Testing and Contrasting Road Safety Education, Deterrence, and Social Capital Theories: A Sociological Approach to the Understanding of Male Drink-Driving in Chile's Metropolitan Region

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ABSTRACT – Three theories offer different explanations to the understanding of male drink-driving. In order to test road safety education, deterrence, and social capital theories, logistic regression analysis was applied to predict respondents' statements of having or not having engaged in actual drink-driving (DD). Variable for road safety education theory was whether a driver had graduated from a professional driving school or not. Deterrence theory was operationalized with a variable of whether a driver had been issued a traffic ticket or not. Social capital theory was operationalized with two variables, having children or not and having religion identification or not. Since both variables 'years of formal education' and 'years of driving experience' have been reported to be correlated to alcohol consumption and DD respectively, these were introduced as controls. In order to assess the significance of each variable statistically, Wald tests were applied in seven models. Results indicate on the one hand that road safety education variable is not statistically significant; and on the other, deterrence theory variable and social capital theory variable 'having children' were both statistically significant at the level of .01. Findings are discussed in reference to Chile's context. Data were taken from the "Road Users Attitudes and Behaviors towards Traffic Safety" survey from the National Commission of Road Safety of the Government of Chile (2005). The sample size was reported to be 2,118 (*N* of male drivers was 396). This survey was representative of Chile's Metropolitan Region road users' population.

INTRODUCTION

In industrial nations drink-driving (DD) has been comprehensively researched by disciplines such as transports engineering, epidemiology, psychology, economics and sociology [Chi et.al., 2010; Impinen et al., 2010; Clinard and Meier, 2008:274-276; Erke, 2009; Fiorentino, Berger and Ramirez, 2007; Shaffer et al., 2007; Winfree, Giever, and Maupin, 2007; Hingson and Winter, 2003; Williams, 2003; Ross, 1993; Arnett, 1990; Gusfield 1998]. Within this literature a common finding has been the association between DD and male drivers [Elvik et al., 2009; Leadbeater B J, Foran K, and Grove-White A, 2008; Schwartz J, 2008]. There are at least three theories which can offer different explanations to the understanding of what social circumstances may trigger or inhibit the association between DD and male drivers: road safety education, deterrence, and social capital theories.

Firstly, supporters of road safety education argue that individuals exposed to road safety education, i.e courses in primary or secondary levels and professional driving schools, learn knowledge which helps them to distinguish which road behaviors are either risky or safe [Montoro, 2011; McKenna, 2007][i]. Specifically, Thomson et al. (1996) have proposed a set of principles where the link between road safety knowledge and road safety behavior can be met. In sociological terms, this would imply that processes of secondary socialization led by formal institutions such as primary or secondary schools, or professional driving schools should have a positive impact on road users' safety behaviors.

According to Christie (2001) few studies have analyzed the association between road safety education and road users' behaviors. Particularly, in the area of driving training, some studies suggest that this type of education is not significantly associated to road safety behaviors or road crashes [Elvik et al., 2009; Ker et al., 2005; Lund, Williams and Zador, 1986]. Even two studies state that road safety education can have negative effects on road safety [Morrison, Petticrew and Thomson, 2003; Elvik et al., 2009:787-789]. It is important to acknowledge, however, that individuals who register in professional driving schools do it because they aim at obtaining a driver's license rather than preventing crashes [Elvik et al., 2009:793]. Therefore, negative or lack of association may not be regarded as a driving school's inefficacy per se. A potential explanation to understand why professional driving school methods may not be effective, particularly when targeting male students, can be related to its inadequate approach to tackle masculinity in relation to driving, as Walker, Butland and Connell suggest (2001).

Secondly, deterrence theory argues that both formal threats of sanctions and sanctions themselves decrease risky behaviors [Leal, Barry and King 2007]. Specifically, these social structures operate as 'constrain potential choices of would-be offenders' [Pratt et al., 2009:370]. Application of this frame on

DD has produced two contradictory types of findings. Some suggest that formal sanctions are effective on deterring and decreasing DD [Asbridge et al., 2004; Berger and Marelich, 1997]. Conversely other studies indicate that the association between formal threats and DD is weakened when variables representing informal threats are included into the analysis [Green, 1998; Tibbets 1997].

Thirdly, the concept of social capital generally refers to the assets that reside within social individuals' relationships [Bebbington, 2009]. These assets are understood as constituting an important part of people's identities, livelihood, interests and aspirations. This theory indicates that if social capital is strong at the individual level, risky behavior is likely to be inhibited [Coleman, 1990; Wright, Cullen and Miller, 2001]. If family relationships are one dimension of how social capital can be measured at the individual level, application of this theory states that certain family roles (marriage and having children) are significantly associated to the promotion of health behavior, which ultimately affects mortality [Umberson, 1987]. When religion is another dimension of how social capital is measured, findings indicate that individuals who belong to religious groups are less likely to engage in road risky behavior [O'Malley and Johnston, 1999; Nazif and López, 2006].

Grosso modo the last two theories agree on the importance of control as a means of inhibiting risky social actions. However, these approaches analytically differentiate two answers for the question of where control is socially situated in order to avoid DD. For the former, control is conceived to be in state institutions and its manifestation can be either formal threats of sanctions (i.e. public announcement of patrolling, patrolling, and threats of monetary fines, driver's license suspension, and imprisonment, among others) or execution of sanctions (i.e incapacitation of driving by either license suspension or imprisonment). Whereas for the latter, control can be situated in certain type of families or organizations such as sports clubs or churches, among others, since individuals who belong to these groups are more likely to be inclined to consider whether their actions can impact their immediate social environments.

Both theories are ultimately complementary, because under certain social contexts these types of control can coexist and also reinforce each other when a given social norm is shared. Furthermore, a mechanism which both theories can also share is the feeling of shame of potential offenders [Braithwaite, 1989; Green, 1989; Tibbets 1997].

Since research on DD has been mainly carried out in industrial nations, and there has not been an attempt to test which of these three theories would seem to be most appropriate to the understanding of males and DD, the objective of this paper is twofold: Firstly, to advance in the area of the sociology of road safety by studying a setting (Chile's Metropolitan Region) characterized by higher traffic fatality rates and weaker road safety policies when compared to advanced countries [Nazif, 2011]. Secondly, to enhance knowledge of the DD's area, by testing, and contrasting road safety education, deterrence and social capital theories in a representative sample of male drivers from a Latin-American highly urbanized city.

METHODS

Data

Data were taken from the "Road Users Attitudes and Behavior towards Traffic Safety" Survey of the National Commission of Traffic Safety of the Government of Chile (2005). This data was gathered from a representative sample of Chile's Metropolitan Region road user population aged 16 and over. Information was obtained from 2,118 respondents. Table 1 describes the main statistical variables of the sample.

Table 1 Descriptive statistics of the sample

Variables	Answer	N	%
Type of road user	Drivers	549	25.1
	Pedestrians or passengers[ii]	1569	74.9
Gender	Male	1053	48.1
	Female	1135	51.9
Age	16-29	704	32.2
	30-49	867	39.6
	Over 49	617	28.2
n = 2.118			

The sub-sample of drivers (*n*= 549) had 137 females (24.9%) and 412 males (75.1%). A sub-sample composed of individuals who were male drivers and had responded to all questions regarding the variables analyzed here was taken in order to carry out the

analysis (n = 396). In other words, there were 16 male drivers in the sub-sample of male drivers (n=412) who were not incorporated into the analysis because they had not responded to questions regarding road safety education, deterrence theory, social capital theory, years of education, years of driving experience and/or age.

Dependent Variable

In order to classify whether a male driver had engaged in DD, statements from the question 'how many days per week do you drive after having drunk alcohol?' were coded into two categories: 'never' as (0), and 'only once per week', 'twice per week' and 'more than twice per week' as (1). Rationale of this operationalization is as follows: a male who drinks alcohol and decides to drive in this condition once per week or more is nonetheless a source of road risk. Therefore in order to capture this road risky behavior properly, categories of having DD were collapsed into only one group. Table 1 summarizes descriptive statistics of the dependent variable 'DD'.

Table 2 Descriptive statistics of the dependent variable

Dependent variable	Answers	%
DD (How many days per week do you drive after having drunk alcohol?)	(0) Never	77.0
	(1) More than once	23.0
n = 396		

Independent and Control Variables

Independent and control variables are operationalized to test each theory previously discussed.

1. Road safety education theory (RSET)

In order to classify whether a male driver had graduated from a professional driving school or not, statements from the question 'where did you learn to drive?' were coded into two categories: 'parents', 'another relative', 'friend', 'autodidact' and 'other' as (0) and 'professional driving school' as (1).

2. Deterrence theory (DT)

In order to classify whether a male driver had been subject of effective traffic controls or not, a variable from the question 'have you ever been issued a traffic ticket?' was operationalized. Statements from this question were coded into two categories: 'no' as (0), and 'yes' as (1).

3. Social capital theory (SCT)

SCT was operationalized with two dichotomous variables:

a) SCTi: In order to classify whether a male driver had children or not, statements from the question 'do you have children?' were coded into two categories: 'no' as (0), and 'yes' as (1).

b) SCTii: In order to classify whether a male driver had any religious identification or not, statements from the question 'which of the following religions do you identify with?' were coded into two categories: 'without religion' as (0), and 'Catholic', 'Protestant', 'Jehovah's Witnesses' and 'Other religion' as (1).

Table 3 Descriptive statistics of independent and control variables

Variable	Answers	%	Mean	S.D.
RSET	(0) No	84.3		
	(1) Yes	15.7		
DT (had been issued a traffic ticket)	(0) No	28.0		
	(1) Yes	72.0		
SCTi (having children)	(0) No	26.3		
	(1) Yes	73.7		
SCTii (having religion identification)	(0) No	19.9		
	(1) Yes	81.1		
YFE (control)			13	2.405
YDE (control)			20.21	12.762
n = 396				

4. Years of formal education (YFE control variable)

The variable YFE was introduced as control because it has been positively associated to alcohol consumption (Ministry of Health of Chile, 2010). Years of education come from the question 'what is your highest level of education'.

5. Years of driving experience (YDE control variable)

Since the variable YDE has been reported to be a strong predictor in the literature (Elvik et al., 2009; Williamson, 2003), this was introduced as control. Information to build this variable was taken firstly from the question 'When did you obtain your driver´s license?'. Secondly, in order to know specifically how many years of driving experience a person had, values from this question were subtracted from the year when the survey was taken (2005). Table 2 summarizes descriptive statistics of independent and control variables.

Statistical method

Since the dependent variable was dichotomous, a logistic regression technique was applied.

The logistic regression models to test each theory were as follow:

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1RSET} + \beta_{2YFE} + \beta_{3YDE} \quad (1)$$

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1DT} + \beta_{2YFE} + \beta_{3YDE} \quad (2)$$

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1SCTi} + \beta_{2SCTii} + \beta_{3YFE} + \beta_{4YDE} \quad (3)$$

Where p is the probability of a male driver having engaged in DD; α the intercept; β_{xi} the slope parameters of the independent and control variables (coefficients); $RSET_i$ represents a variable of road safety education theory which measures whether a male driver had graduated from a professional driving school or not; *DT* is the variable representing deterrence theory, which measures whether a male driver had been issued a traffic ticket or not; SCT_i represents a variable of social capital theory which measures whether a male driver had children or not; SCT_{ii} represents a social capital variable which measures whether a male driver had religion identification or not; YFE represents a control variable which measures years of formal education and YDE is the control variable which measures how many years of driving experience a male driver had.

These three first models are set to test whether each independent variable representing each theory is associated to DD. In a second stage other models will be run in order to test the statistical significance of each variable while introducing variables from other competing theories. The control variables YFE and YDE however will be introduced in every model. Results are reported as coefficient exponents (odds ratio) and standard errors (s.e.) of the parameters. X^2 and Wald test are applied to test the statistical significance of the models and coefficients respectively. Statistical significance was established at three different values p< .05, .01 and .001.

RESULTS

Results of the three models are presented in table 3. In this table, we firstly observe that models 1, 2 and 3 are statistically significant. In other words, the group of variables introduced into the models is statistically associated to the distribution of the odds ratio of variable DD, since their p values are lower than 0.001. In order to understand whether each variable is significantly associated to DD each model needs to be assessed independently.

Table 4 Logistic regression models 1, 2 and 3 for the dependent variable DD

	Models		
	1	2	3
RSET	1.132 (.324)	-----	-----
DT	-----	2.740** (.314)	-----
SCTi	-----	-----	-.377** (.298)
SCTii	-----	-----	-.656 (296)
YFE (control)	1.117* (.055)	1.116* (.055)	1.053 (.058)
YDE (control)	-.971** (.011)	-.959*** (.011)	-.991 (.012)
Constant	.120** (.759)	-.072*** (.789)	-.485 (.870)
n=396			
L(0)	426.914	426.914	426.914
L(θ)	412.642	402.152	400.322
X^2	14.271***	24.762***	26.592***
Pseudo R^2 Nagelkerke	.054	.092	.098

Coeficientes exp (B) and s.e between brackets. Level of significance * p < .05 / **p < .01 / ***p < .001.

In model 1 we observe that RSET's positive direction would indicate that a male driver who has graduated from a professional driving school is more likely to

engage in DD than a male driver who learnt to drive under an informal structure, however this association is not significant. Secondly, YFE is positively and significantly associated to DD, which would suggest that the more years of education a male driver has, the chances of engaging in DD increase. Thirdly, when analyzing the second control variable YDE we observe that it is statistically significant, therefore values of this variable are associated to the odds ratio distribution of engaging in DD. Specifically, an increase of years in driving experience is associated to a decrease of the odds ratio of engaging on DD.

In model 2 we observe that DT is statistically significant, however, unlike what is commonly assumed the direction of the parameter is positive. This suggests that a male driver who has not been issued a traffic fine is less likely to engage in DD than a male driver who has been issued a traffic fine. Secondly, both control variables are statistically significant, and therefore model 1's interpretation is also valid for mode 2.

We observe in model 3 that both variables SCTi and SCTii are negatively associated to DD. This means that a male driver who had children or identifies with a religious group is less likely to be associated to DD than a male driver without children or without religious identification. However, when assessing the statistical significance of both variables, only SCTi proves to be significant since its p value is < .001. We observe that the introduction of both SCT's variables has ultimately decreased the statistical significance of the control variables YFE and YDE.

Four more models are going to be run in order to identify whether or not associations to DD remain statistically significant when a variable from a competing theory is introduced. The models are as follow:

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1RSET} + \beta_{2DT} + \beta_{3YEF} + \beta_{4YDE} \quad (4)$$

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1RSET} + \beta_{2SCTi} + \beta_{3YFE} + \beta_{4YDE} \quad (5)$$

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1DT} + \beta_{2SCTi} + \beta_{3YEF} + \beta_{4YDE} \quad (6)$$

$$\log(\frac{p}{1\ \ p}) = \alpha + \beta_{1RSET} + \beta_{2DT} + \beta_{3SCTi} + \beta_{4YEF} + \beta_{5YDE} \quad (7)$$

Models 4, 5 and 6 are designed to compare only two theories among each other (RSET vs. DT; RSET vs. SCT; and DT vs. SCT). Model 7 is designed to compare these three theories (RSET vs. DT vs. SCT). This method allows seeing which model better fits the distribution of odds ratio of DD for the sub-sample analyzed, and which variables could be statistically associated to DD.

As we can observe in table 4 all the models are statistically significant. Model 7 fits the data better since its X^2 has the highest value. However, this finding must be taken rather cautiously. Even though the introduction of RSET helped to increase this value to 35.854, its individual association to the odds ratio of DD is not statistically significant and the fit model measure by the Pseudo R^2 Nagelkerke remains the same when compared to model 6.

Table 5 Logistic regression models 4, 5 and 6 for the dependent variable DD

	Models			
	4	5	6	7
RSET	1.059 (.332)	1.092 (.330)	-----	1.026 (.340)
DT	2.730 *** (.315)	-----	2.779*** (.322)	2.775*** (.322)
SCTi	-----	-.371 ** (.297)	-.366*** (.303)	-.366*** (.304)
YFE (control)	1.116* (.055)	1.067 (.058)	1.064 (.088)	1.064 (.088)
YDE (control)	-.960 *** (.011)	-.988 (.012)	-.977 (.012)	-.977 (.013)
Constant	-.071 ** (.792)	-.310 (.821)	-.189 (.846)	-.188 (.850)
n=396				
L(0)	426.914	426.914	426.914	426.914
L(θ)	402.122	402.234	391.065	391.059
X^2	24.791***	24.680***	35.849***	35.854***
Pseudo R^2 Nagelkerke	.091	.092	.131	.131

Coeficientes exp (B) and s.e between brackets. Level of significance * p < 0.05 / **p < 0.01 / ***p < 0.001.

In model 4 we observe that variables RSET and DT are positive. This implies that a male driver who either had not graduated from a professional driving school or had not been issued a traffic ticket is less

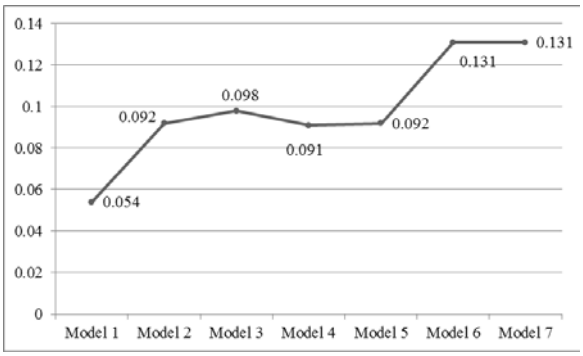
likely to engage in DD, than a male driver who had graduated from a professional driving school and had been issued a traffic ticket. However, between these two variables only DT is statistically significant associated to the odds ratio of DD. This association remains significant even with the introduction of two control variables which are also statistically significant. Specifically, both a decrease of YFE and an increase on YDE are associated to a decrease of the odds ratio of engaging on DD.

In model 5 we observe that RSET is not statistically significant and therefore its association to DD remains at best unknown. SCTi is, on the other hand, statistically significant, and therefore, male drivers who had children are less likely to engage in DD than male drivers who did not. Comparable to model 3, control variables YFE and YDE are not statistically associated to DD, and therefore these factors need to be reconsidered when analyzing this type of risky behavior. In other words, having introduced variable SCTi in the model implies that the statistical power of YFE and YDE has decreased significantly.

When variables are introduced in model 6 we observe that both DT and SCTi are statistically significant. Control variables YFE and YDE are not statistically associated to DD since its p value is ˃ 0.05. Like models 2 and 4, variable DT has a positive direction and therefore, a male driver who has been issued a traffic fine is more likely to engage in DD than a male driver who has not been issued a ticket. SCTi behaves like models 3 and 5. Since its direction is negative the same interpretation for previous models can be applied i.e. that male drivers who have children are less likely to engage in DD than those who do not have children.

In model 7 we can appreciate whether each of these three variables are statistically significant when associated to DD. Like model 6 DT and SCTi, both are significantly associated to DD. In other words, male drivers who had been issued a traffic ticket are more likely to engage in DD, than those male drivers who had not been issued a traffic ticket. Secondly, male drivers who have children are less likely to engage in DD than male drivers who do not have children. Regarding variable RSET we also see that its introduction is not statistically associated to DD since its p is ˃ .05. Ultimately, control variables YFE and YDE are not significant, and therefore their statistical power is not appropriate to either reject or confirm the distribution of DD's odds ratio in this sub-sample.

Figure 1 Distribution of Pseudo R^2 (Nagelkerke) values by models of DD



Lastly, figure 1 allows us to see how the Pseudo R^2 (Nagelkerke) of each model evolves once variables of each theory here discussed, were introduced. As expected, this value improves when a new variable is added. However, in sociological terms, only DT and SCT seem to be more appropriate to the understanding of DD. In other words, even though model 7 is built with three variables of each sociological theory, while controlling by YFE and YDE, it is model 6 which seems to describe more accurately the association of DT and SCT with the odds ratio distribution of DD. In sum these two variables remain statistically significant and the Pseudo R^2 value of the model does not change when compared to model 7.

DISCUSSION

After testing RSET, DT and SCT independently (models 1 to 3), findings indicate, on the one hand, that while variables RSET and SCTii are not statistically associated to the odds ratio of DD, variables DT and SCTi are. On the other, control variables are statistically significant when RSET and DT are tested, but not with SCTi. Then when the three theories were compared to each other (models 4 to 7), the main finding indicates that both DT and SCTi are the only variables which remain significantly associated to the odds ratio of DD. I proceed now to discuss each of these findings by considering key elements of the Chilean society.

Firstly, since RSET is not statistically associated to DD, and like most literature on road safety education suggests, this finding reinforces the notion that an association between road safety knowledge and road safety behavior is hard to establish. This interpretation moreover would need to be taken cautiously because three elements should be at least researched further: firstly, whether Chilean professional driving schools explicitly teach the risks associated to DD. Secondly, whether or not male

drivers who have graduated from professional driving schools behave significantly different (while controlling for significant variables) than females who have also graduated from professional driving school. Thirdly, as Walker, Butland and Connell (2001) suggest whether professional driving schools develop curricula and approaches which tackle the association between risky driving and the social identity of masculinity. In sum in order to either reject or accept hypotheses regarding the association between professional driving schools and DD in Chile more research is necessary.

Even though other studies suggest that religion is likely to be associated to specific road safety attitudes and behavior [O'Malley and Jonhston, 1999; Nazif and López, 2006; Factor, Mahalel and Yair, 2008], in this study religion (as a proxy of social capital) and DD is at best unknown. In order to consider more attentively the relation between religion identification and DD, studies would have to introduce aspects which come from the sociology of religion. Specifically, by studying how much an individual is involved in a religious group and how religious practices influence alcohol consumption. For instance, in the case of Chile it would be required to see how restriction of alcohol consumption is an essential part of the social construction of masculinities in orthodox evangelical groups [Montecinos, 2002; Mansilla 2007].

It is noteworthy that the introduction of SCTi cancelled out the effects of both control variables. In theoretical and methodological terms, this suggests that sociological variables need to be fully integrated in road safety analyses because it allows us to expand our understanding of this phenomenon. Specifically, since SCTi had more statistical power than years of driving experience -a traditional variable of transport engineering- analyses of DD will benefit enormously if sociological approaches complement engineering perspectives. The finding associated to variable YFE is particularly interesting for the case of Chile. When SCTi was not part of the models, this variable had a very similar performance, as it was reported in the literature, i.e. an increase in level of education was positively associated to an increase in alcohol consumption. However, when SCTi is introduced YEF is no longer significantly associated to DD. This finding has two important implications. Firstly, DD needs to be investigated on its own merit because male drivers constitute a group with their own social characteristics, which for instance go beyond their inner difference in terms of level of education. Secondly, alcohol consumption might also be associated to social capital and therefore assessment of when and how much males drink alcohol should be reassessed; this might ultimately affect the effect of level of education.

When analyzing DT we observe that it has a positive and significant direction on the odds ratio of DD. This suggests that a male driver who had not been issued a traffic ticket has fewer chances of engaging in DD than a male driver who had been issued one. This also suggests that, a driver who had been issued a traffic ticket is less likely to declare that he has never DD, than a male who had not been issued one. Before analyzing one important methodological issue of this finding, I will discuss this association by describing the Chilean context of police enforcement and traffic law regarding DD.

Firstly, Frühling observes that Chilean police -*Carabineros de Chile*- is perceived as one of the most trustworthy police institutions in Latin America; in fact the probability of negotiating with a Chilean police officer to get out of a ticket was found to be the second lowest among 18 countries of the region (2009:234). Secondly, when *Carabineros*' traffic control performance is assessed, more than 60% of the population believe it is good or very good [Interior Office and National Institute of Statistics, 2003]. Regarding DD it is also important to consider how Chile's traffic law sanctions this behavior. Firstly, the legal status of driving while intoxicated (Blood Alcohol Concentration (BAC) $\geq$ .10) is a crime, and therefore sanctions may include imprisonment, costly fines and driver's license suspension. Secondly, the legal status of driving under the influence of alcohol ($.05 \leq BAC < .10$) is a misdemeanor, and therefore, sanctions may include fines and driver´s license suspension. According to this context two complementary hypotheses could explain the association between DD and DT. Firstly, one group of male drivers is not likely engaging in DD because being controlled—which is expressed in effective policing—along with the nature of punishment—which is the sanctions established in Chile's traffic law—might be perceived to be both high and effective, and therefore this group is deterred from engaging in DD. However, there is a group of male drivers who is not likely to be deterred, even though they had been effectively ticketed. One potential explanation for this association can be found in the Problem-Theory Behavior (PBT). PBT states that three major systems: the perceived-environment system, the personality system, and the behavior system, serve either as instigations for engaging in problem behavior or controls against involvement in problem behavior (Jessor, Donovan and Costa, 1991). If having been fined (i.e the

perceived-environment system) is not deterring DD (i.e. behavior system), we could therefore assume that a disruption at the personality system of the offenders may be occurring.

However, an important methodological limitation of this finding is how DT has been operationalized. Thus, in order to advance more precisely in the understanding between control and male's DD in Chile further research should include elements such as whether an individual had been subject to alcohol controls, what the result of the alcohol test was, had been issued a traffic fine due to DD, his attitudes towards the legal graduation of the BAC limits, his perception of how intense traffic patrolling had been and information regarding their personality.

Regarding SCTi we observe that male drivers who have children are less likely to engage in DD than male drivers without children. In order to understand the association between this indicator of social capital and DD, I suggest two hypotheses which complement each other. Firstly, engaging in DD has at least two types of effects which can be analytically distinguished i) road crashes with fatal or severe injury consequences, and ii) legal sanctions (imprisonment, suspension of driver´s license, monetary fines, among others), male drivers with children perceive that both consequences have also unintended effects on their children's development. In other words, neither fatal, severe injuries nor the legal graduation of engaging in DD is taken unambiguously by a male driver with children because both not only can affect his own well-being and/or his driving record, but also his social capital. Specifically, road crash consequences and legal sanctions might bring a variety of side effects whereby restriction of household incomes (in case of long term disability and/or high monetary sanction [Ritchey and Nicholson-Crotty, 2011; Pérez-Nuñez et al. 2011; van Beeck, van Roijen and Mackenbach, 1997]) or absence of the father in the household (in case of death or imprisonment [Wildeman, 2010; Murray and Farrington, 2008]) also impact on how the children are educated and how the relationship father-child is weakened.

Lastly, Chile's evidence indicates that self-perception of lack of time is higher in men with children than men without children [Valenzuela and Herrera, 2006:283]. If time limitations impact the behavior of these two groups differently, then engagement in DD can also be associated to this constraint. In this case the second hypothesis is: perception of having less time in male drivers with children limits heavily their willingness to engage in DD since many other activities may be regarded as more important. However, in order to assess whether this factor, in reference to the first hypothesis, is interactive or not, more research would be required.

CONCLUSION

In this study I tested and contrasted three different theories in order to understand why male drivers engage in DD. Seven models of logistic regression were run and findings indicate that only variables from DT and SCT are significantly associated to DD. Evidence for RSET suggests that either a radical change in how RSE is designed needs to take place in order to be effective, or better methodologies should be applied in order to capture its actual impact. A finding indicates that ticketing seems to be effective in deterring a specific group of male drivers, however deficient to deter other. However, since the variable applied is insufficient in measuring police control, new information, including the perception of legal sanctions of DD, frequency of police patrolling, actual results of blood-alcohol concentration in drivers and personality of the individuals should be added. The introduction of one indicator of social capital allowed us to see that one constraint of male drivers for engaging in DD is whether they are or not parents. Male driver mechanisms of self-regulation can be associated to foreseen side effects of road crashes consequences and legal sanctions on children and the relationship father-child.

Since ground transportation is greatly affected by social conditions of the individuals, more sociological research would be necessary to identify and explain some of these characteristics. For instance by studying which social conditions and social mechanisms trigger DD, we may shed light on whether a group of male drivers is structural to the functioning of society or is an aggregated sum of individuals who engage in DD when certain opportunities are present.

Lastly, these findings suggest at least two countermeasures. Firstly, a parallel increase of both controlling and sanctioning should be implemented. Ultimately, only a combination of these two strategies can tackle a male group who seem resilient to driving safely. Specifically, lowering the legal BAC limit from 0.1 to .05 g/100m, and changing this offence from regulatory to criminal and increasing the potential sanctions for engaging in DD should be studied carefully. Secondly, public campaigns, which address the challenge of DD, should also consider social capital elements of the population in order to disseminate messages more effectively. In other words, public campaign messages of DD need to

appeal to male drivers who do not have children, because this group of drivers is more likely to engage in DD than those who have children.

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[i] Chris suggests (2001) to analytically distinguish between road safety education and driver training, since both systems have different methods. While I agree with this distinction in this paper both concepts are used synonymously since both systems aim at improving road users' safety behaviours.

[ii] Respondents could identify themselves as pedestrians and/or passengers.