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Psychopathic traits in the interpersonal context: Is the effect of psychopathic traits on prosocial behavior mediated by peer problems?

Iris Frowijn [a,b,*], Elien De Caluwé [a]

[a] Department of Developmental Psychology, University of Tilburg, the Netherlands
[b] Fivoor Science and Treatment Innovation (FARID), Rotterdam, the Netherlands

A R T I C L E I N F O

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A B S T R A C T

Psychopathic traits are often investigated within the individual, while most traits come to expression within the interpersonal context. Low social communion might even be an important overlooked core feature of psychopathy. This raises the question how psychopathic (i.e., Grandiose-Manipulative, Callous-Unemotional, and Irresponsible-Impulsive) traits affect the tendency to show prosocial behavior, and whether peer problems explain this relationship. Besides, the effects of gender on these subrelations are explored. In total, 541 community adolescents and emerging adults (26.4 % men; 16–25 years old, $M_{\text{age}} = 21.7$, $SD_{\text{age}} = 2.50$) completed questionnaires, measuring psychopathic traits, prosocial behavior, and peer problems. The relationship between psychopathic traits and prosocial behavior was investigated with three separate moderated mediation regression analyses (for Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible traits separately) including peer problems as mediator and gender as moderator. Significant direct negative effects of Grandiose-Manipulative and Callous-Unemotional traits on prosocial behavior were found, though not for Impulsive-Irresponsible traits. Peer problems did not mediate this relation and gender was no moderator. The significant moderation effect indicated that only for women a significant direct positive effect of Callous-Unemotional traits on peer problems was found, but not for men nor other psychopathic traits. More gender differences were found with men (vs. women) scoring significantly higher on all three psychopathic traits and lower on prosocial behavior. Implications of psychopathic traits within the interpersonal context are discussed and future research could further investigate how this relationship can be explained, for example by including different types of measures and other potential mediators (e.g., empathy).

1. Introduction

Psychopathy is defined as “a socially devastating disorder defined by a constellation of affective, interpersonal, and behavioral characteristics, including egocentricity, impulsivity, irresponsibility, shallow emotions, lack of empathy, guilt or remorse, pathological lying, manipulativeness, and the persistent violation of social norms and expectations” (Hare, 1998, p. 188). These characteristics seem to have a neurobiological basis in, among others, the amygdala and prefrontal cortex (Blair, 2013; Viding & McCrory, 2019). Consequently, psychopathy can be seen as a neurodevelopmental disorder (Blair, 2013), which implies an individualistic perspective to the psychopathology. However, most of the described psychopathic traits come to expression in direct social contact with others, since psychopathy is “a socially devastating disorder” (Hare, 1998, p.188). For instance, lying and deceit usually require involvement of other persons, namely the person one is lying to. This indicates that the interpersonal context is of major importance in understanding such traits, while in research, such psychopathic impairments in social affiliation and prosocial behavior are often overlooked (Sherman & Lynam, 2017; Viding & McCrory, 2019) and hence will be the focus of the current study.

As can be deducted from the constellation of traits that define psychopathy (Hare, 1998), the construct is rather heterogeneous and can be seen as a 3-factor hierarchical model composed of three distinguishable factors of dimensional nature (Cooke & Michie, 2001). These factors include: (1) a grandiose and manipulative interpersonal style, (2) a callous and unemotional pattern, and (3) impulsive, irresponsible, and sensation seeking behavior (Andershed et al., 2002; Cooke & Michie, 2001). Specifically, these callous and unemotional traits (CU traits), which can be characterized by empathy and guilt related deficiencies,

* Corresponding author at: Department of Developmental Psychology, Tilburg University, 5000 LE Tilburg, the Netherlands.
E-mail address: I.Frowijn@tilburguniversity.edu (I. Frowijn).

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shallow emotions, and indifference about personal performances, are believed to form the core of psychopathy (Frick et al., 2014). Within youngsters suffering from conduct problems, these CU traits can be captured in 'the with limited prosocial emotions (LPE) specifier' according to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association [APA], 2013). This indicates that although these CU traits are diagnosed individually, they are visible through social emotions, and hence behaviors. This is supported by the finding that higher levels of psychopathy are related to lower social communion and lower value of social relationships, which is therefore proposed to be regarded as a core feature of psychopathy (Sherman & Lynam, 2017). However, the question remains how these psychopathic traits (including all three factors of psychopathic traits) apply to the interpersonal context. More concretely, how do these psychopathic traits affect prosocial behavior towards others, given this potential core feature of low communion in psychopathy (Sherman & Lynam, 2017)?

Prosocial behavior is defined as being generally positive responsive, helpful, and considerate towards others in terms of their wishes and well-being (Hay & Pawlby, 2003). In general, research on psychopathy has focused primarily on antisocial behavior, where it is often thought that prosocial behavior is simply an opposite of antisocial behavior. However, this is probably more complicated, since it was found that antisocial and prosocial behavior have different predictors (Wendt et al., 2017), and in some situations might even be positively related (Patton et al., 2018). For instance, when an individual performs a dangerous heroic act, the behavior is primarily viewed as prosocial and altruistic, but this also positively correlates with psychopathy, boldness, and narcissism (Patton et al., 2018). Nevertheless, a lack of prosocial behavior has been identified as one of the most important predictors for an increased future risk status and decreased adaptation in social context (Crick, 1996). Therefore, it is important to further investigate specific predictors of prosocial behavior, especially in terms of psychopathic traits.

In previous longitudinal studies, psychopathic traits, and specifically CU traits, have often been related to less prosocial behavior in children and adolescents (e.g., Eisenbarth et al., 2017; Fontaine et al., 2011; Milledge et al., 2019). However, Wendt et al. (2017) investigated predictors of prosocial behavior in school children aged 9–12 years old (cross-sectionally) and they emphasized the importance to look beyond CU traits, since they found that narcissism and impulsivity are also important predictors of prosocial behavior. Moreover, other studies found that girls generally show more prosocial behavior than boys, as investigated in samples of school children (Eisenbarth et al., 2017; Milledge et al., 2019; Paap et al., 2013), and incarcerated juvenile offenders (13–20 years; Pechorro et al., 2013). However, Wendt et al. (2017) also found that after including narcissism and impulsivity on top of CU traits, the effect of gender on prosocial behavior disappeared (school children age 9–12; Wendt et al., 2017), and no effect of gender on prosocial behavior was found in an adolescent/young adult sample (18–21 years; White, 2014). Besides, Milledge et al. (2019) used parent and teacher reports (vs. self-report), which specifically for gender are prone to bias due to culturally related beliefs and stereotypes, in the sense that girls are generally viewed as more prosocial than boys (Hastings et al., 2007; Zimmer-Gembeck et al., 2005). Given these inconsistencies, the effect of gender should be included when investigating the relationship between psychopathic traits and prosocial behavior what will be done in the current study.

Furthermore, relationships with peers seem to be of importance as well, since individuals with psychopathic traits show less prosocial behavior to peers even if they have close relationships with them (Sherman & Lynam, 2017; Viding & McCrory, 2019). In general, higher CU traits have been linked to more delinquent peer relationships (Kimonis et al., 2004), bullying (Viding et al., 2009), and peer relationship problems (Eisenbarth et al., 2017; Milledge et al., 2019). Peer problems can therefore be seen as an umbrella term including bullying or being bullied, and difficulties in developing and maintaining constructive and qualitative friendships with others of the same age group (Goodman, 2001; NCRSMH, 2023). More specifically, higher CU traits in childhood (measured at age 3 in a high-risk sample) predicted lower scores on being liked by peers in teenage years (age 10), though moderated by executive functioning in the sense that relatively high executive functioning could be a protective factor (Waller et al., 2017). In this context, especially the combination of lower executive functioning and higher levels of CU traits is predictive for poor peer liking outcomes later on (Waller et al., 2017). In offender samples (age 14–18 and 13–17 respectively), it was even found that delinquent peer relationships mediate the effect of psychopathic traits on offending, indicating the importance to include peer relationships (Bryson et al., 2020; Ray et al., 2017).

However, peer relationships in individuals who score relatively high on psychopathic traits with peers who score relatively low on psychopathic traits can be complicated and difficult to investigate. Against expectations, it was found that youngsters with relatively high scores on psychopathic traits (age 12–15) have as many friends as youngsters with relatively low scores on psychopathic traits (Muñoz et al., 2008). Besides, in general, peer relationships within the psychopathic-trait group were found to be stable across time and bilateral (it was not specified whether the peers of these individuals in the psychopathic-trait group scored either high or low on psychopathic traits). However, individuals in the psychopathic-trait group tended to misinterpret conflicts with their peers in the sense that they perceived more conflicts while the accompanying peers did not acknowledge these conflicts (Muñoz et al., 2008). So, if individuals with relatively high scores on psychopathic traits report more peer problems (vs. individuals who score relatively low on psychopathic traits), this does not necessarily mean there are more peer problems but can also be explained by possible misperceptions of conflicts in peer relationships.

Moreover, although some studies found no effect of gender on peer relationships in individuals with psychopathic traits, or focused mostly on men (Bryson et al., 2020; Eisenbarth et al., 2017; Ray et al., 2017; Viding et al., 2009; Waller et al., 2017), it could be that the effects of psychopathic traits on peer problems are specifically relevant in girls (vs. boys). For instance, Carlson et al. (1997) indicated that girls with opposite defiant disorder (ODD; a childhood behavioral disorder related to the development of psychopathy; APA, 2013), experience more peer problems than boys with ODD. This could imply there is an effect of gender on the relationship between psychopathic traits and peer problems, but again this requires further investigation; an issue that will be addressed in the current study.

Peer problems are also directly related to prosocial behavior, though this effect is thought to be reciprocal. Better peer relationships lead to more prosocial behavior, and more prosocial behavior leads to better peer relationships (Paap et al., 2013; Wentzel, 2014; Zimmer-Gembeck et al., 2005). For girls (age 9–12), prosocial behavior seems to be even more important than for boys because of positive associations with future peer acceptance and negative associations with peer rejection (Crick, 1996). Therefore, the relationship between peer problems and prosocial behavior might be stronger for girls than boys, which is why gender should be taken into consideration. Besides, although the effect between peer problems and prosocial behavior is probably bidirectional, it is likely that the role of peers on prosocial behavior is especially important in adolescence (Wentzel, 2014), particularly considering that relatedness to peers is regarded as a strong incentive for showing prosocial behavior (Baumeister & Leary, 1995). Relatedness is one of the three important basic psychological needs in the self-determination theory (SDT), expressing a need to belong that has to be satisfied to achieve intrinsic motivation (Deci & Ryan, 2000). In the context of prosocial behavior, it is believed that peer relationships can be intrinsically (e.g., empathic/altruistic internalized motives) as well as extrinsically (e.g., what other peers think of you) motivated reasons to show prosocial behavior (Wentzel, 2014; Wentzel et al., 2007).

Therefore, and given the main interest in the effect of psychopathic traits on prosocial behavior, the focus in this study will be on the effect of peer relationships on prosocial behaviors and not the other way around.

More specifically, according to Sherman and Lynam (2017), and Viding and McCrory (2019), individuals with psychopathic traits show less prosocial behavior to anyone, regardless of having close relationships with the person to whom these prosocial behaviors are intended. However, it was found that individuals with psychopathic traits have/perceive relatively more peer problems (Eisenbarth et al., 2017; Milledge et al., 2019; Muñoz et al., 2008), which in turn may lead to showing less prosocial behavior (Paap et al., 2013; Wentzel, 2014; Zimmer-Gembeck et al., 2005). Therefore, having peer problems could potentially explain, and thus mediate, the general tendency to show less prosocial behavior in individuals with psychopathic traits. Having peer problems has been identified as a mediator previously (Bryson et al., 2020; Ray et al., 2017), where specifically delinquent peer relationships mediated the effect of psychopathic traits on criminal offending. Moreover, these peer problems give an indication of the social context in which psychopathic traits could arise and influence prosocial behavior.

1.1. The present study

Concretely, investigating psychopathic traits in the social context is relevant for multiple reasons. First, there is still a lot unknown in the characterization of psychopathy, especially regarding the social features (Sherman & Lynam, 2017; Viding & McCrory, 2019). Second, the main focus is generally on antisocial behavior, while prosocial behavior, which has already been identified as a very important predictor for future risk status (Crick, 1996), remains largely understudied. Furthermore, clinical programs generally aim at reducing risk behaviors, while social relationships (among others with peers) and prosocial behavior can be seen as important protective behaviors (National Institute for Health and Care Excellence [NICE], 2013).

The research question we opt to answer is: How do youth psychopathic traits affect prosocial behavior, and do peer problems explain this relationship? Moreover, what are the effects of gender on these interrelations? Since (youth) psychopathic traits are not a unidimensional construct but can be seen as a 3-factor hierarchical model, we will investigate the effects of the three factors (Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible) separately. We do not have specific hypotheses regarding the three different factors of youth psychopathic traits, but since the factors are differently correlated to external variables (e.g., age of crime onset, physical violence, and substance use; Pechorro et al., 2015) we want to distinguish the possibly differing effects in the current study. Consequently, the goal is to gain an increased understanding of these psychopathic traits in adolescents and emerging adults within the social context by focusing on prosocial behavior and peer problems. It is expected that all three factors of psychopathic traits negatively predict prosocial behavior directly, but also via the mediator peer problems, meaning that having more peer problems will (partly) explain why having higher scores on psychopathic traits is related to less prosocial behavior.

Since there are many inconsistent findings regarding gender, the sample will not simply be split in men and women, but we will investigate the specific effects of gender for every subrelation. It is expected that gender moderates the relationship between youth psychopathic traits and prosocial behavior, however, it is unclear whether the effect would be stronger in women or men. Moreover, it is expected that gender moderates the subrelation between youth psychopathic traits and peer problems, in the sense that the hypothesized positive effect of youth psychopathic traits on peer problems is thought to be stronger in women than men. Gender is also expected to moderate the subrelation between peer problems and prosocial behavior, which is expected to be stronger for women than men. A conceptual model is visualized in Fig. 1.

2. Method

2.1. Participants and procedure

Dutch-speaking adolescents and emerging adults aged 16–25 years from the general population were approached by Master's students psychology of Tilburg University via convenience sampling and were asked to complete an online Qualtrics questionnaire. The final sample included 541 participants with 143 men (26.4 %) and 398 women (73.6 %). Participants had to be between 16 and 25 years old to be included. The mean age was 21.7 years old (SD = 2.50), which did not significantly differ for men (M = 21.87; SD = 2.72) and women (M = 21.64, SD = 2.42), with $t(227.31) = 0.88$, p = .381, d = 0.09, 95 % CI [−0.10, 0.28]. However, significant gender differences did occur in level of education, $\chi2(6) = 13.87$, p = .031, with a slightly lower level in men compared to women (see Table 1 for more details).

Before participation, participants received information about the study. They were informed that participation was completely volontary and anonymous. Furthermore, it was emphasized that they could withdraw at any time without providing reasons. Participants did not receive any reward for participation. Further, they were notified of several websites for psychological help in case the questions would raise discomfort. Ethical approval was granted by the Ethics Review Board of Tilburg School of Social and Behavioral Sciences, and all answers were stored anonymously following the European Union General Data Protection Regulation (GDPR) guidelines. All participants gave informed consent.

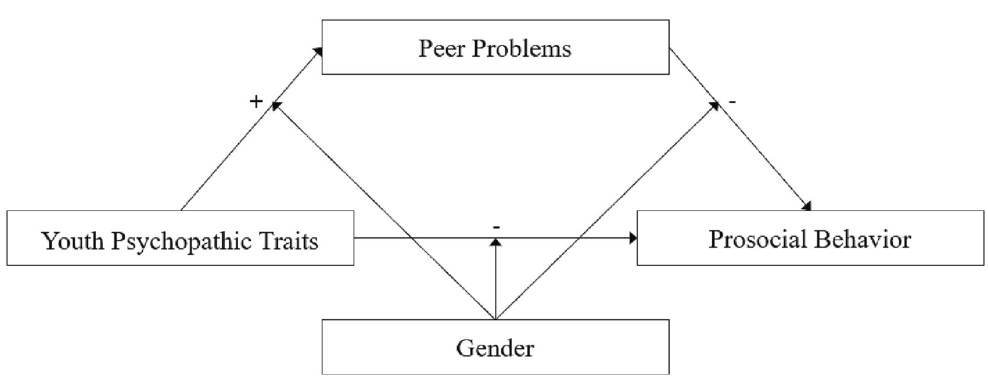

Fig. 1. Conceptual model.
Note. The model will be tested for the three factors (Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible) of youth psychopathic traits separately.

Table 1
Education level.

	Full sample ($N = 541$)		Men ($n = 143$)		Women ($n = 398$)	
	N	%	n	%	n	%
VMBO	9	1.7	3	2.1	6	1.5
HAVO	26	4.8	14	9.8	12	3.0
VWO	25	4.6	6	4.2	19	4.8
MBO	61	11.3	20	14.0	41	10.3
HBO	177	32.7	45	31.5	132	33.2
WO	237	43.8	53	37.1	184	46.2
Other	6	1.1	2	1.4	4	1.0

Note. Education levels correspond to the Dutch schooling system, presented in ascending order. VMBO, HAVO, and VWO represent higher secondary education, MBO represents intermediate vocational education, HBO represents university of applied science, WO represents a university education, and Other (textual responses included: no education, primary school, premaster, etc.).

2.2. Measures

2.2.1. Youth psychopathic traits inventory (YPI)

Psychopathic traits were assessed using the Dutch version of the YPI (Andershed et al., 2002; Das & de Ruiter, 2003), which is a 50-item self-report instrument. The YPI was created to reduce common problems in self-report measures of psychopathic traits, such as lying and manipulation, by phrasing the traits as abilities rather than problematic behaviors (Andershed et al., 2002). Moreover, this instrument focusses mainly on the (psychopathic) personality constellation instead of behavioral indices. Consequently, the YPI consists of ten subscales, which can be categorized in three bigger factors, namely grandiose-manipulative (GM), callous-unemotional (CU), and impulsive-irresponsible (II). The corresponding subscales are, for GM: dishonest charm, grandiosity, lying, and manipulation (e.g., "I can get almost anyone to believe anything."); for CU: calloussness, unemotionality, and remorselessness (e.g., "I don't let my feelings affect me as much as other people do."); and for II: impulsivity, thrill-seeking, and irresponsibility (e.g., "I get bored quickly by doing the same thing over."). The participants were asked how they think of each statement in general (not in this specific moment), and it was emphasized that there are no right or wrong answers. The responses were rated on a 4-point Likert scale (0 = *does not apply at all*, 1 = *does not apply well*, 2 = *applies fairly well*, 3 = *applies very well*) (Andershed et al., 2002).

In general, the YPI is considered sufficiently reliable, as assessed in the general population (Total YPI Score in boys: $\alpha = 0.70$, and in girls: $\alpha = 0.74$; Hillege et al., 2010) and in incarcerated boys (Total YPI Score: $\alpha = 0.85$; Colins et al., 2017). Moreover, the YPI scores show metric invariance and partial scalar invariance in the sample of incarcerated boys, implying no differences in validity across ethnic groups (Colins et al., 2017). The YPI items are also considered to be measurement invariant for boys and girls (Zwaanswijk et al., 2017). Regarding construct validity, higher YPI scores are related to a more dominant/hostile interpersonal style, and to a less submissive/friendly interpersonal style (Hillege et al., 2010). In the current study, the internal consistency was excellent for the YPI total score (α= 0.93), and ranging from good to excellent for the factors (GM: $\alpha = 0.92$, CU: $\alpha = 0.80$, and II: $\alpha = 0.84$) that were used in the analyses.

2.2.2. Strengths and Difficulties Questionaire (SDQ)

Prosocial behavior and peer relationship problems were assessed using the Dutch self-report youth version of the SDQ (Goodman, 2001). The SDQ is a 25-item questionnaire measuring psychological attributes, resulting in five scales (five items per scale), originally developed for children aged 5–15 years. The four "difficulty" scales are: emotional symptoms, conduct problems, hyperactivity-inattention, and peer problems, of which only the peer problems subscale was used in the current study (e.g., "I have at least one good friend [reversed]"). The fifth "strength" scale, which was also used in the current study, is: prosocial behavior (e.g., "I am helpful if someone is hurt, upset or feeling ill"). The participants were asked to rate each item on a 3-point Likert scale (0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*), based on the past 6 months (Goodman, 2001). Consequently, the scale score represented the sum score of the five items within the scale (range = 0–10).

Previous research implies sufficient reliability of the self-report version in late adolescents (16–19 years), with $\alpha = 0.60$ for peer problems, and $\alpha = 0.64$ for prosocial behavior (Van Roy et al., 2008). However, in another study, the peer problems subscale (measured with the Dutch self-report version of SDQ) lacked internal consistency (peer problems: $\alpha = 0.39$; van Widenfelt et al., 2003). They suggested this was caused by a lack of awareness of these kind of problems in children and adolescents (11–16 years; van Widenfelt et al., 2003). In the current study, the internal consistency for the subscale peer problems was also unacceptable ($\alpha = 0.43$), and low for the subscale prosocial behavior ($\alpha = 0.55$), both could not be improved by deleting items. Therefore, additionally mean intercriterion correlations (MIC) were calculated that are deemed more appropriate for subscales with fewer items. For the prosocial behavior subscale this yielded a MIC value of 0.21, which is considered acceptable (rule of thumb: MIC between 0.15 and 0.50; Clark & Watson, 1995). For the peer problems subscale this was 0.14, which is slightly too low. When investigating this for men and women separately, it can be concluded that the internal concistency of the peer problems items seems higher for women ($\alpha = 0.46$; MIC = 0.16) than men ($\alpha = 0.32$; MIC = 0.10). Although more research is required, this could indicate that the subscale is functioning differently for men and women.

2.3. Statistical analyses

All analyses were conducted in SPSS version 26, following the preregistration[1] on AsPredicted.org (https://aspredicted.org/blind.php?x=yn4ci9). The original sample size consisted of 855 participants, however, 314 participants had >25 % missings on the variables and therefore were excluded. The remaining participants ($N = 541$) had no missing values. Then, although it was described in the preregistration that outliers would be removed based on the interquartile range (IQR) to identify extreme values, after inspection of the data it was decided to keep the outliers. The reason for this is that there was no normal distribution of the variables, as for all five continuous variables (i.e., Grandiose-Manipulative traits, Callous-Unemotional traits, Impulsive-Irresponsible traits, prosocial behavior, and peer problems) both tests of normality (i.e., Kolmogorov-Smirnov and Shapiro-Wilk) were significant. When investigating the Q-Q plots and mean scores (see Table 2), it appears that the majority of participants score rather low on psychopathic traits and peer problems, and rather high on prosocial behavior. When removing the outliers, this would even decrease the (already limited) variability. In total, 21 participants had outlier scores that were >1.5 * IQR beneath the first quartile or beyond the third quartile (Kannan et al., 2015), and remained included in the data.

Then, descriptive analyses were conducted, including independent samples *t*-tests to evaluate whether there were statistically significant differences ($p < .05$) between men and women on the variables of interest (i.e., Grandiose-Manipulative traits, Callous-Unemotional traits, Impulsive-Irresponsible traits, prosocial behavior, and peer problems). Besides, since the variables did not follow a normal distribution, Spearman's rho correlations among these variables were assessed, for the sample as a whole and for men and women separately. Moreover, the required assumptions for the regression analyses were evaluated. First, the assumption of normality of the residuals was violated, but not problematic because of the use of bootstrapping. Second, the assumptions of linearity between the independent and dependent variables and

[1] Based on the revisions during the review process, we have diverted from the preregistration.

Table 2
Comparison of scores for gender.

	Range	Full sample ($N = 541$)		Men ($n = 143$)		Women ($n = 398$)		Group differences (df)	p	Cohen's d
		M	SD	M	SD	M	SD			
Grandiose-manipulative	0–2.60	0.49	0.47	0.76	0.55	0.40	0.40	$t(200.61) = 7.25$	<0.001	0.812
Callous-unemotional	0–2.47	0.53	0.37	0.81	0.39	0.42	0.30	$t(205.17) = 10.61$	<0.001	1.170
Impulsive-irresponsible	0–2.67	0.94	0.48	1.09	0.52	0.88	0.46	$t(539) = 4.44$	<0.001	0.433
Peer problems	0–7	1.77	1.46	1.78	1.39	1.76	1.49	$t(539) = 0.10$	0.917	0.010
Prosocial behavior	1–10	8.69	1.43	8.23	1.63	8.86	1.32	$t(213.07) = -4.14$	<0.001	−0.445

Note. Mean total scores were calculated for the Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible factors (possible range: 0–3). Peer problems and prosocial behavior were indicated by the sum scores of the SDQ (possible range: 0–10).

homoscedasticity were evaluated using a the normal P-P plot and the scatterplot and were met. Third, the assumption of multicollinearity was met with VIF values <5, and tolerance >0.1.

The moderated mediation regression analyses were conducted using PROCESS, allowing a mediator as well as a moderator by using model 59 (Hayes, 2017). In this model, the continuous independent variable (IV) was the mean total score on the three youth psychopathic trait factors (hence, three separate models for GM, CU, and II), and the continuous dependent variable (DV) was prosocial behavior (indicated by the sumscore). The continuous mediator accounting for the indirect effect between youth psychopathic traits and prosocial behavior, was peer problems (indicated by the sumscore). The moderating variable gender indicating the conditional effect was dichotomous (0 = *male*, 1 = *female*). Accordingly, the three models were tested with a bootstrapped 95 % confidence interval [CI] based on 5000 resamples, as it is generally recommended to use bootstrapping when investigating indirect effects allowing samples of practically any size (Preacher et al., 2007).

3. Results

3.1. Descriptive and correlational analyses

As presented in Table 2, men scored significantly higher on Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible traits than women. On the contrary, women scored significantly higher on prosocial behavior than men. For the entire sample, significant negative correlations (see Table 3) were found with prosocial behavior for Grandiose-Manipulative traits ($\rho = -0.13$, $p = .002$), and Callous-Unemotional traits ($\rho = -0.21$, $p < .001$). No correlation with prosocial behavior was found for Impulsive-Irresponsible traits, nor peer problems. Only Callous-Unemotional traits significantly positively correlated with peer problems ($\rho = 0.17$, $p < .001$). When looking at the correlations for men and women separately (see Table 4), in men only a significant negative correlation was found for Callous-Unemotional traits and prosocial behavior ($\rho = -0.20$, $p = .017$). In women, solely significant correlations were found for Callous-Unemotional traits with prosocial behavior (negatively: $\rho = -0.14$, $p = .006$), and peer problems (positively: $\rho = 0.21$, $p < .001$).

Table 3
Correlations for study variables in entire sample.

Variable	1	2	3	4	5
1. Grandiose-manipulative	–				
2. Callous-unemotional	0.40**	–			
3. Impulsive-irresponsible	0.51**	0.30**	–		
4. Peer problems	0.03	0.17**	0.05	–	
5. Prosocial behavior	−0.13**	−0.21**	−0.06	−0.07	–

Note. Results for the entire sample ($N = 541$). The correlation coefficient is Spearman's rho, due to non-normality.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 4
Correlations for study variables disaggregated by gender.

Variable	1	2	3	4	5
1. Grandiose-manipulative	–	0.24**	0.48**	−0.02	−0.06
2. Callous-unemotional	0.47**	–	0.22**	0.21**	−0.14**
3. Impulsive-irresponsible	0.47**	0.28**	–	0.07	−0.02
4. Peer problems	0.11	0.06	−0.03	–	−0.09
5. Prosocial behavior	−0.15	−0.20*	−0.06	0.02	–

Note. Results for women ($n = 398$) are shown above the diagonal, results for men ($n = 143$) below the diagonal. The correlation coefficient is Spearman's rho, due to non-normality.
*$p < .05$, **$p < .01$, ***$p < .001$.

3.2. Regression analyses

3.2.1. Moderated mediation model for factor 1: Grandiose-manipulative traits

First, a moderated mediation model with Grandiose-Manipulative traits as independent variable was calculated (Table 5). Grandiose-Manipulative traits, gender, and interaction 1 (GM * gender) together explained 0.4 % of the variance in peer problems, with $F(3, 537) = 0.69$, $p = .557$, $R^2 = 0.004$ (not significant, hence the effects could not further be interpreted). Then, Grandiose-Manipulative traits, peer problems, gender, interaction 1 (GM * gender), and interaction 2 (peer problems * gender) together significantly explained 7.9 % of the variance in prosocial behavior, with $F(5, 535) = 9.19$, $p < .001$, $R^2 = 0.079$. Both interaction effects were not significant and the addition of the moderator did not significantly increase the effect of Grandiose-Manipulative

Table 5
Regression results for independent variable grandiose-manipulative (GM) traits.

Variable	b	SE	95 % CI	
			LL	UL
Outcome: Peer problems				
Constant	−0.06	0.14	−0.33	0.21
GM	0.26	0.23	−0.19	0.70
Gender	0.07	0.16	−0.24	0.37
Interaction 1: GM × gender	−0.10	0.29	−0.67	0.47
Outcome: Prosocial behavior				
Constant	8.41[a]	0.13	8.15	8.66
GM	−0.66[a]	0.21	−1.08	−0.24
Peer problems	0.02	0.08	−0.15	0.19
Gender	0.40[a]	0.15	0.12	0.69
Interaction 1: GM × gender	0.17	0.27	−0.37	0.71
Interaction 2: Peer problems × gender	−0.14	0.10	−0.32	0.05
Index of moderated mediation	−0.02	0.05	−0.10	0.09

Note. $N = 541$. CI = confidence interval; LL = lower limit; UL = upper limit; GM = Grandiose-Manipulative traits. GM and peer problems were mean centered.
[a] Effects were considered significant if the (bootstrap based on 5000 resamples) 95 % CI did not include 0.

traits on prosocial behavior, with $F(1, 535) = 0.38$, $p = .540$, $\Delta R^2 = 0.001$, nor the effect of peer problems on prosocial behavior, with $F(1, 535) = 2.00$, $p = .157$, $\Delta R^2 = 0.004$ (hence the conditional direct effects could not be interpretated). Besides, based on the index of moderated mediation, there was no moderated mediation, meaning that the conditional indirect effects were not interpreted. Thus, only the unconditional direct effects on prosocial behavior could be interpreted. There was a significant negative effect of Grandiose-Manipulative traits on prosocial behavior, $b = -0.66$, $t(535) = -3.07$, $p = .002$, 95 % CI [−1.08; −0.24], and a significant positive effect of gender on prosocial behavior, $b = 0.40$, $t(535) = 2.75$, $p = .006$, 95 % CI [0.11; 0.69] meaning that women score on average 0.4 higher on prosocial behavior compared to men.

3.2.2. Moderated mediation model for factor 2: Callous-unemotional traits

Second, a moderated mediation model with Callous-Unemotional traits as independent variable was calculated (Table 6). Callous-Unemotional traits, gender, and interaction 1 (CU * gender) together significantly explained 3.4 % of the variance in peer problems, with $F(3, 537) = 6.37$, $p < .001$, $R^2 = 0.034$. The addition of the moderator significantly increased the effect of Callous-Unemotional traits on peer problems, with $F(3, 537) = 6.46$, $p = .011$, $\Delta R^2 = 0.012$, meaning that an additional 1.2 % of the variance in peer problems was explained. The effect of interaction 1 (CU * gender) was significant, $b = 0.99$, $t(537) = 2.54$, $p = .011$, 95 % CI [0.23; 1.76], meaning that there is a conditional direct effect. For women there was a significant positive effect of Callous-Unemotional traits on peer problems, $b = 1.05$, $t(537) = 4.37$, $p < .001$, 95 % CI [0.58; 1.52], while the effect was not significant for men, $b = 0.06$, $t(537) = 0.18$, $p = .857$, 95 % CI [−0.55; 0.66] (see Fig. 2).

Consequently, Callous-Unemotional traits, peer problems, gender, interaction 1 (CU * gender), and interaction 2 (peer problems * gender) together significantly explained 9.9 % of the variance in prosocial behavior, with $F(5, 535) = 11.78$, $p < .001$, $R^2 = 0.099$. Both interaction effects were not significant and the addition of the moderator did not significantly increase the effect of Callous-Unemotional traits on prosocial behavior, with $F(1, 535) = 0.81$, $p = .368$, $\Delta R^2 = 0.001$, nor the effect of peer problems on prosocial behavior, with $F(1, 535) = 0.79$, $p = .374$, $\Delta R^2 = 0.001$ (hence the conditional direct effects could not be interpretated). In addition, there was no moderated mediation, so the conditional indirect effects were not interpreted. Again, only the unconditional direct effects on prosocial behavior were interpreted, where only a significant negative effect from Callous-Unemotional was found, $b = -1.18$, $t(535) = -4.06$, $p < .001$, 95 % CI [−1.76; −0.61].

Table 6
Regression results for independent variable callous-unemotional (CU) traits.

Variable	*b*	*SE*	95 % CI	
			LL	*UL*
Outcome: Peer problems				
Constant	−0.005	0.15	−0.30	0.29
CU	0.06	0.31	−0.55	0.66
Gender	0.11	0.17	−0.22	0.44
Interaction 1: CU × gender	0.99[a]	0.39	0.23	1.76
Outcome: Prosocial behavior				
Constant	8.57[a]	0.14	8.29	8.84
CU	−1.18[a]	0.29	−1.76	−0.61
Peer problems	−0.0006	0.08	−0.16	0.16
Gender	0.20	0.16	−0.11	0.52
Interaction 1: CU × gender	0.34	0.37	−0.40	1.07
Interaction 2: Peer problems × gender	−0.08	0.10	−0.27	0.10
Index of moderated mediation	−0.09	0.06	−0.22	0.04

Note. N = 541. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; CU = Callous-Unemotional traits. CU and peer problems were mean centered.
[a] Effects were considered significant if the (bootstrap based on 5000 resamples) 95 % CI did not include 0.

3.2.3. Moderated mediation model for factor 3: Impulsive-irresponsible traits

Finally, a moderated mediation model with Impulsive-Irresponsible traits as independent variable was calculated (Table 7). Impulsive-Irresponsible traits, gender, and interaction 1 (II * gender) together explained 0.4 % of the variance in peer problems, with $F(3, 537) = 0.74$, $p = .528$, $R^2 = 0.004$ (not significant, hence the effects could not further be interpreted). Then, the variables Impulsive-Irresponsible traits, peer problems, gender, interaction 1 (II * gender), and interaction 2 (peer problems * gender) together significantly explained 5.4 % of the variance in prosocial behavior, with $F(5, 535) = 6.12$, $p < .001$, $R^2 = 0.054$. Both interaction effects were not significant and the addition of the moderator did not significantly increase the effect of Impulsive-Irresponsible traits on prosocial behavior, with $F(1, 535) = 0.12$, $p = .725$, $\Delta R^2 = 0.0002$, nor the effect of peer problems on prosocial behavior, with $F(1, 535) = 1.27$, $p = .261$, $\Delta R^2 = 0.002$ (hence the conditional direct effects could not be interpretated). There was no moderated mediation, so the conditional indirect effects were not interpreted. The only significant unconditional effect was the positive effect of gender on prosocial behavior, $b = 0.57$, $t(535) = 4.07$, $p < .001$, 95 % CI [0.30; 0.85], meaning that women scored averagely 0.57 higher on prosocial behavior than men.

4. Discussion

The goal of the current study was two-fold: first, to investigate how Grandiose-Manipulative, Callous-Unemotional, and Impulsive-Irresponsible psychopathic traits affect prosocial behavior, and whether peer problems could explain this relationship; and second, whether these effects differed for men and women on every subrelation. In line with our hypotheses, the results indicated that participants with lower scores on Grandiose-Manipulative or Callous-Unemotional traits reported more prosocial behavior, though no effect on prosocial behavior was found for Impulsive-Irresponsible traits. There was no mediating role of peer problems, nor did we find a direct relation between peer problems and prosocial behavior. We did, however, find that only women (vs. men) with higher scores on Callous-Unemotional traits reported having more peer problems. Moreover, women disclosed more prosocial behavior than men, while men had higher scores on all three fators of the youth psychopathic traits then women.

The finding that Grandiose-Manipulative and Callous-Unemotional traits (and not Impulsive-Irresponsible traits) negatively predict the tendency to show prosocial behavior is in line with the findings of White (2014) that egocentricity (GM) and callousness (CU) negatively predicted altruism, while antisociality (II) did not predict altruism. The expected negative effects of Grandiose-Manipulative and Callous-Unemotional traits on prosocial behavior can be explained by (emotional) empathy deficiencies, since empathy has been found to act as a mediator in the study of White (2014). Especially signaling fearful, sad, and happy emotional cues of others—a form of emotional empathy—is often impaired in psychopathy (Blair, 2013) and might even be a requirement or cue to show prosocial behavior towards others. This neurobiological perspective might also explain why the link with prosocial behavior was not found for Impulsive-Irresponsible traits, since the callous psychopathic component is associated with an empathic response (located in the amygdala), while the impulsive-antisocial psychopathic component with a decision-making response (located in the ventromedial prefrontal cortex and striatum) (Blair, 2013).

However, prosocial behavior is probably an even more complex construct, as White (2014) found that egocentric, callous, and antisocial psychopathic traits have varying effects on distinctable aspects of prosocial behavior. He disentangled public, altruistic, and anonymous types

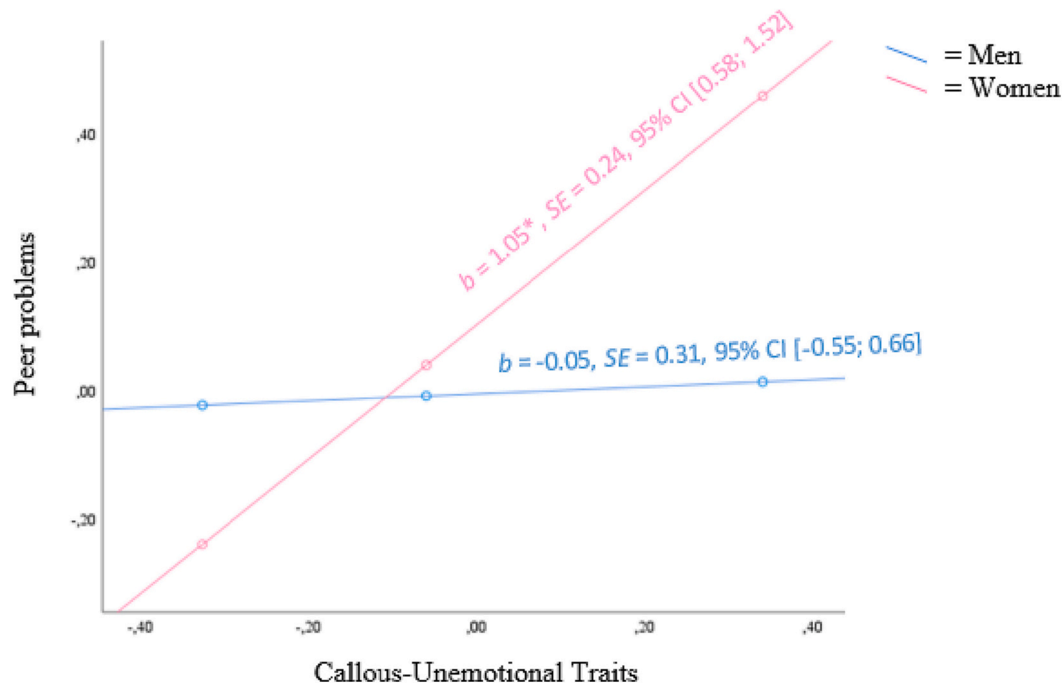

Fig. 2. Simple slopes of conditional direct effect of callous-unemotional traits on peer problems.
* $p < .05$

Table 7
Regression results for independent variable impulsive-irresponsible (II) traits.

Variable	*b*	*SE*	95 % CI	
			LL	*UL*
Outcome: Peer problems				
Constant	0.02	0.13	−0.23	0.27
II	−0.06	0.24	−0.53	0.40
Gender	−0.01	0.15	−0.30	0.28
Interaction 1: II × gender	0.30	−0.29	−0.27	0.86
Outcome: Prosocial behavior				
Constant	8.27[a]	0.12	8.03	8.51
II	−0.28	0.23	−0.73	0.17
Peer problems	−0.008	0.08	−0.18	0.16
Gender	0.57[a]	0.14	0.30	0.85
Interaction 1: II × gender	0.10	0.27	−0.44	0.64
Interaction 2: Peer problems × gender	−0.11	0.10	−0.30	0.08
Index of moderated mediation	−0.03	0.04	−0.10	0.05

Note. N = 541. CI = confidence interval; *LL* = lower limit; *UL* = upper limit; II = Impulsive-Irresponsible traits. II and peer problems were mean centered.
[a] Effects were considered significant if the (bootstrap based on 5000 resamples) 95 % CI did not include 0.

of prosocial behavior, and found a positive link for psychopathic traits with public prosocial behavior, while this was inversed for altruistic and anonymous prosocial behavior. This indicates the importance of incorporating motives to show prosocial behavior, since this can also differ from being self-serving or selfless (Eisenberg et al., 2010; White, 2014). Moreover, depending on the context, prosocial behaviors can have different costs or benefits for the person showing these behaviors. For example, helping a homeless person who is asking for money to stay in a shelter would cost money, while helping a classmate by lending a pencil has no costs. Therefore, this self-report measure of prosocial behaviors might not have been ecologically nor externally valid. In the items, participants were asked to indicate their general tendency, measuring prosocial behavior as a trait, while it might also be informative to ask for specific situations or number of times the participant showed prosocial behavior (with a list of specific behaviors) in a specified period to objectify this measure.

The absence of the mediating effect of peer problems can also be explained by the measurement, since peer relationships may simply be a context in which prosocial behaviors can occur, but it is probably more complicated than what was captured within the self-report. Peer relationships involve separate individuals, dual, and even group dynamics, meaning that there are many individual differences between persons and within relationships that can interfere (Bowker & White, 2021). When looking at the content of the items, for a more extraverted person being generally alone might be perceived as problematic, while for a more introverted person being alone might be wanted. So, for instance the item “I am usually on my own” might not straightforwardly indicate peer problems. Moreover, although peers are increasingly important during adolescence, it was found that specifically parenting is predictive of prosocial development (Malonda et al., 2019). There even seem to be differing effects of parenting style (e.g., support or permissiveness) for mothers and fathers on prosocial behavior and prosocial reasoning, which were found to be mediated by empathic concern and perspective taking (Samper et al., 2021). This points to the possibly prominent role of parents in prosocial behavior where empathy is again introduced as a mechanism.

With regard to gender differences, consistent to our hypotheses it was found that there was a positive effect of psychopathic traits on peer problems, however, only for Callous-Unemotional traits in women. Although the hypothesis was based on the finding that girls with ODD experiences more peer problems than boys with ODD (Carlson et al., 1997), this does not necessarily explain the current results since ODD would symptom-wise be more closley related to Impulsive-Irresponsible than Callous-Unemotional traits. An extensive review on peer relationship processes (Rose & Rudolph, 2006) reveals that girls form more intimate and emotional bonds with peers compared to boys, which can in turn inhibit antisocial behaviors. In comparison, boys generally have larger peer groups with more dominance hierarchies and fewer emotional provisions than girls (Rose & Rudolph, 2006). Although there were no gender differences in the quantitative score on peer problems in the current study, perhaps this could imply a more qualititative difference. Peer problems in women could be more of emotional nature than in men, and hence Callous-Unemotional traits (characterized by empathy deficiencies) are more likely to interfere with these increased emotional peer relationships among women compared to men. However, we do not know whether the peer problems measured in the current study were with the same-sex. Moreover, these were self-reported peer problems and as already concluded, higher scores on psychopathic traits could also imply more perceived conflict rather than actual conflict (Muñoz et al., 2008).

Additionally, it was found that women scored lower on all three factors of psychopathic traits and higher on prosocial behavior compared to men in the current study. These results could indicate that there are actual gender differences in these constructs, but could also be explained by stereotypical effects, or the functioning of the items itselves. It was previously found that specifically for parent and teacher evaluations there are culturally related beliefs that women are more prosocial and caring than men (Hastings et al., 2007; Paap et al., 2013). Maybe these beliefs also come to expression in self-report, since men might view themselves as less prosocial than women which may result in a lower score. This also accounts for psychopathic traits, that may have a different manifestation for men and women. Perhaps, the measured traits are viewed more desirable for men than women, as can be seen in the suggested gender bias in the diagnostic criteria of ASPD (APA, 2013; Jane et al., 2007). More specifically, based on item response theory analyses, it was found that for men and women with similar underlying psychopathology (i.e., latent traits), the criteria of ASPD were supported by men to a higher rate compared to women. This was especially the case for, among others, aggressive and reckless behaviors, which means that ASPD (in DSM-5 section II) might not incorporate the potentially different manifestation of the criteria in women (Jane et al., 2007).

It is important to mention that in the current study most participants scored rather low on psychopathic traits and peer problems, and rather high on prosocial behavior, which could indicate that adolescents and emerging adults with lower (self-reported) Grandiose-Manipulative and Callous-Unemotional psychopathic traits show relatively more (self-reported) prosocial behavior. These scores can be the result of the rather high education levels in the current study, which is expected to be the consequence of the convenience sampling by university students. Higher levels of education have previously been associated with more prosocial behavior including volunteer work and donations (money/medical) (Bekkers & de Graaf, 2006), and lower scores on psychopathic traits (Lilienfeld et al., 2014). Another explanation of these scores could be social desirability bias, since it is socially desirable to be helpful and caring (i.e., prosocial) towards others. This could be a personal statement or interpersonal goal accounting for almost everyone. Besides, as part of the measurement of youth psychopathic traits, grandiosity and inflated self-concepts could create even more reason to give socially desirable answers, which might even be personal beliefs of the participant. This was also suggested by Barry et al. (2017), who found that individuals with high levels of narcissistic traits scored relatively higher on self-reported prosocial behavior (compared to lower levels of narcissistic traits), even when controlling for social desirability. Consequently, the researchers explained this by individuals with narcissistic tendencies seeing themselves as helpful and prosocial, and therefore they did not answer socially desirable, but according to their own beliefs (Barry et al., 2017).

Moreover, all results should be interpreted within the limitation that the SDQ subscales did not function properly and had rather low reliabilities. Since the internal consistency was excellent on the YPI, it seems that these results are not due to the sample/participants, but to the SDQ subscales. Similar results were found specifically for the peer problems subscale in previous research using Cronbach's alpha (Muris et al., 2004; Theunissen et al., 2019; van Widenfelt et al., 2003; Vugteveen et al., 2020; Vugteveen et al., 2021), but also when using composite reliability and test-retest reliability (11–17 years; Baviskar et al., 2020), and McDonals's ω (9–15 years; Gaete et al., 2018), a low internal consistency was found. However, it is concluded in most studies that for identification or screening purposes the subscales of the SDQ are still considered to be sufficiently valid (e.g., Theunissen et al., 2019; Vugteveen et al., 2021). All these mentioned studies included younger participants (9–17 years) compared to the current study including (older) adolescents and emerging adults (16–25 years), which was not previously found to lead to different internal consistencies (though only total scores were evaluated; Brann et al., 2018). The current study could indicate that for an older age (older adolescents and emerging adults vs. younger adolescents) more caution is required when using and interpreting the SDQ. Emerging adulthood is identified as a life stage in which the structured environment (with accompanying supports) decreases, and a relatively higher agency is required to make up for this loss (Wood et al., 2018). Compared to the central role of peers in adolescence, and although peer relationships are a protective factor, the focus in emerging adulthood is somewhat shifted to identity and the self (Wood et al., 2018). Moreover, a slight incline in prosocial behavior is generally seen in emerging adulthood (compared to adolescence), specifically for women (measured longitudinally; Crocetti et al., 2016), which could also explain the relatively high scores on the prosocial behavior construct. It could be that emerging adults are in a different life stage with different demands compared to adolescents, and these SDQ items do not sufficiently represent the potential peer problems or prosocial behaviors that are related to their behaviors anymore.

4.1. Limitations and Future Directions

This preregistered[1] study provides an important novel approach on youth psychopathic traits in a more social and interpersonal context aimed at positive (prosocial) behavior instead of the often investigated antisocial behavior. Especially the focus on these factors of psychopathic traits in youngsters (rather than adulthood) in combination with peer relationships is very important, since these peer relationships could both protect or increase risk for future psychopathy-related problems. However, despite this novel approach, a sufficient sample size, and disaggregation for gender on every subrelation (rather than splitting the sample), there were several limitations. First, the reliability of the SDQ subscales measuring prosocial behavior and peer problems was low. Another limitation was the use of self-report which could have led to social desirability or other response biases. Although for prosocial behavior self-report was actually preferred over teacher or parent-reports (Hastings et al., 2007; Zimmer-Gembeck et al., 2005), it would have been better to additionally include reports of peers, parents, and/or teachers, to get a more comprehensive view. Closely related to this, is that participants were gathered through convenience sampling and only demographic information regarding age and education level was obtained. The education levels were relatively high in the current sample, which might not be generalizable to all education levels. As mentioned before, higher executive functioning (vs. low) has previously been identified as a protective factor for the relation between higher CU traits (age 3) and less being liked by peers (age 10) (Waller et al., 2017), which could imlpy that our expected effects might not be visible in the current relatively high-educated sample. Besides, there may be bidirectional effects between the measured constructs that the cross-sectional study design did not incorporate. Consequently, given the cross-sectional study design, we could not draw any conclusions regarding causality.

For future research, a longitudinal study design is suggested to investigate the developmental pathways of prosocial behavior in relation to psychopathic traits rather than the often examined antisocial behavior. In addition, we suggest to again include gender differences, but also focus on different ages and life stages in which these behaviors occur. Future research should also incorporate different types of prosocial behavior, or at least take into account the multidimensionality of the construct. Possible suggestions would be to study distinctions between public, altruistic, and anonymous kinds of prosocial behavior

(White, 2014), or further objectify the measures by asking for specific sitations or frequencies maybe even using experience sampling methods. In general, the constructs peer problems and prosocial behavior are rather complex in terms of dyadic or group relationships, and require a study design that can incorporate such complexity. Concretely, this could be a more experiment-wise design, a study within a class or school (using peer-ranking), or at least inclusion of additional reports from parents, teachers, colleagues and/or friends. If these constructs remain measured with self-report, it is recommended to focus on the development of a more reliable and valid scale. Furthermore, although offenders are found to act as prosocially as the general population (Birkeland et al., 2014), psychopathic traits are more common in a clinical (forensic) setting (DeMatteo et al., 2006), hence it could be interesting to investigate these constructs in a more clinical (forensic) setting. Finally, to further examine the mechanics why psychopathic traits negatively predicted prosocial behavior in the current sample, it is suggested to include other possible mediators. For instance, emotional and cognitive empathy (White, 2014), executive functioning (investigated as moderator between psychopathic traits and being liked by peers; Waller et al., 2017), or moral reasoning (related to less prosocial behavior; Paciello et al., 2013).

4.2. Clinical implications and conclusion

Besides the previously mentioned negative outcomes of absence of prosocial behavior (Crick, 1996), showing prosocial behavior and altruism have also been related to increased subjective well-being (Curry et al., 2018) and could even be contagious (Chancellor et al., 2018). More specifically, it was found that enhancing prosocial behavior could be a key to succes within prison environments (Warren et al., 2013), therefore, prosocial behavior can be seen as an important construct that requires further investigation for prevention, identification, and/or treatment possibilities within forensic psychology. In conclusion, despite its limitations, this study grants additional evidence that Grandiose-Manipulative and Callous-Unemotional psychopathic traits are related to a reduced tendency to show prosocial behavior. Therefore, these prevention, identification, and/or treatment possibilities of prosocial behavior should particularly be evaluated for these psychopathic traits, and an increased focus on psychopathic traits and positive behaviors within the interpersonal context in general is recommended.

4.3. Statements

All authors contributed to the study conception and design. Material preparation and data collection were performed by Elien De Caluwé. Analyses were performed by Iris Frowijn. The first draft of the manuscript was written by Iris Frowijn and both authors commented on previous versions of the manuscript. Both authors read and approved the final manuscript.

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Ethics

The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Ethical approval was obtained, and all participants gave informed consent.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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