockelman, 2003).

- Gender differences in driving behaviour and crash rates have been reliably replicated (Lonczak, et al, 2007).
Plan

- Role of experience
- Driver style
- Personality

Example of personality factor: Locus of Control (LOC)

Putting it all together:
- LOC, gender and experience on driver style
Role of experience

- The decrease in collision involvement with increasing age is attributed largely to increasing skill with increasing experience.

- But the extent to which driving skill benefits from experience is a more complex issue than it first appears, interacting with gender, personality and driving style.
Role of experience

Kweon & Kockelman (2003) compared crash rates per vehicle miles driven:
- the difference between young men and women was much less.

Young men’s higher risk may be simply due to the fact that they drive more
but
their higher driving experience does not make young men any less crash involved per mile driven.

Young men do not seem to benefit from greater driving experience as much as young women
Driving Style

Human factors in driving are composed of two main components: driving skills and driving style, and both affect accident outcome.

Driving style: the way drivers choose to drive, or habitually drive:

► speed
► attitudes to other road users
► attitudes to rules
► general attentiveness.

• This is influenced by beliefs about one’s own ability and what makes a good driver, as well as personality and values.
Driver style

- Multidimensional Driving Style Inventory (MDSI, Taubman-Ben-Ari, et al., 2004).

- Eight driving styles:
  (i) Dissociative
  (ii) Anxious,
  (iii) Risky
  (iv) Angry
  (v) High-velocity
  (vi) Distress-reduction
  (vii) Patient
  (viii) Careful
Driver Style

Angry, Risky, High velocity
All predict self-reports of car collision involvement and driving offences, and are inversely associated with the “careful” style.

Dissociative, Risky, High velocity
All make a unique contribution to actual crash involvement, in addition to the prediction from age and gender.
Personality variables

• Personality factors investigated in relation to driving:
  • aggression hostility
  • risk taking,
  • sensation seeking

• locus of control (LOC, Rotter, 1966)

  particularly useful for those seeking to influence driver behaviour in terms of developing safe driving for life, and to discover contributing explanations for the puzzle of lack of experience benefit in young men

variation in this trait implies within it different responses to outcomes in terms of their influence on future behaviour.
Locus of control

- External LOC: people who believe outcomes are controlled by external forces (e.g., fate, powerful others, not self),
- Internal LOC: people who perceive outcomes to be dependent on their own skill, efforts or behaviour.

- It is suggested that the more external a person’s LOC, the less likely they may be to change behaviour in response to outcomes.
- But alternatively, the more internal a person’s LOC, the more they may believe in their own ability to avoid a collision, independent of circumstances.
Past research on LOC and crash risk

• A striking feature of studies reviewed is that participants are often either all male, or biased in that direction, and are often selected for high crash involvement.

• Crash involved respondents may respond on LOC scales to present themselves as appearing less responsible for the crash, and involvement may have led them to attribute road traffic collisions to external fault, reducing validity of findings.

• Studies with a balanced gender population, that have not selected specifically for high rates of serious collision involvement, have not found a relationship between externality and collisions or risky behaviour.
However...

- Young male drivers consistently emphasise skill factors and overestimate their own skill, particularly during their first year of driving.

- Given that young men have more collisions than young women, this suggests that such “internal” beliefs may be related to risk taking.

- This leads one to expect a group of young male drivers, not selected for previous collision involvement, to score higher on internality.
LOC, gender and experience

• The complex interactions with effects of gender and driver experience on development of driver styles during the first few thousand miles, months and years of driving have not been examined.

• It is proposed that such interactions may be related to some of the gender differences reported in driving behaviour and collision frequency and severity.
Hypotheses

1. Young men and women will differ in terms of their predominant driving styles.

2. Driving experience (duration and amount) may influence these driving style differences between genders.

3. Young men and women will differ in terms of LOC.

4. The interaction of LOC will influence the effect of experience on driver style.

The influence of LOC on the effect of experience will inform understanding of differential effects of experience effects on different genders.
Participants

• 122 women and 100 men aged 18 to 29 years (mean age = 21.32 years, SD= 2.5).

• with a valid driving licence

• minimum of a month’s driving experience
Measures

- Experience assessed as:
  - number of months driving (duration)
  - number of hours driven per week (amount):

- MDSI (Taubman-Ben-Ari, et al., 2004)
- LOC (Rotter, 1966)
Results

1. Young men and women will differ in terms of their predominant driving styles

   - **Driving Styles**
   - Women scored higher on dissociative, anxious, and patient driving styles

   - men scored higher on risky, angry and high velocity driving style,

   all $p<0.01$
2. Driving experience (duration and amount) will influence driving style gender differences.

Measures of driving experience as covariates in this gender comparison.

- **Amount of driving** (hours per week): had a significant effect on dissociative, anxious, angry and high velocity driving styles (all at least $p<0.05$)

- **Duration of driving** (months) only effect on anxious driving style was significant

- Effect of experience slightly reducing the gender effect in all cases, but gender effect remained significant:

  ▶ Experience differences contribute to, but do not fully account for, gender differences in driver style
3. Young men and women will differ in terms of LOC.

- Women had a higher (more external) total LOC score than men, $F(1,219)=5.69, p<0.05$.

- (i.e. men were more internal)
4. The interaction of LOC will influence effect of experience on driver style.

- (i) Correlations between experience and driver styles

- The greater the duration of driving, the less drivers demonstrated anxious and dissociative driving style (both genders)

- MEN: the greater the amount of driving done per week, the more men demonstrated high velocity style.

- WOMEN: angry driving style increased the longer they had been driving.
4. The interaction of LOC will influence effect of experience on driver style.

• (ii) Correlations between driving styles and LOC

• The higher the LOC (more external), the more likely dissociative, anxious and distress reduction driving styles were reported.
4. The interaction of LOC will influence effect of experience on driver style.

- (i) Correlations between experience and driver styles
- (ii) Correlations between driving styles and LOC
- (iii) partial correlations between experience measures and driving styles were conducted, controlling for LOC.

- (Statistical control shows what would happen if LOC wasn’t having an impact)
Influence of LOC on effects of experience on driver style

• MEN: once LOC was controlled, the positive effect of duration of driving experience on reducing angry and high velocity driving style was increased although this was still non-significant.

• MEN: More dramatically, the almost negligible positive relationship between duration of experience and carefulness increased to become significant, \( r(96)=0.22, p<0.05 \).

• WOMEN: relationships changed in a more negative direction such that once LOC was controlled, greater experience increased angry and high velocity driving to a greater extent (\( r(117) = 0.23, p=0.01 \); \( r(117) = 0.17, p=0.06 \) respectively)

• But reduced careful driving (\( r(117)=-.13, \text{ns} \))
Young Men

- When influence of LOC was controlled, the positive effect of duration of driving experience on reducing angry and high velocity driving style increased

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Young Men

High internal LOC

Experience

Carefulness

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Young Men

• and the almost negligible positive relationship between duration and carefulness increased to become significant

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Young women

- In contrast, the increased negative effect of experience for women once LOC was controlled suggests that their higher externality was having a positive influence on effect of experience.

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Young women

Experience (duration)

High external LOC

Angry style
High velocity style

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Summary

Young men’s high internality was suppressing the positive effect of experience.

Young women’s high externality was suppressing the negative effects of experience.
Conclusion

- Experience was shown to have a generally positive influence on anxious and dissociative driving styles (the “stress” styles), but amount of driving was the more important experience variable for women, who show more of this problem than men.

- Duration of driving seemed to be the more important variable for men in terms of reducing negative driving styles.
Some specific pointers: Driver Anger

• Although men scored higher on angry driving style, even controlling for experience, this negative style increased for women with increasing experience.

• With increased amount and duration of driving, all drivers may experience more inconsiderate driving or progress being impeded, which may result in increased angry styles.

• Need for control (internal LOC) is a psychological source of angry driving style (Taubman-Ben-Ari et al., 2004), the driver being unable to control incidents such as impeded progress.

• Driving anger has been related to aggressive and risky behaviour and increased collisions.
Driver anger

- Findings highlight the need to develop effective counter-measures to reduce anger experienced whilst driving,

  - focussing on beliefs related to high internal control in young drivers may be a useful route for intervention.
Finally

This research has underlined the role of a specific personality factor, locus of control, in safe and unsafe driving styles, and specifically, highlighted important interactions with gender and experience that go some way towards explaining the puzzle of why young men continue to have higher risk than young women as drivers despite their greater experience.

Findings provide guidance on counter-measures that could be developed in order to reduce crash risk, such as alerting driving examiners to behavioural markers that would predict collision related styles, informing the type of experience accumulation needed (duration versus amount) in further training for new drivers once licensed, and informing driver style management for individuals.
Key References
