

RESEARCH NOTE

# Strong evidence that callous–unemotional traits are not related to risk-taking task performance [version 1; referees: 2 approved]

Luna C. M. Centifanti <sup>1</sup>, James Negen<sup>2</sup>

<sup>1</sup>University of Liverpool, Liverpool, UK

<sup>2</sup>University of Durham, Durham, UK

**v1** First published: 26 Apr 2018, 7:502 (doi: [10.12688/f1000research.14623.1](https://doi.org/10.12688/f1000research.14623.1))  
 Latest published: 26 Apr 2018, 7:502 (doi: [10.12688/f1000research.14623.1](https://doi.org/10.12688/f1000research.14623.1))

**Abstract**

A hypothesized association between callous–unemotional (CU) traits and risk-taking may account for the link between CU traits and real-world risky behaviors, such as illegal behavior. Prior findings show that reward and punishment responsivity differs in relation to CU traits, but is not associated with general risk-taking. However this has only been examined previously with one task, only with a frequentist framework, and with limited interpretation. Here, we expand to another task and to Bayesian analyses. A total of 657 participants (52% female) completed the Inventory of Callous–Unemotional Traits, the Balloon Analogue Risk Task (essentially a gambling task), and the Stoplight driving task, which repeatedly presents participants with riskier or less risky choices to make while driving. We found strong evidence for the null model, in which there is no relation between the two risk-taking tasks and CU traits ( $R^2 = 0.001$ ;  $BF_{10} = 1/60.22$ ). These results suggest that general risk-taking does not underlie the real-world risky behavior of people with CU traits. Alternative explanations include a different method of valuing certain outcomes.

**Keywords**

Callous–unemotional traits, risk taking, decision making, driving, gambling, Bayesian, re-analysis

**Open Peer Review**

Referee Status:

	Invited Referees	
	1	2
<b>version 1</b>		
published	report	report
26 Apr 2018		
1 <b>Carlo Garofalo</b> , Tilburg University, Netherlands		
2 <b>Timothy R. Stickle</b> , University of Vermont, USA <b>Andrew Gill</b> , University of Vermont, USA <b>Ashley Dobbins</b> , University of Vermont, USA <b>Amanda Falcon</b> , University of Vermont, USA		

**Discuss this article**

Comments (0)

**Corresponding author:** Luna C. M. Centifanti ([luna.centifanti@liverpool.ac.uk](mailto:luna.centifanti@liverpool.ac.uk))

**Author roles:** **Centifanti LCM:** Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Writing – Original Draft Preparation, Writing – Review & Editing; **Negen J:** Conceptualization, Formal Analysis, Software, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing

**Competing interests:** No competing interests were disclosed.

**How to cite this article:** Centifanti LCM and Negen J. **Strong evidence that callous–unemotional traits are not related to risk-taking task performance [version 1; referees: 2 approved]** *F1000Research* 2018, 7:502 (doi: [10.12688/f1000research.14623.1](https://doi.org/10.12688/f1000research.14623.1))

**Copyright:** © 2018 Centifanti LCM and Negen J. This is an open access article distributed under the terms of the [Creative Commons Attribution Licence](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Data associated with the article are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

**Grant information:** The research presented here was possible with funding from the British Academy, project SG100982, given to the first author. No other funding sources were declared.

*The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.*

**First published:** 26 Apr 2018, 7:502 (doi: [10.12688/f1000research.14623.1](https://doi.org/10.12688/f1000research.14623.1))

## Introduction

Callous–unemotional (CU) traits are an aspect of psychopathy, which includes traits such as callously using others for one’s personal gain, a lack of caring for society’s values and lacking emotional depth<sup>1</sup>. Risk-taking includes choosing behaviors with uncertain outcomes (but possibly higher rewards) over behavior with more certainty in its rewards<sup>2</sup>. Here, we show that the two are unrelated when measured in a laboratory setting.

This is surprising for three reasons. First, a variety of risky real-world behaviors and illegal behaviors<sup>1</sup>—themselves risky—are associated with CU traits (e.g., substance use, sexual risk-taking)<sup>3–7</sup>. Second, there is a difference in reward and punishment responsivity in relation to CU traits<sup>4,6,8–12</sup>. For example, in a test of gambling, the Balloon Analogue Risk Task (BART), CU was related to weaker reward responsivity, in that adolescents with these traits failed to show an increase in risk-taking following successful (rewarded) trials<sup>4,13</sup>. Third, CU traits are one aspect of a cluster of traits known as psychopathy, which is associated with risk-taking<sup>14–16</sup>.

These data were originally collected as part of a study about the influence of peer presence on risk-taking behavior, with two laboratory tasks conducted<sup>13,17</sup>. CU traits were measured as a potential moderator. Results on the relationship between CU traits and a gambling task have been previously reported using frequentist methods, but the null finding failed to be interpreted<sup>13</sup>. Here, we re-analyze the data in a Bayesian framework, allowing for the relationship between CU traits and gambling to be interpreted. In addition, for the first time, we report our findings on the association between CU traits and a driving risk-taking task<sup>17</sup>.

## Methods

### Participants and tasks

A total of 675 people (52% female; 16–18 years of age) from six schools in Northwest England participated in 2010. Heads of schools acted *in loco parentis*, and verbal consent was obtained to ensure privacy, which was approved by the ethics committee, within the schools where the research was conducted. Ethical approval was given by the University of Central Lancashire to the first author (PSY0809122). Complete information about the sample and recruitment can be found in a previous report<sup>17</sup>.

A total of 657 participants produced usable data on all three measures reported here. The Inventory of Callous Unemotional Traits (ICU)<sup>18–20</sup>, a self-reporting questionnaire, was used to assess CU traits. The BART<sup>21</sup>, where participants can repeatedly gamble by pumping a balloon for greater reward but risk popping it and receiving no reward, was one measure of risk-taking. The Stoplight driving task<sup>22</sup>, where participants repeatedly choose to either enter yellow/red lights and risk time-consuming crashes

or stop and then proceed on the green light, was also given in counterbalanced order as an additional risk-taking task. All three are standard choices that have been validated<sup>19,21,23</sup>. At the time of writing, the ICU and BART tasks can be obtained online, and the Stoplight can be obtained by contacting the authors<sup>22</sup>. Unrelated to the aims of the present study, participants were asked to bring two friends of the same gender and completed the tasks either in their presence or not.

### Statistical analysis

MultiLevel Data Manipulations were conducted in MLwiN 2.30 (University of Bristol, 2014), resulting in an outcome variable for each task that was adjusted to be equated across peer group membership. Descriptive statistics, zero-order Pearson correlations and p-values were calculated using JASP 0.8.2.0<sup>24</sup>. An online tool was used to calculate Bayes factors<sup>25</sup>.

## Results

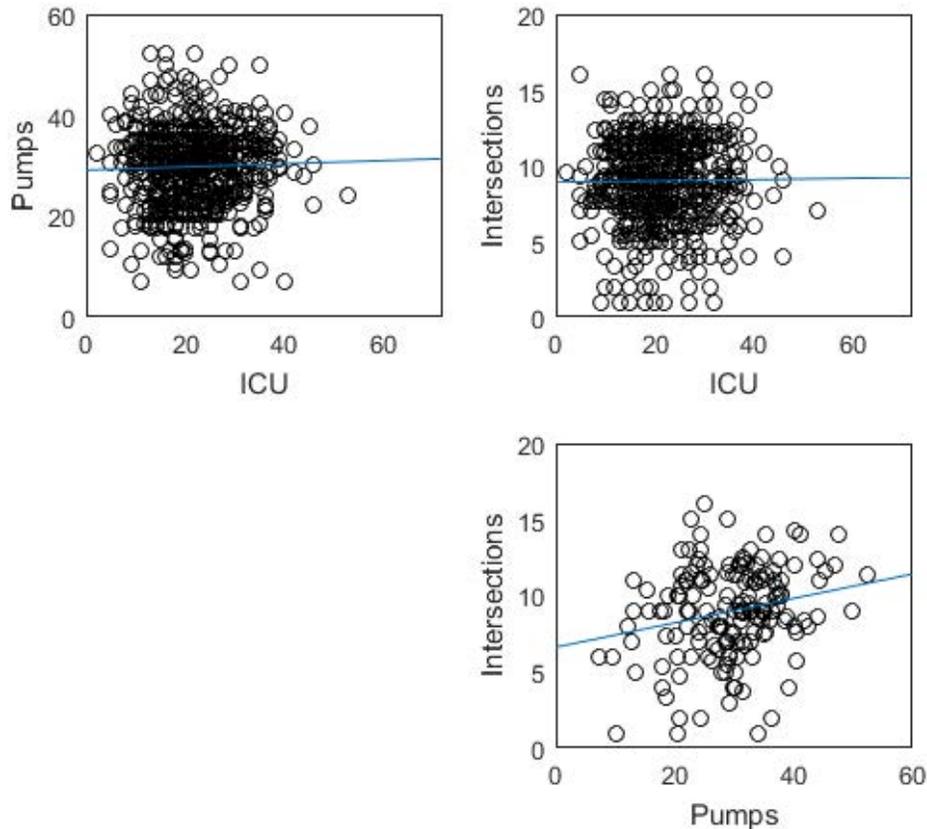
Figure 1 shows scatterplots of the relations among the three variables. There was a significant zero-order correlation between the tasks,  $r=0.22$ ,  $p<0.001$ , but not between the ICU scores and either the BART,  $r=0.033$ ,  $p=0.397$ ,  $N=657$ ,  $BF_{10}=1/8.09$  or the driving task,  $r=0.013$ ,  $p=0.738$ ,  $N=672$ ,  $BF_{10}=1/11.00$ . More importantly, a multiple linear regression, with the risk-taking tasks predicting ICU scores, showed no significant relation to the BART,  $\beta=0.033$ ,  $t=0.824$ ,  $p=0.410$ , or the driving task,  $\beta=-0.000$ ,  $t=-0.012$ ,  $p=0.990$ . The overall fit was  $F(2, 654)=0.359$ ,  $p=0.698$ ;  $R^2=0.001$ ,  $R=0.033$ ,  $N=657$ ,  $BF_{10}=1/60.22$ . In a Bayesian analysis, this is considered strong evidence for the null hypothesis<sup>25,26</sup>.

We also examined the comparability of our sample to others. The mean  $\pm$  SD for total ICU ( $21.62 \pm 7.85$ ) was comparable to previous community and at-risk samples. For example, our scores were similar to those from a community sample (male,  $25.25 \pm 7.90$ ; female,  $21.76 \pm 9.4$ )<sup>27</sup>, as well as to youths from a residential facility ( $25.74 \pm 7.95$ )<sup>28</sup>.

### Dataset 1. Subject demographic information, together with Inventory of Callous–Unemotional Traits score and results of the tasks

<http://dx.doi.org/10.5256/f1000research.14623.d201818>

Data are provided in raw form and peer-level adjusted format within the same spreadsheet<sup>29</sup>. Condition: peer present, 1; peer absent, 0; Subject ID, anonymized participant ID number; Female: female gender, 1; male gender, 0; Age, age in years; BART Pumps AdjAvg\_raw data, adjusted average pumps; Peer group level adjusted BART Pumps, peer-group level-adjusted adjusted average pumps; Peer ID, peer group membership ID number; Stoplight Intersections\_raw data, number of intersections entered on the Stoplight driving task; Peer group level adjusted Stoplight, peer-group level-adjusted number of intersections entered on the Stoplight driving task; Total ICU, number of CU traits using the Inventory of Callous-Unemotional Traits.



**Figure 1. Scatterplots of the relations among the three variables.** Scores were adjusted for peer-level clustering, since participants were recruited with two friends.

## Discussion

The results of this study rule out a specific theory about why CU traits are related to risky real-world behaviors including illegal behavior. People with CU traits are not more likely to engage in risky behavior in a lab setting, so real-world risky behaviors are unlikely to be driven by risk-seeking for its own sake. More broadly, this is a worked demonstration that differences in reward and punishment responsivity on a task do not necessarily imply differences in overall risk-taking, even in the same dataset. On the basis of previously reported findings<sup>13,17</sup> and our re-analyses, we conclude that these two concepts should not be used interchangeably in interpreting risk-taking results.

There are potential alternative explanations for why people with high CU traits tend to do risky things, like having unprotected sex. For one, they may simply place different values on the outcomes of catching a disease and/or seeking bodily sensations. However, an interaction between CU traits and antisocial behavior (i.e., conduct disorder) has shown effects on laboratory risk-taking<sup>23</sup>. One broad possibility is that CU traits do not operate singly, since psychopathy is multifaceted, and some

factors of psychopathy appear to be more reliably related to risk taking than others<sup>14,30</sup>.

People who engage in antisocial behavior suffer legal, educational and socio-economic consequences<sup>31</sup>, and we know CU traits predict antisocial behavior<sup>32,33</sup>. Thus, further research is needed to understand the mechanisms by which people with CU traits (i) engage in antisocial behavior, and (ii) fail to care about the consequences of their behavior on themselves and on other people. The present study sheds light on one part of this, by showing that one obvious idea of how CU traits and illegal behavior relate is not tenable.

## Data availability

**Dataset 1. Subject demographic information, together with Inventory of Callous-Unemotional Traits score and results of the tasks.** Data are provided in raw form and peer-level adjusted format within the same spreadsheet<sup>29</sup>. Condition: peer present, 1; peer absent, 0; Subject ID, anonymized participant ID number; Female: female gender, 1; male gender, 0; Age, age in years; BART Pumps AdjAvg\_raw data, adjusted average pumps; Peer group level adjusted BART Pumps, peer-group

level-adjusted adjusted average pumps; Peer ID, peer group membership ID number; Stoplight Intersections\_raw data, number of intersections entered on the Stoplight driving task; Peer group level adjusted Stoplight, peer-group level-adjusted number of intersections entered on the Stoplight driving task; Total ICU, number of CU traits using the Inventory of Callous-Unemotional Traits.

DOI: [10.5256/f1000research.14623.d201818](https://doi.org/10.5256/f1000research.14623.d201818)<sup>29</sup>

### Competing interests

No competing interests were disclosed.

### Grant information

The research presented here was possible with funding from the British Academy, project SG100982, given to the first author. No other funding sources were declared.

*The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.*

### Acknowledgements

The authors wish to acknowledge the help of Dr Susanne MacLellan, who assisted with data collection. Thanks, also, to Helen Gowling and Jo McBoyle, who assisted with coding and data entry.

### References

- Frick PJ, Ray JV, Thornton LC, *et al.*: **Annual research review: A developmental psychopathology approach to understanding callous-unemotional traits in children and adolescents with serious conduct problems.** *J Child Psychol Psychiatry.* 2014; **55**(6): 532–548.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Mills B, Reyna VF, Estrada S: **Explaining contradictory relations between risk perception and risk taking.** *Psychol Sci.* 2008; **19**(5): 429–433.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Baskin-Sommers AR, Waller R, Fish AM, *et al.*: **Callous-Unemotional Traits Trajectories Interact with Earlier Conduct Problems and Executive Control to Predict Violence and Substance Use Among High Risk Male Adolescents.** *J Abnorm Child Psychol.* 2015; **43**(8): 1529–1541.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Marini VA, Stickle TR: **Evidence for deficits in reward responsivity in antisocial youth with callous-unemotional traits.** *Personal Disord.* 2010; **1**(4): 218–229.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Ray JV, Thornton LC, Frick PJ, *et al.*: **Impulse Control and Callous-Unemotional Traits Distinguish Patterns of Delinquency and Substance Use in Justice Involved Adolescents: Examining the Moderating Role of Neighborhood Context.** *J Abnorm Child Psychol.* 2016; **44**(3): 599–611.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Wymbs BT, McCarty CA, King KM, *et al.*: **Callous-unemotional traits as unique prospective risk factors for substance use in early adolescent boys and girls.** *J Abnorm Child Psychol.* 2012; **40**(7): 1099–110.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Thornton LC, Frick PJ, Ray JV, *et al.*: **Risky Sex, Drugs, Sensation Seeking, and Callous Unemotional Traits in Justice-Involved Male Adolescents.** *J Clin Child Adolesc Psychol.* 2017; **1**–12.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Blair RJ: **The amygdala and ventromedial prefrontal cortex: functional contributions and dysfunction in psychopathy.** *Philos Trans R Soc Lond B Biol Sci.* 2008; **363**(1503): 2557–2565.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Blair RJ, Colledge E, Murray L, *et al.*: **A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies.** *J Abnorm Child Psychol.* 2001; **29**(6): 491–498.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Mitchell DG, Colledge E, Leonard A, *et al.*: **Risky decisions and response reversal: Is there evidence of orbitofrontal cortex dysfunction in psychopathic individuals?** *Neuropsychologia.* 2002; **40**(12): 2013–2022.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Pardini DA, Byrd AL: **Perceptions of aggressive conflicts and others' distress in children with callous-unemotional traits: 'I'll show you who's boss, even if you suffer and I get in trouble'.** *J Child Psychol Psychiatry.* 2012; **53**(3): 283–291.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Roose A, Bijttebier P, Claes L, *et al.*: **Psychopathic traits in adolescence: Associations with the revised Reinforcement Sensitivity Theory systems.** *Pers Individ Dif.* 2011; **50**(2): 201–205.  
[Publisher Full Text](#)
- Centifanti LC, Modecki K: **Throwing caution to the wind: callous-unemotional traits and risk taking in adolescents.** *J Clin Child Adolesc Psychol.* 2013; **42**(1): 106–119.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Hosker-Field AM, Molnar DS, Book AS: **Psychopathy and risk taking: Examining the role of risk perception.** *Pers Individ Dif.* 2016; **91**: 123–132.  
[Publisher Full Text](#)
- Kastner RM, Sellbom M: **Hypersexuality in college students: The role of psychopathy.** *Pers Individ Dif.* 2012; **53**(5): 644–649.  
[Publisher Full Text](#)
- Khan R, Brewer G, Kim S, *et al.*: **Students, sex, and psychopathy: Borderline and psychopathy personality traits are differently related to women and men's use of sexual coercion, partner poaching, and promiscuity.** *Pers Individ Dif.* 2017; **107**: 72–77.  
[Publisher Full Text](#)
- Centifanti LCM, Modecki KL, MacLellan S, *et al.*: **Driving Under the Influence of Risky Peers: An Experimental Study of Adolescent Risk Taking.** *J Res Adolesc.* 2014.  
[Publisher Full Text](#)
- Essau CA, Anastassiou-Hadjicharalambous X, Muñoz LC: **Psychometric properties of the Spence Children's Anxiety Scale (SCAS) in Cypriot children and adolescents.** *Child Psychiatry Hum Dev.* 2011; **42**(5): 557–568.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Kimonis ER, Frick PJ, Skeem JL, *et al.*: **Assessing callous-unemotional traits in adolescent offenders: validation of the Inventory of Callous-Unemotional Traits.** *Int J Law Psychiatry.* 2008; **31**(3): 241–252.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Roose A, Bijttebier P, Decoene S, *et al.*: **Assessing the affective features of psychopathy in adolescence: a further validation of the inventory of callous and unemotional traits.** *Assessment.* 2010; **17**(1): 44–57.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Lejuez CW, Read JP, Kahler CW, *et al.*: **Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART).** *J Exp Psychol Appl.* 2002; **8**(2): 75–84.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Chein J, Albert D, O'Brien L, *et al.*: **Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry.** *Dev Sci.* 2011; **14**(2): F1–F10.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Fanti KA, Kimonis ER, Hadjicharalambous MZ, *et al.*: **Do neurocognitive deficits in decision making differentiate conduct disorder subtypes?** *Eur Child Adolesc Psychiatry.* 2016; **25**(9): 989–996.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- JASP Team: **JASP (Version 0.8.2).** 2018.
- Rouder JN, Morey RD: **Default Bayes Factors for Model Selection in Regression.** *Multivariate Behav Res.* 2012; **47**(6): 877–903.  
[PubMed Abstract](#) | [Publisher Full Text](#)
- Kass RE, Raftery AE: **Bayes Factors.** *J Am Stat Assoc.* 1995; **90**(430): 773–795.  
[Publisher Full Text](#)

27. Muñoz LC, Qualter P, Padgett G: **Empathy and bullying: Exploring the influence of callous-unemotional traits.** *Child Psychiatry Hum Dev.* 2011; **42**(2): 183–196.  
[PubMed Abstract](#) | [Publisher Full Text](#)
28. Lui JH, Barry CT, Sacco DF: **Callous-unemotional traits and empathy deficits: Mediating effects of affective perspective-taking and facial emotion recognition.** *Cogn Emot.* 2016; **30**(6): 1049–1062.  
[PubMed Abstract](#) | [Publisher Full Text](#)
29. Centifanti LCM, Negen J: **Dataset 1 in: Strong evidence that callous-unemotional traits are not related to risk-taking task performance.** *F1000Research.* 2018.  
[Data Source](#)
30. Swogger MT, Walsh Z, Lejuez CW, *et al.*: **Psychopathy and Risk Taking among Jailed Inmates.** *Crim Justice Behav.* 2010; **37**(4): 439–452.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
31. Scott S, Knapp M, Henderson J, *et al.*: **Financial cost of social exclusion: follow up study of antisocial children into adulthood.** *BMJ.* 2001; **323**(7306): 191.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
32. McMahon RJ, Witkiewitz K, Kotler JS, *et al.*: **Predictive validity of callous-unemotional traits measured in early adolescence with respect to multiple antisocial outcomes.** *J Abnorm Psychol.* 2010; **119**(4): 752–63.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
33. Muñoz LC, Frick PJ: **The reliability, stability, and predictive utility of the self-report version of the Antisocial Process Screening Device.** *Scand J Psychol.* 2007; **48**(4): 299–312.  
[PubMed Abstract](#) | [Publisher Full Text](#)

# Open Peer Review

Current Referee Status:  

Version 1

Referee Report 11 May 2018

doi:10.5256/f1000research.15914.r33543



**Timothy R. Stickle**<sup>1</sup>, **Andrew Gill**<sup>2</sup>, **Ashley Dobbins**<sup>2</sup>, **Amanda Falcon**<sup>2</sup>

<sup>1</sup> Department of Psychological Science, University of Vermont, Burlington, VT, USA

<sup>2</sup> University of Vermont, Burlington, VT, USA

This is an interesting research note and is likely to contribute to the literature. There are, however, several areas that need elaboration or clarification to better communicate the findings and their contribution.

Use of Bayesian analysis in a reasonably large sample adds strength to the authors interpretation of null findings.

Clarification about some detail of the Bayesian analysis for the reader would be helpful and should include:

How was the prior selected and what was used for the prior distribution?

Was it a noninformative or an informative prior?

Was sensitivity analysis conducted to gauge the effect of the prior?

It is worth noting that the sample is reasonably large, so the effect of the prior on at least some parameters may be small. Nevertheless, it would be helpful for the authors to note the effect of sample size on prior and posterior probabilities.

In the first paragraph of the Discussion section, the authors make a strong declarative statement that the results "...rule out a specific theory about why CU traits are related to risky real-world behaviors... People with CU traits are not more likely to engage in risky behavior in a lab setting, so real-world risky behaviors are unlikely to be driven by risk-seeking for its own sake."

Although the following statements regarding caution in generalizing reward and punishment processing in laboratory tasks to behavior outside the lab clearly are warranted, the above statements seem a step too far. That is, the results clearly cast some doubt on the links and mechanisms of risk. The notion that the finding is conclusive, however, does not seem warranted. Rather, it is recommended that the authors use language to indicate that the current results fail to support links between the specific measure of risk used here and CU traits. It is a reasonable inference to note that the presence of CU traits alone and documented mechanisms of reward and punishment processing are not de facto predictors of risk. It seems more defensible to state something more akin to noting that the current results call for

reexamination of the mechanisms thought to link CU traits and risky behaviors.

In extending these recommended comments, it would also be helpful for the authors to synthesize the discussion paragraphs a bit more in their discussion of the multifaceted/multidimensional nature of psychopathy and the implications of the broader psychopathy construct in understanding risk and its mechanisms.

Overall, the paper is interesting and the above comments are offered in the spirit of strengthening how the results are communicated.

**Is the work clearly and accurately presented and does it cite the current literature?**

Partly

**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**

Partly

**If applicable, is the statistical analysis and its interpretation appropriate?**

Yes

**Are all the source data underlying the results available to ensure full reproducibility?**

Yes

**Are the conclusions drawn adequately supported by the results?**

Partly

**Competing Interests:** No competing interests were disclosed.

**Referee Expertise:** Callous and unemotional traits, youth psychopathy, adolescent substance use, statistics

**We have read this submission. We believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Referee Report 08 May 2018

doi:[10.5256/f1000research.15914.r33540](https://doi.org/10.5256/f1000research.15914.r33540)



**Carlo Garofalo** 

Department of Developmental Psychology, Tilburg University, Tilburg, Netherlands

Thanks for the opportunity to review this manuscript. The study described has important strengths, such as the large sample, the use of well-validated assessment methods, and the sophisticated statistical techniques. I also extremely appreciate the fact that full data are made available, something that happens too rarely to the detriment of the field. The topic is certainly an important one, and one that historically attracts speculations that permeates popular beliefs on the nature and dynamics of callous-unemotional traits. I therefore think that the publication of (null) findings like this is imperative as to not fuel

misconceptions on the topic.

While I am therefore clearly positive regarding this submission, I also list below some issues that occurred to me while reading the manuscript, which I think may deserve further elaboration to strengthen the contribution of this study to the literature. I suspect that the writing was constrained by length limits, which could make it impossible to address my suggestions thoroughly, but I thought I would nevertheless mention what I believe could further improve this well-executed and well-written study.

1. It is clear to me that the findings do not support the hypothesis that CU traits are related to risk taking. But I could not tell: who proposed this link, and whether this hypothesis also guided the present research. I think it would help situate the present study within the broader literature on CU if the manuscript could (briefly) refer whether the CU-risk taking link was just one that 'makes sense', or one that is central in existing theories of CU (e.g., in the opening of the discussion, it is stated that the present study rules out a 'specific theory', but it is unclear which theory is referred to). I think this is important because such theories would have to be re-considered in light of this null finding (as opposed to the scenario in which the CU-risk taking link is more of a popular misconceptions with no footing in scholarly work). Relatedly, as I find the alternative explanation (i.e., 'a different method of valuing certain outcomes') equally – if not more – compelling, I think it would be helpful to know whether this possibility was already acknowledged before the study was conducted, or followed the null findings that did not support the initial hypothesis.
2. A second conceptual clarification that may be needed concern the overlap and dissociation between reward/punishment sensitivity and risk-taking. This seems relevant to understand specific abnormalities related to CU traits and what they can mean. Related to this – it looks like CU traits were also not related in punishment sensitivity, if I am not misunderstanding. If that is the case, how does this null finding aligns with existing theories of psychopathy such as the low-fear hypothesis or the response modulation model?
3. For non-familiar readers (as myself), it may be worth expanding on how the Bayesian framework adopted allows for an interpretation of the null finding in a way that frequentist methods would not (also just a brief mention of why the overall fit can be considered strong evidence of null hypothesis).
4. I cannot help but wonder what the results look like if the ICU is examined at a sub-scale level. I do not expect differences, but I think it is important to rule out that the overall null effect is not due to differential associations between ICU subscales and risk-taking.

**Is the work clearly and accurately presented and does it cite the current literature?**

Yes

**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**

Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**

Yes

**Are all the source data underlying the results available to ensure full reproducibility?**

Yes

**Are the conclusions drawn adequately supported by the results?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Referee Expertise:** Clinical forensic psychology

**I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

---

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact [research@f1000.com](mailto:research@f1000.com)

**F1000Research**