



## Analysing the inability to focus on the driving task in young males, inexperienced and offender drivers

Castro, C., Gugliotta, A. & Padilla, J.L.



*ugr* | Universidad  
de Granada



## Why You shouldn't Drive with:

- - - - - a Beer-Drinking
- - - - - Single Young Driver
- - - - - Named Juan
- - - - - on a Friday Night
- - - - - in a red car
- - - - - in Rural Europe

## What is risky on the Road and Why?

Example suggested by Tom Vanderbilt, reading (2008). *Traffic: Why we drive the way we do. And what it says about us.* New York: Random House, Inc.



PUENTE DE ANDALUCÍA

### Fallece un joven de 23 años en un accidente de tráfico en Pozoblanco



JULIA LÓPEZ / - @abccordoba Córdoba

28/02/2017 12:18h - Actualizado: 28/02/2017 17:07h.

Guardado en: Andalucía Córdoba

Un joven de 23 años ha fallecido este martes y otra joven ha resultado gravemente herida en un accidente de tráfico registrado en la carretera que une las localidades de Pozoblanco y Villanueva de Córdoba. El tercer joven que viajaba en el turismo ha salido ileso.

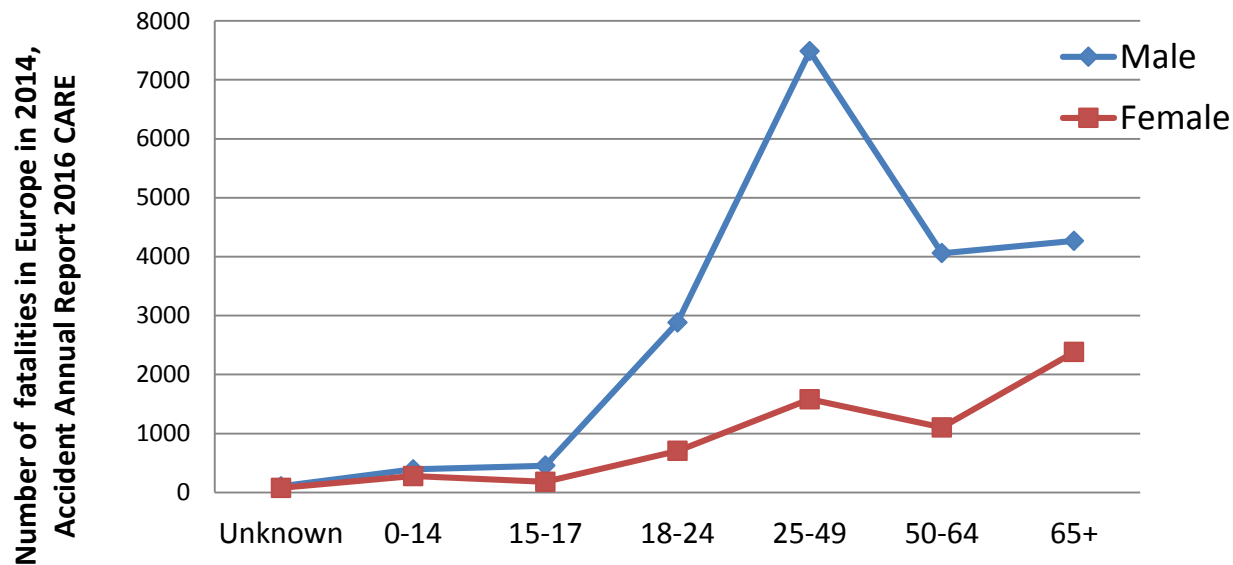
## 2. Young people (18-24)

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.



Source: CARE (EU road accidents database) or national publications  
Last update: May 2016

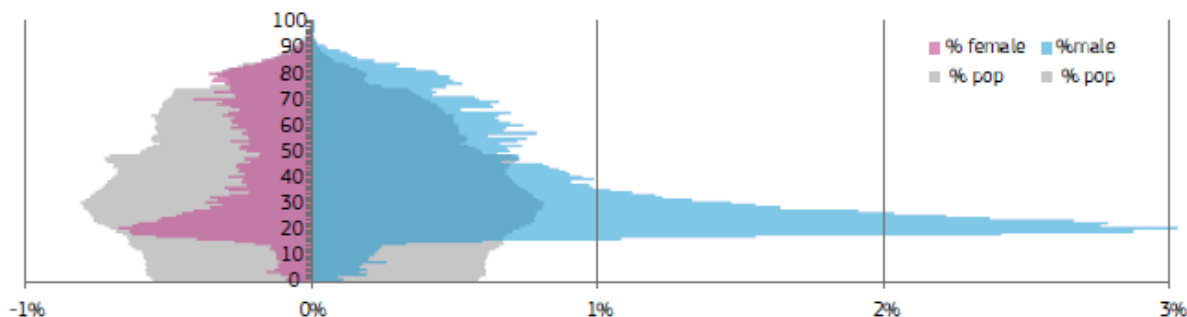
### Age X Gender



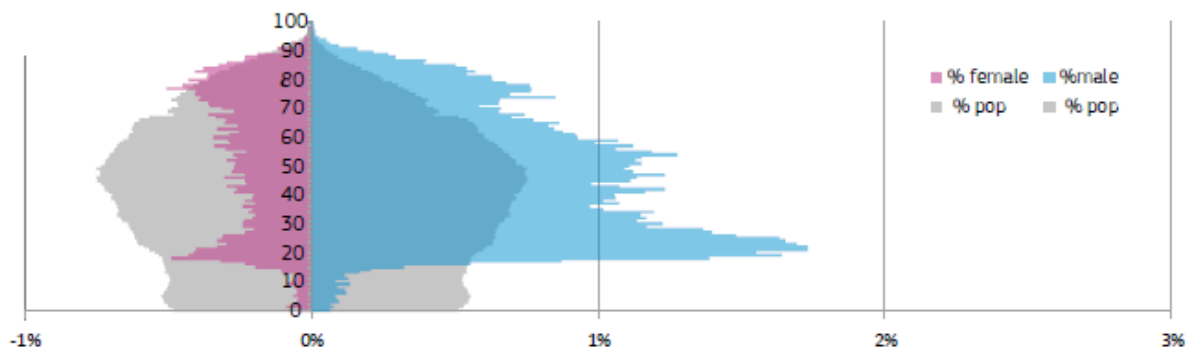
## 2. Young people (18-24)

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.

1990: % OF FATALITIES AND POPULATION BY AGE AND GENDER



2015: % OF FATALITIES AND POPULATION BY AGE AND GENDER



## 2. Young people (18-24)

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.

Figure 13: Distribution of male and female fatalities by road user type in the EU, 2014



Source: CARE (EU road accidents database) or national publications

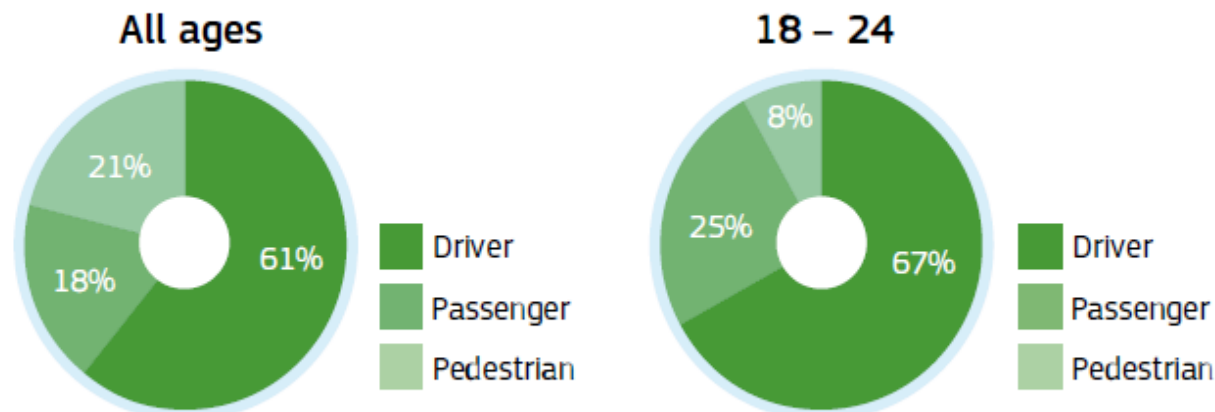
Last update: May 2016

## 2. Young people (18-24)

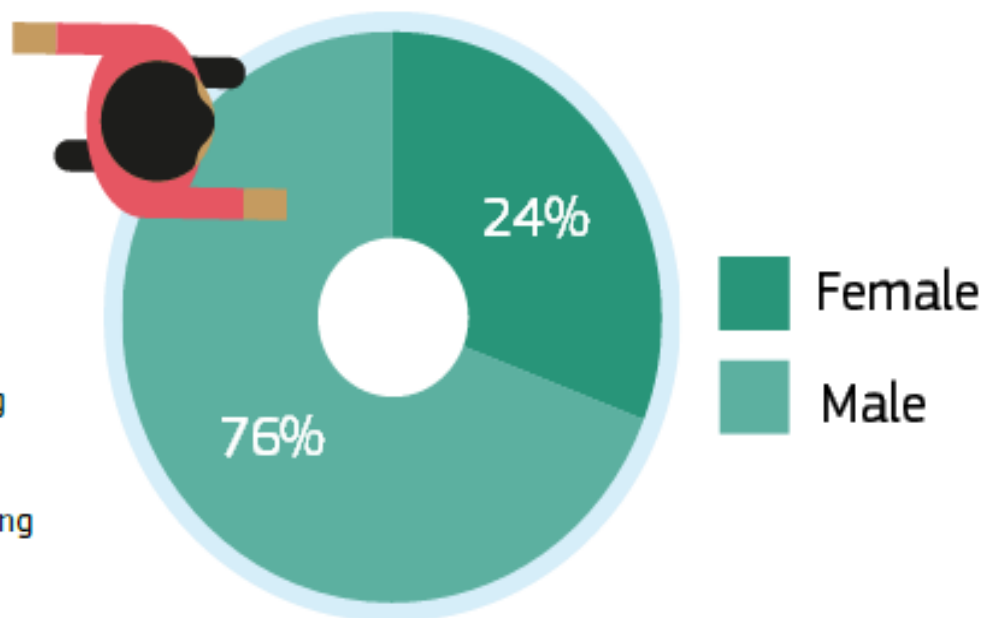
Source: CARE (EU road accidents database) or national publications  
Last update: May 2016

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.

### ROAD FATALITIES BY ROAD USER TYPE



## DISTRIBUTION OF ROAD FATALITIES BY GENDER IN THE EU



Men are still largely overrepresented among young victims: 80% of young people killed in road crashes were men. This can be explained by young men's different risk taking behaviour and also by the fact that young men tend to take longer trips than young women do.

## 2. Young people (18-24)

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.



### Common characteristics of crashes that severely injure motorcyclists:

- More than 90% of victims are men.
- Young people and middle-aged are most at risk.
- Crashes mainly involve cars or fixed objects, or happen without an opponent.
- Most crashes happen in rural areas or on urban roads.



### Common characteristics of crashes that severely injure car occupants:

- Two thirds of victims are men.
- Young people are most at risk.
- Most crashes involve cars or fixed objects, or occur without an opponent.
- Most injuries occur on rural roads, when driving at speeds of over 70 km/h.



## 2. Young people (18-24)

- Young people (between 18 and 24 year old) account for 14% of those killed on roads but represent only 8% of the population.
- Young people are almost twice as likely to be killed in a road crash than the average person.
- The number of young people died on the roads decreased by 65% between 2001 and 2015, more than for any other age group.
- In 2015, two thirds of young people killed in road crashes in the EU were drivers, whereas only 8% were pedestrians.

### Common characteristics of crashes that severely injure pedestrians:

- Men and women are about equally represented.
- Elderly people and children are most at risk.
- Mainly cars and heavy vehicles are involved.
- Crashes occur mostly in urban areas on 50 km/h road sections.
- Main contributing factors are failure to look before crossing, poor judgment, speed and psychoactive substances.
- Head- and upper body injuries are most common when heavy vehicles and higher speed roads are involved. Legs are often injured in crashes involving cars on lower speed roads.



### Common characteristics of crashes that severely injure cyclists:

- Men are overrepresented.
- Mostly the elderly, young people and children are at risk.
- Crashes involve cars or occur in single vehicle crashes.
- Crashes occur mainly in urban areas on 50 km/h road sections or intersections.
- Main contributing factors are failure to look, poor judgment, reckless driving and loss of control.
- Head injuries are frequent in all crash scenarios. Legs are mainly injured in single vehicle crashes involving elderly people on lower speed roads. Thorax injuries mainly happen in side-impact crashes in urban areas and at junctions.



<sup>1</sup>) Study on Serious Road Traffic Injuries in the EU (SUSTAIN) [http://ec.europa.eu/transport/road\\_safety/topics/serious\\_injuries\\_en](http://ec.europa.eu/transport/road_safety/topics/serious_injuries_en)



## What is risky on the road and why?

Main contributing factors of crashes:

- FAILURE TO LOOK
- POOR JUDGEMENT
- LOSS OF CONTROL
- SPEEDING
- DRINKING & THE USE OF PSYCHOACTIVE SUBSTANCES

Young, males, inexperienced  
and offender drivers



Outlining  
a profile of the young driver,  
using behavioural and self-report  
measures.



# INSTRUMENTS

**Subjective risk estimation determines the risk that the driver is able to tolerate**  
(Brown & Groeger, 1988; Deery, 1999).

## RISK PERCEPTION



### Measured with the **DOSPERT**

A Domain-Specific Risk-Taking (DOSPERT) scale for adult populations Blais & Weber (2006)  
Social, recreational, financial, health/security, ethic.

Risk perception, English						
1	2	3	4	5	6	7
Not at all	Slightly	Somewhat	Moderately	Risky	Very	Extremely
Risky	Risky	Risky	Risky		Risky	Risky

1. Admitting that your tastes are different from those of a friend. (S)
2. Going camping in the wilderness. (R)
3. Betting a day's income at the horse races. (F)
4. Investing 10% of your annual income in a moderate growth mutual fund. (F)
5. Drinking heavily at a social function. (H/S)
6. Taking some questionable deductions on your income tax return. (E)
7. Disagreeing with an authority figure on a major issue. (S)

# INSTRUMENTS

## SENSITIVITY TO PUNISHMENT AND REWARD



Drivers with a higher anti-normative behaviour are less sensitive to punishment (Castellà & Pérez, 2004; Panayiotou, 2015).

Torrubia R, Avila C, Molto J, Caseras X. The Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) as a Measure of Gray's Anxiety and Impulsivity Dimensions. *Pers Individ Differ* 2001; 31(6): 837-62.

1. Do you often refrain from doing something because you are afraid of it being illegal?
2. Does the good prospect of obtaining money motivate you strongly to do some things?
3. Do you prefer not to ask for something when you are not sure you will obtain it?
4. Are you frequently encouraged to act by the possibility of being valued in your work, in your studies, with your friends or with your family?
5. Are you often afraid of new or unexpected situations?
6. Do you often meet people that you find physically attractive?
7. Is it difficult for you to telephone someone you do not know?
8. Do you like to take some drugs because of the pleasure you get from them?
9. Do you often renounce your rights when you know you can avoid a quarrel with a person or an organisation?
10. Do you often do things to be praised?
11. As a child, were you troubled by punishments at home or in school?
12. Do you like being the centre of attention at a party or a social meeting?
13. In tasks that you are not prepared for, do you attach great importance to the possibility of failure?
14. Do you spend a lot of your time on obtaining a good image?
15. Are you easily discouraged in difficult situations?
16. Do you need people to show their affection for you all the time?
17. Are you a shy person?
18. When you are in a group, do you try to make your opinions the most intelligent or the funniest?
19. Whenever possible, do you avoid demonstrating your skills for fear of being embarrassed?
20. Do you often take the opportunity to pick up people you find attractive?
21. When you are with a group, do you have difficulties selecting a good topic to talk about?
22. As a child, did you do a lot of things to get people's approval?
23. Is it often difficult for you to fall asleep when you think about things you have done or must do?
24. Does the possibility of social advancement, move you to action, even if this involves not playing fair?

# INSTRUMENTS

## Balloon Analogue Risk Task (BART)

*Lejuez CW, Read JP, Kahler CW, Richards JB, Ramsey SE, Stuart GL, Strong DR, Brown RA (2002) Journal of Experimental Psychology: Applied, 8, 75-84.*

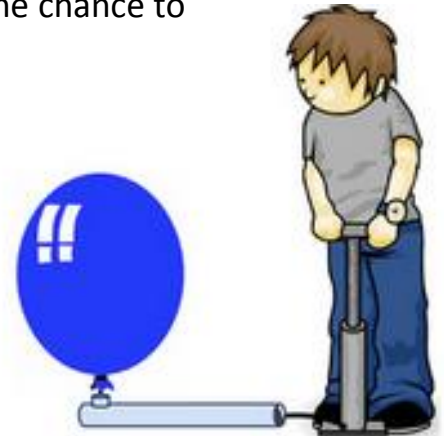
### IMPULSIVITY

The Balloon Analogue Risk Task (BART) is a computerized measure of risk taking behavior. The BART models real-world risk behavior through the conceptual frame of balancing the potential for reward versus loss.

In the task, the participant is presented with a balloon and offered the chance to earn money by pumping the balloon up by clicking a button.

Thus, each pump confers greater risk, but also greater potential reward. If the participant chooses to cash-out prior to the balloon exploding then they collect the money earned for that trial, but if balloon explodes earnings for that trial are lost.

Participants are not informed about the balloons breakpoints; the absence of this information allows for testing both participants' initial responses to the task and changes in responding as they gain experience with the task contingencies.



## DEVELOPMENT OF A DRIVING ANGER SCALE<sup>1,2</sup>

JERRY L. DEFFENBACHER, EUGENE R. OETTING, REBEKAH S. LYNCH

8

Colorado State University

**DAS: DRIVING ANGER SCALE**

1–5 scale (1= not at all, 5= very much) for the amount of anger experienced if they occurred



Item by Cluster	Corrected Item/Total <i>r</i> Full Scale	Corrected Item/Total <i>r</i> Short Scale
29. A police officer pulls you over.*	.47	.46
23. A police car is driving in traffic close to you.	.40	
Cluster 4 Slow Driving		
1. Someone in front of you does not start up when the light turns green.	.44	
3. A pedestrian walks slowly across the middle of the street slowing you.	.40	
4. Someone is driving too slowly in the passing lane holding up traffic.	.48	
9. Someone is driving slower than reasonable for the traffic flow.	.50	
10. A slow vehicle on a mountain road will not pull over and let people by.*	.50	.46
18. Someone is slow in parking and holding up traffic.*	.56	.52
Cluster 5 Discourtesy		
5. Someone is driving right up on your back bumper.	.41	
7. Someone cuts in right in front of you on the freeway.	.46	
8. Someone cuts in and takes the parking spot you have been waiting for.	.46	

# INSTRUMENTS

## RISK PERCEPTION



**Subjective risk estimation determines the risk that the driver is able to tolerate** (Brown & Groeger, 1988; Deery, 1999).

## SENSITIVITY TO PUNISHMENT AND REWARD



Drivers with a higher anti-normative behaviour are less sensitive to punishment (Castellà & Pérez, 2004; Panayiotou, 2015).

**Females are more sensitive to punishment.** (Castellà & Pérez, 2004).

## IMPULSIVITY



**According to Foy, Runham & Chapman (2016), young drivers' impulsivity is due to the lack of maturity of the frontal lobe.**

## DAS: DRIVING ANGER SCALE



*Driving Anger Scale (Deffenbacher, Oetting & Lynch, 1994)*



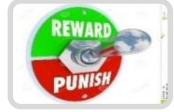
# METHOD

## PARTICIPANTS

AGE  
 Young (N= 105)  
 Middle-aged (N=190)  
 Elderly drivers (N=113)

GENDER  
 MALES (N=265)  
 FEMALES (N=143)

OFFENDER STATUS  
 Non-offender (N=265)  
 Re-Offender (N=143)

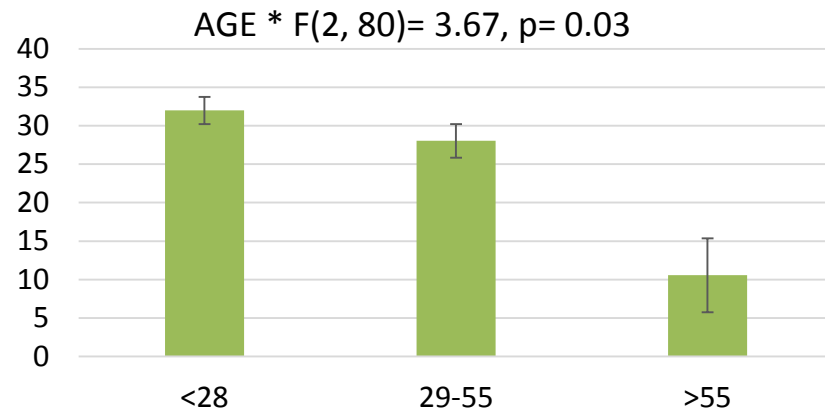


	Age (years)	BART	DOSPERT	DAS	SPSRQ-20
Young	<28	45	75	76	76
Middle-aged	29-55	74	117	119	119
Elderly drivers	>55	5	68	70	70
<b>Males</b>	<b>Total</b>	<b>124</b>	<b>260</b>	<b>265</b>	<b>265</b>
Young	<28	15	29	29	29
Middle-aged	29-55	11	72	72	71
Elderly drivers	>55	1	44	44	43
<b>Females</b>	<b>Total</b>	<b>27</b>	<b>145</b>	<b>145</b>	<b>143</b>
Young	<28	60	104	105	105
Middle-aged	29-55	85	189	191	190
Elderly drivers	>55	6	112	114	113
<b>TOTAL</b>		<b>151</b>	<b>405</b>	<b>410</b>	<b>408</b>

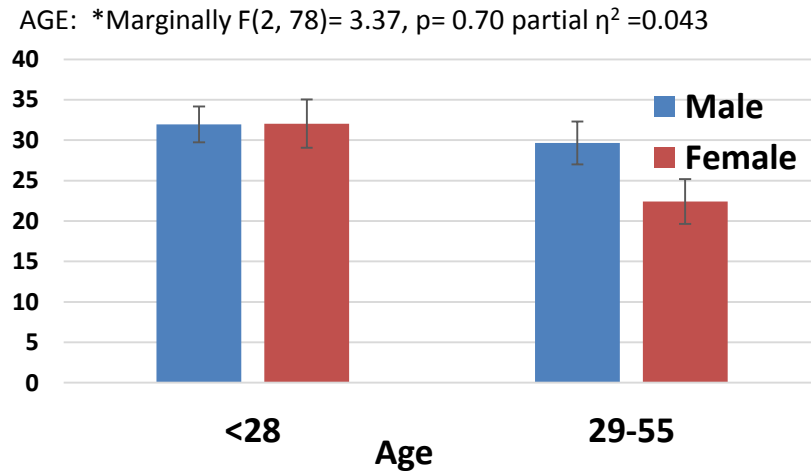
# RESULTS: BART: *Balloon Analogue Risk Task*



Adjusted number of pumps  
**IMPULSIVITY**



Adjusted number of pumps:  
**IMPULSIVITY**

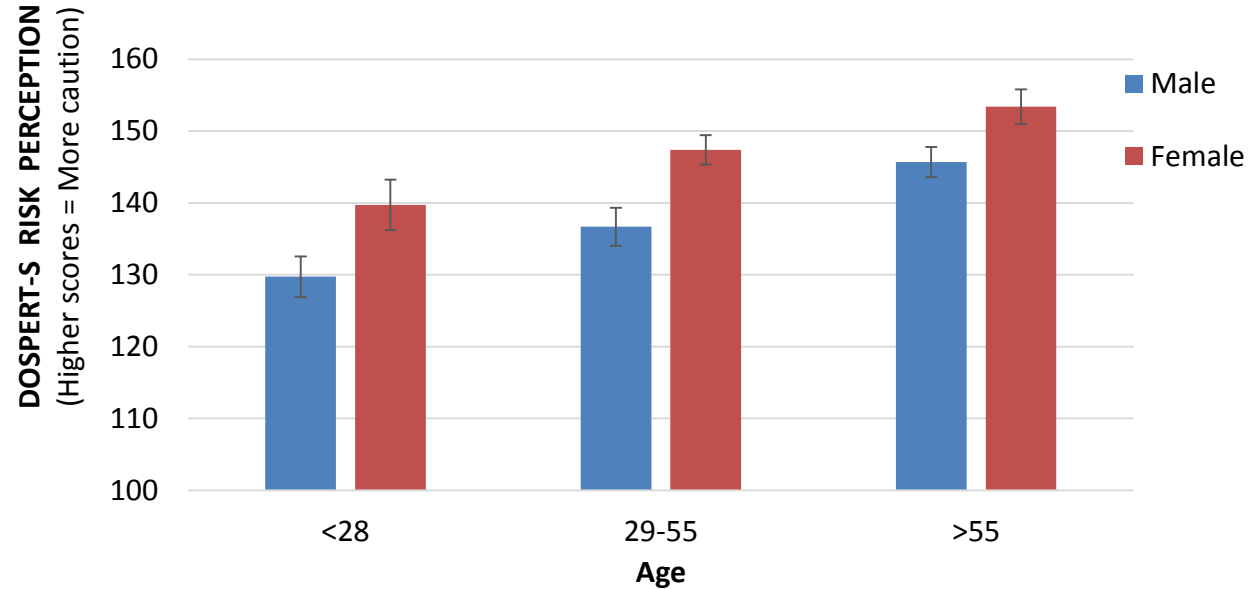


# RESULTS: DOSPERT-S *Domain Specific Risk Taking Scale*



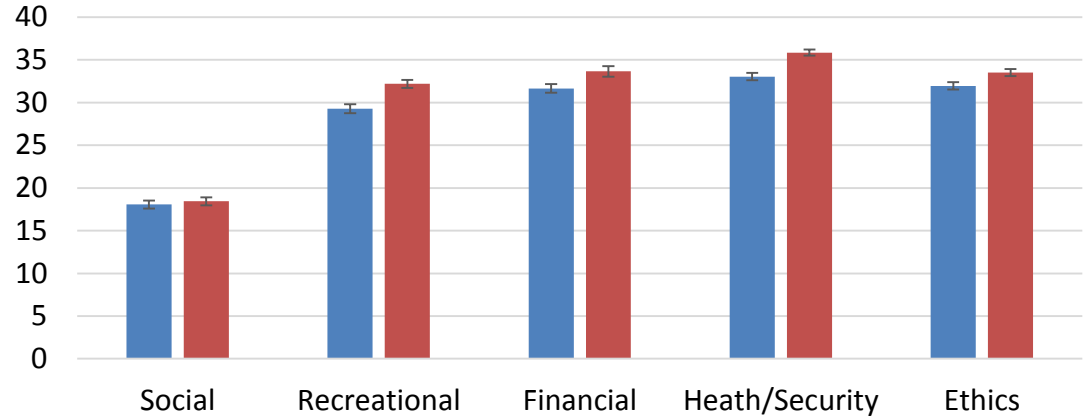
AGE\*  $F(2, 281) = 14.86, p = 0.001$  partial  $\eta^2 = 0.098$

GENDER\*  $F(1, 281) = 19.75, p = 0.001$  partial  $\eta^2 = 0.067$



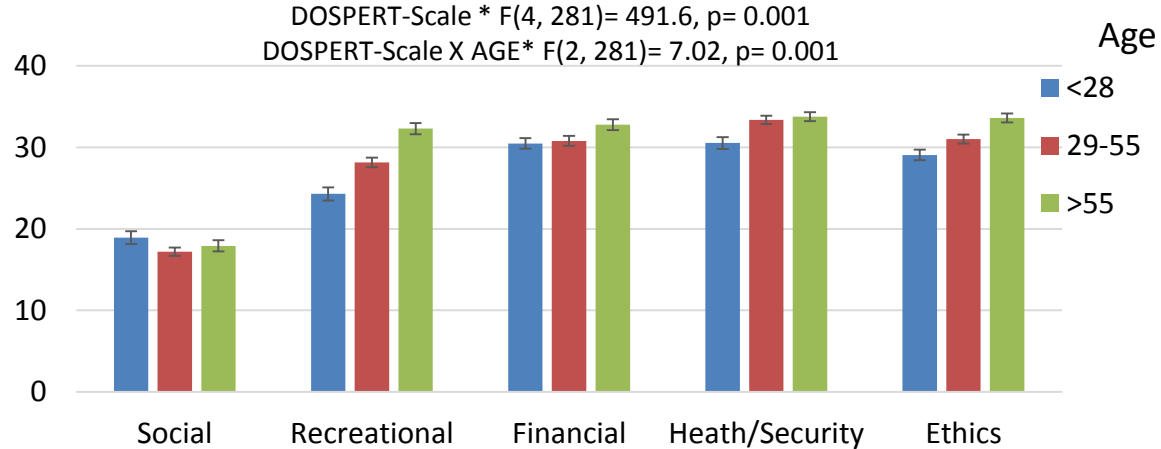


DOSPERT-S RISK PERCEPTION  
(Higher scores = More caution)



DOSPERT Subscales

DOSPERT-S RISK PERCEPTION  
(Higher scores = More caution)



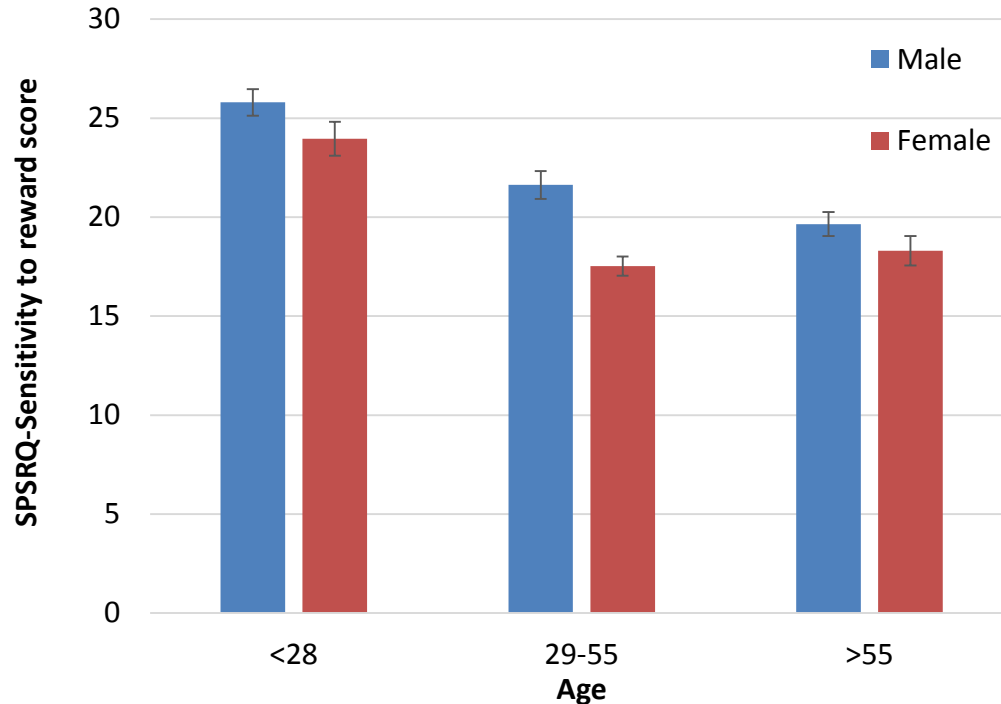
DOSPERT Subscales

# RESULTS: SPSRQ-20: *Sensitivity to Reward Scale*



## SENSITIVITY TO REWARD SCORE

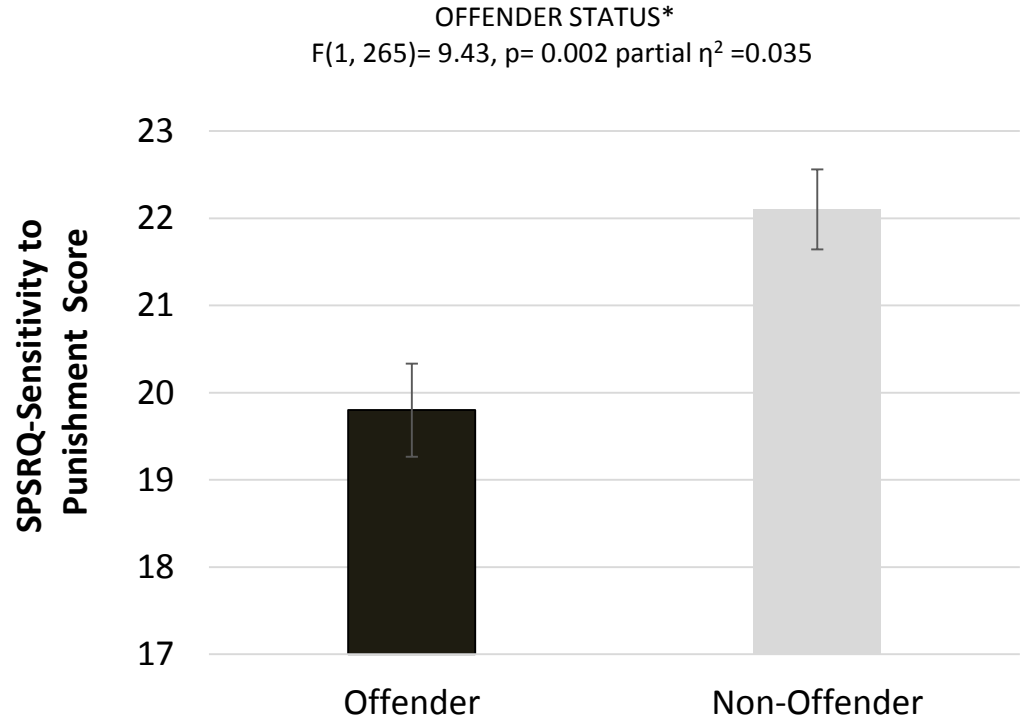
AGE\*  $F(2, 280) = 37.62, p = 0.001$  partial  $\eta^2 = 0.215$   
GENDER\*  $F(1, 281) = 18.79, p = 0.001$  partial  $\eta^2 = 0.064$



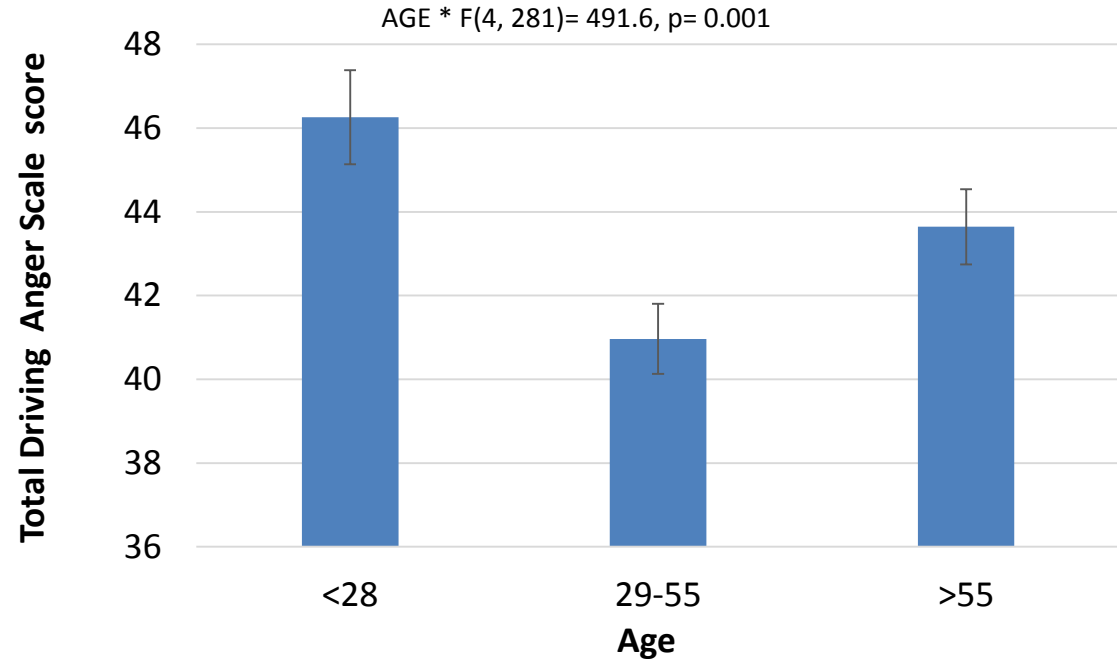
# RESULTS: SPSRQ-20: *Sensitivity to Punishment*



## SENSITIVITY TO PUNISHMENT



# DAS: *Driving Anger Scale* (Deffenbacher, Oetting & Lynch, 1994)





# Male Young drivers:

- Show more impulsivity
- Perceive less dangerous to get involved in different situations:  
recreational, financial, health/security, ethic.
- Recognise driving with anger in the highest degree.

## Young drivers (i.e men)

seem to be more sensitivity to reward.

## Offender drivers

seem to be less sensitive to punishment than non-offender drivers.





## CONCLUSIONS

1

It may be necessary for young drivers not to obtain full licenses until they have acquired more experience and neuronal maturity.  
*e.g. With progressive or restrictive driving licenses, driving only with adults, no-driving at weekends or only during the day, etc.*

2

Why not stop punishing reoffender drivers if this method doesn't work?  
*e.g. Also to reduce criticisms of the sanctioning system that only aims to increase the coffers of the state...*

3

Early detection of the particular personality traits that predispose drivers to develop patterns of risky behaviour at the wheel, *e.g. Assessment for intervention and treatment...*

*The problem of reoffending could be the tip of the iceberg for more serious problems prior to or that arise as a result of withdrawing the license, above all with a judicial sentence: an 8-month ban...*



Merci beaucoup pour  
votre attention!

candida@ugr.es

# REFERENCES

- Aluja, A. & Blanch, A. (2011). Neuropsychological behavioral inhibition system (BIS) and behavioral approach system (BAS) assessment: A shortened sensitivity to punishment and sensitivity to reward questionnaire version (SPSRQ-20). *Journal of Personality Assessment*, 93(6), 628-636. doi: 10.1080/00223891.2011.608760
- Brown, I.D. & Groeger, J.A. (1988). Risk perception and decision taking during the transition between novice and experienced driver status. *Ergonomics*, 31(4), 585. doi: 10.1080/00140138808966701
- CARE (2014). *How safe are your roads? Commission road safety statistics show small improvement for 2014*. Bruselas: EU. Recuperado el 18 de mayo de 2016, desde: [http://europa.eu/rapid/press-release\\_IP-15-4656\\_en.htm](http://europa.eu/rapid/press-release_IP-15-4656_en.htm)
- Castellà, J. & Pérez, J. (2004). Sensitivity to punishment and sensitivity to reward and traffic violations. *Accident; Analysis and Prevention*, 36(6), 947-952. doi: 10.1016/j.aap.2003.10.003
- Deery, H.A. (1999). Hazard and risk perception among young novice drivers. *Journal of Safety Research*, 30(4), 225-236. doi: 10.1016/S0022-4375(99)00018-3
- DGT (2015). *Las principales cifras de la siniestralidad vial. España 2014*. Madrid: DGT. Recuperado el 25 de abril de 2016, desde: [http://www.dgt.es/Galerias/seguridad-vial/estadisticas-e-indicadores/publicaciones/principales-cifras-siniestralidad/2015-2228\\_principales\\_cifras\\_de\\_la\\_Siniestralidad\\_Vial\\_2014\\_ACCESIBLE.pdf](http://www.dgt.es/Galerias/seguridad-vial/estadisticas-e-indicadores/publicaciones/principales-cifras-siniestralidad/2015-2228_principales_cifras_de_la_Siniestralidad_Vial_2014_ACCESIBLE.pdf)
- Foy, H.J., Runham, P., & Chapman, P. (2016). Prefrontal cortex activation and young driver behaviour: A fNIRS study. *PLoS One*, 11(5), 1. doi: 10.1371/journal.pone.0156512
- Horcajo, J. Rubio, V. Aguado, D. Hernández, J. M. & Márquez, M. O. (2014). Using the implicit association test to assess risk propensity self-concept: Analysis of its predictive validity on a risk-taking behaviour in a natural setting. *European Journal of Personality*, 28(5), 459-471. doi: 10.1002/per.1925
- Lejuez, C.W. Read, J.P. Kahler, C.W. Richards, J.B. Ramsey, S.E. Stuart, G.L. Strong, D.R. & Brown, R.A. (2002). Evaluation of a behavioral measure of risk taking: The balloon analogue risk task (BART). *Journal of Experimental Psychology Applied*, 8(2), 75-84. doi: 10.1037/1076-898X.8.2.75
- Panayiotou, G. (2015). The bold and the fearless among us: Elevated psychopathic traits and levels of anxiety and fear are associated with specific aberrant driving behaviors. *Accident; Analysis and Prevention*, 79, 117-125. doi: 10.1016/j.aap.2015.03.007

# ABSTRACT

- Adult men, young people and inexperienced drivers are an issue in road accident data.
- Age, experience and gender appear to be determining factors in accident rates. Young men are more likely to be involved in risky behaviours because they perceive less risk in situations like driving under the influence of alcohol or talking on the phone while driving. Experienced drivers are more capable of detecting road hazards than inexperienced drivers. Offender drivers show significantly higher levels in driving angrily, seeking sensation and being aggressive and impulsive. Impulsiveness has a cognitive/attentional dimension, defined as the inability to focus on the tasks at hand and cognitive instability involving thought insertions and racing thoughts.
- In this study we analysed the relationship between experience, risk perception, sensitivity to punishment, sensitivity to reward, impulsivity and driver profile (offender or non-offender). These constructs have so far been studied in a relatively diffuse form, as an impulsivity and risky decision-making paradigm (Balloon Analogue Risk Task, BART), a measurement of self-reported perceived risk (Domain-Specific Risk-Taking Scale-Spain, DOSPERT) and a measurement of sensitivity to punishment and sensitivity to reward (Sensitivity to Punishment and Sensitivity to Reward Questionnaire, SPSRQ-20). The aim of this study was a better understanding of the variables that could be relevant in reducing the accident rate.
- A sample of 220 drivers, offenders and non-offenders, aged between 18 and 60 years, from driving schools, training centres and universities, was gathered for this study. The main results demonstrated that inexperienced drivers show a risk-underestimation pattern, with higher impulsivity and higher insensitivity to punishment. This pattern was also found in both young and adult male participants. Regarding non-offender drivers, driving experience is related to increased risk perception. Adult men perceive less risk than women in different situations. It seems that factors such as age, gender and driving experience are more closely related to impulsivity in the BART task, since no differences were observed between offenders and non-offenders with regard to impulsivity. Finally, offenders showed less sensitivity to punishment compared to non-offenders. This may be due to an adaptation to punishment from authorities. Non-offenders are less exposed to these punishments, making them more sensitive to it.