

INTERNATIONAL SCIENTIFIC CONFERENCE ON SOCIAL SCIENCES -
ISCSS2022, 22-31 AUGUST, 2022

THE RELATIONSHIP BETWEEN CALLOUS- UNEMOTIONAL TRAITS AND SYMPTOMS OF CONDUCT DISORDER: A META-ANALYSIS

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INTRODUCTION

DSM-5: conduct disorder (CD) can be interpreted as stabilized and returning behavioral patterns, through which an individual violates others' fundamental rights, or breaks their age-appropriate social norms and rules. Symptoms are organized around four main dimensions: aggression to people and animals, destruction of property, deceitfulness or theft, and serious violations of rules [1], [2].

Callous-unemotional traits (CU) traits can be described through manifestations such as lack of remorse or guilt, callousness or lack of empathy, unconcern about one's performance, and shallow or deficient affect [1], [4], [5], [7], [13], [14].

It was proved that the frequency of CU traits is significantly lower among children who do not have CD. Comparison results show that people who experience both CD and CU traits manifest more severe aggression-related symptoms as opposed to people who have CD without the presence of CU traits [2], [6], [11].

It was found that in the presence of CU traits, antisocial behaviors are significantly more severe, as opposed to children who do not show CU traits [4], [10].

Psychological intervention techniques used for CD showed to be less effective when CU traits could be identified [2], [8], [13].

CU traits show stronger correlation with externalizing behaviors. Several studies even mention them as predisposing factors or predictors of externalizing behaviors [4], [9], [15].

CU traits can be predictors of conduct problems, and symptoms can be traced back to early childhood [8], [12].

MATERIALS AND METHODS

Selection of studies


The search for studies was conducted in the **Pubmed, MEDLINE and Cochrane** online databases, based on predetermined keywords.


For this method, we created the following string: (((callous) OR (unemotional) OR (callous-unemotional) OR (callous unemotional traits) OR (callous-unemotional traits) OR (CU traits) AND (conduct disorder symptoms) OR (CD symptoms) AND (children) OR (teens) OR (adolescents))).


Next, we used Endnote to filter out duplicates, and narrow down the number of studies based on titles and abstracts.

MATERIALS AND METHODS

Inclusion/exclusion criteria

- 
- studies published in English were involved
 - time of publication: we only chose studies that were published after 2013

- 
- age of participants: we only included researches in our analysis if their studied population's age was between infancy and 18 years
 - participants of these studies have CD symptoms and CU traits

- 
- we included publications which had tools most appropriate to literature specifications and recommendations to measure the constructs in question
 - studies contain descriptive statistical data about participants (eg. gender, age), as well as information that enables the systematic analysis of correlations (eg. correlation coefficients, sample size)

MATERIALS AND METHODS

Inclusion/exclusion criteria

The exclusion and reduction process is presented in Figure 1.

After the selection process, we included 11 researches in our analysis.

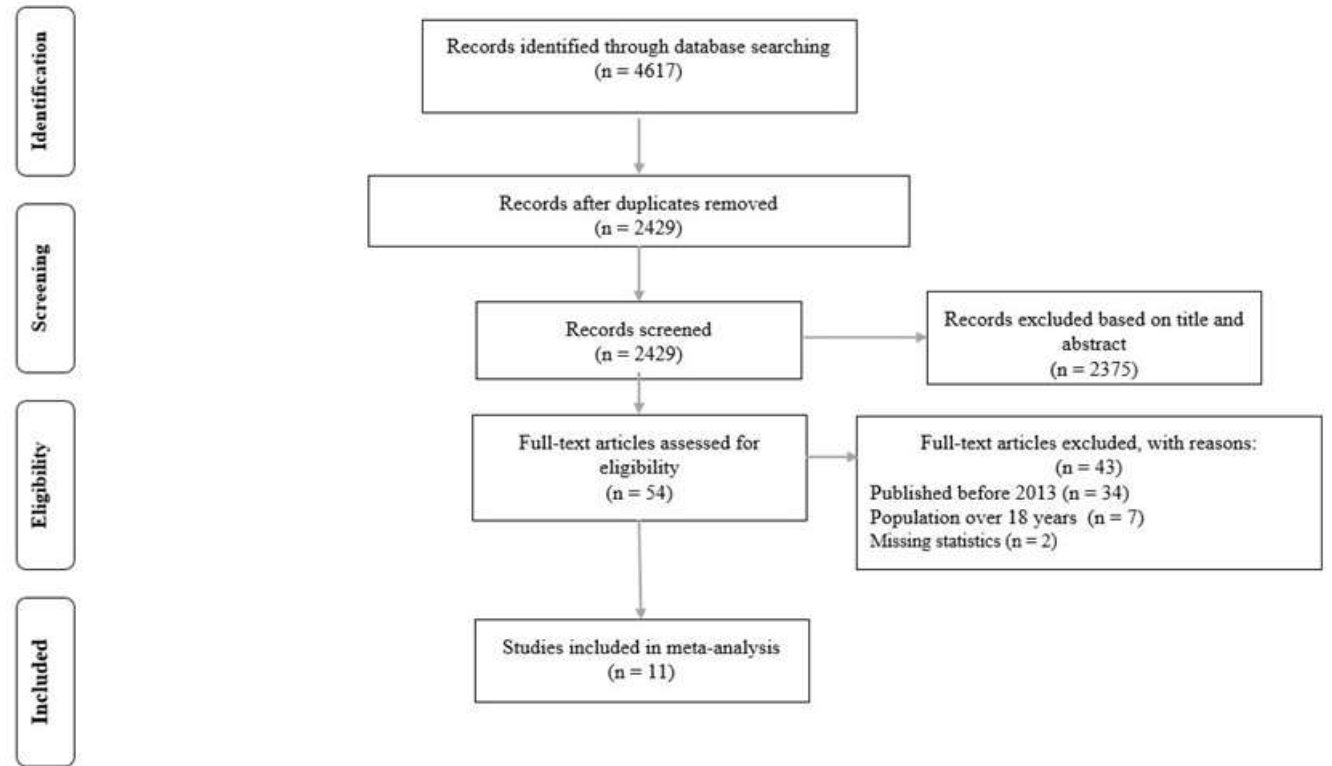


Figure 1. PRISMA flow diagram of the research selection process

MATERIALS AND METHODS

Coding of studies

- Name of the primary author
- Year of publication
- Number of participants (sample size)
- Age group segments as follows: a) infancy (from birth to the end of the first year); b) early childhood (1-3 years); c) preschool age (4-6 years); d) elementary school age (7-10 years); e) adolescence (11-18 years). We differentiated these categories based on the age stages described by [3]
- Gender distribution of participants
- The tools used to measure CU traits and CD symptoms.
- In addition, we coded if a measuring tool was self-reporting, parent-, or parent and teacher-reported.

MATERIALS AND METHODS

- ***Study sample***

One studied specifically male population, in the other ten both males and females were included.

We processed the data of 4381 participants in total.

More than half (59.02%) of the population was male, and 40.98% was female.

The youngest studied age group was preschool children, while the oldest was the adolescent group.

The youngest and oldest participants of the studies were 3 and 18 years old respectively.

Five researches studied the preschool population, three involved elementary school children, and another three assessed adolescent groups.

- ***Instruments***

Measuring CU traits: Inventory of Callous-Unemotional Traits (ICU), Achenbach System of Empirically-Based Assessment - Callous-Unemotional Scale, The Antisocial Process Screening Device (APSD), The Callous-unemotional-scale (CU-s), The Youth Psychopathic Traits Inventory (YPI), and The Child Problematic Traits Inventory (CPTI)

CD symptoms were assessed with: Child Behavior Checklist (CBCL), Strengths and Difficulties Questionnaire (SDQ), Brown-Goodwin Lifetime Aggression Scale (BGLAS), Eysberg Child Behavior Inventory (ECBI), Behavior Disorders Rating Scale (DBD), Reactive-Proactive Aggression Questionnaire (RPQ), The Computerized Diagnostic Interview Schedule for Children (C-DISC).

Table 1*Summary of main research parameters included in the study*

Authors	Year of publication	n	Age group	Males %	CU traits measure + informant	CD symptoms measure + informant
Georgiu et al.	2018	167	3-6/7	50.9 %	ICU (P, T)	ECBI (P, T)
Graziano et al.	2019	249	3-6/7	78 %	ICU (P, T)	DBD (P, T)
Jeziar et al.	2016	188	6/7-10	69.1 %	APSD (P, T)	DBD (P, T)
Kimonis et al.	2013	63	3-6/7	73 %	ASEBA - CU (P)	ECBI (P)
Levy et al.	2017	67	10-18	100 %	ICU (S)	SDQ (S), BGLAS (S)
López-Romero et al.	2020	2266	3-6/7	51.4 %	CPTI (P)	RPQ (P, T)
Masi et al.	2018	142	6/7-10	88.9 %	ICU (S)	CBCL (P)
McDonald et al.	2017	291	6/7-10	53%	ICU (P)	CBCL (P)
Saunders et al.	2018	426	10-18	58 %	YPI (S)	SDQ (S)
Sng et al.	2018	282	10-18	87.6 %	APSD (P)	C-DISC, RPQ (P)
Waller et al.	2015	240	3-6/7	52%	CU - s (P, T)	CBCL (P, T)

Notes. P = Parent; S = Self-report; T = Teacher; ASEBA - CU = Achenbach System of Empirically-Based Assessment - Callous-Unemotional Scale; APSD = The Antisocial Process Screening Device; BGLAS = Brown-Goodwin Lifetime Aggression Scale; CBCL = Child Behavior Checklist; C-DISC = The Computerized Diagnostic Interview Schedule for Children; CPTI = Child Problematic Traits Inventory; CU-s = Callous-Unemotional-scale; DBD = Disruptive Behavior Disorders Rating Scale; ECBI = Eysberg Child Behavior; ICU = Inventory of Callous-Unemotional Traits; RPQ = Reactive-Proactive Aggression Questionnaire; SDQ = Strengths and Difficulties Questionnaire; YPI = Youth Psychopathic Traits Inventory

Table 1 summarizes the characteristics of the researches included in our analysis.

RESULTS

Ten out of the eleven studies found moderate correlation between the measured variables, where the r values were between 0.32 and 0.46.

Results of one research show high correlation, with $r = 0.51$.

Synthesizing these values, we can conclude that there is a moderate, statistically significant correlation ($r = 0.37$, 95 % CI [0.34, 0.44], $p < 0.001$) between CU traits and CD symptoms.

The forest plot in Figure 2 summarizes the effect sizes and confidence intervals.

Study name

Georgiou et al. (2018)
Graziano et al. (2019)
Jezior et al. (2016)
Kimonis et al. (2015)
Levy et al. (2017)
Lopez-Romero et al. (2020)
Masi et al. (2018)
McDonald et al. (2017)
Saunders et al. (2018)
Sng et al. (2018)
Waller et al. (2015)

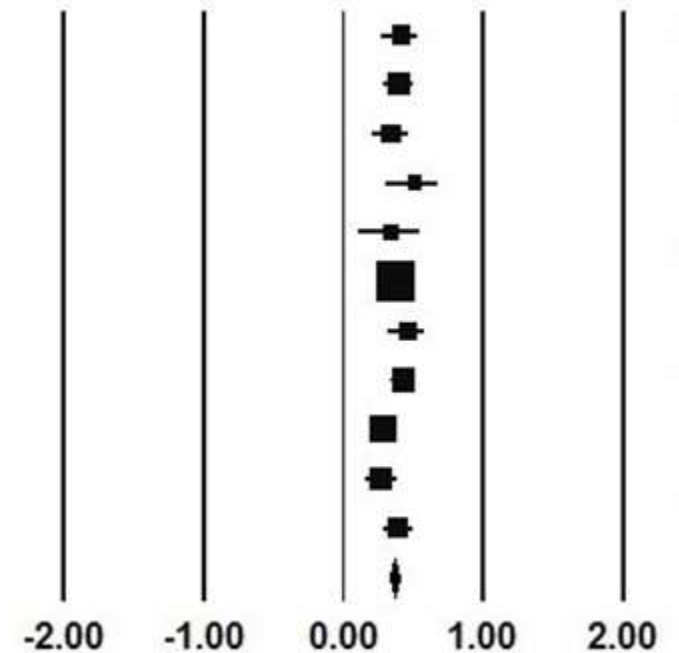


Figure 2. Forest plot presenting effect sizes and confidence intervals

RESULTS

To ensure the reliability of results, we verified the publication bias. We examined trim and fill method by Duval and Tweedie, as well as Egger's regression test.

Duval and Tweedie's trim and fill method pointed to 0 potentially missing studies in our case.

These statements are also supported by the results of Egger's regression test, which can be interpreted as there are no identifiable publication bias in our data (intercept = 0.575, 95% CI = -0.570 - 1.722, $p = 0.142$).

RESULTS

Moderator analysis

We conducted moderation analyses to determine which variables might be able to modify the aforementioned relationship. The results of our moderator-related statistical data processing are presented in Table 2.

Table 2

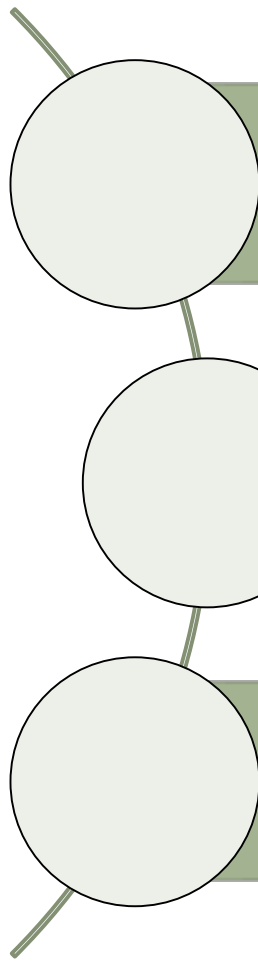
Results of categorical moderation analysis

Moderator variable	ESr	95% CI	Q
Gender			
Male	0.40	[0.35, 0.45]	1.40
Female	0.36	[0.33, 0.39]	
Age group			
Preschool age	0.41	[0.37, 0.43]	6.07*
Elementary school age	0.42	[0.35, 0.48]	
Adolescence	0.32	[0.25, 0.38]	
Informant			
Self-report	0.32	[0.26, 0.40]	4.75*
Parent	0.40	[0.36, 0.41]	
Parent/Teacher	0.41	[0.38, 0.44]	

Notes. ESr = effect size in r; 95 % CI = confidence interval; Q = homogeneity test

RESULTS

Moderator analysis



There are no statistically significant differences between the results of male ($r = 0.40$, 95 % CI [0.35, 0.45]) and female ($r = 0.36$, 95 % CI [0.33, 0.39]) participants ($Q = 1.40$, $p > 0.05$)

There is a statistically significant difference ($Q = 6.07$, $p = 0.04$) between the results of adolescents ($r = 0.32$, 95 % CI [0.25, 0.38]), and elementary- ($r = 0.42$, 95 % CI [0.35, 0.48]) and pre-school ($r = 0.41$, 95 % CI [0.37, 0.43]) children.

There is a significant difference ($Q = 4.75$, $p = 0.02$) between parent-reported ($r = 0.40$, 95 % CI [0.36, 0.41]) results, parent- or teacher-reported ($r = 0.41$, 95 % CI [0.38, 0.44]) answers, and self-reported ($r = 0.32$, 95 % CI [0.26, 0.40]) results from the children.

DISCUSSION AND CONCLUSION

Successfully confirmed previous research results which proved the correlation between the aforementioned two variables [2], [4], [13].

We found moderate, but statistically significant correlation between CU traits and symptoms of CD in preschool and elementary school children as well as adolescents.

This means that among children, who manifest increased problematic affective behaviors, it is also more frequent that they act in a socially unacceptable manner, breaking the rules, and often hurting others' fundamental rights or wellbeing.

Significant difference we found between adolescents, and elementary and preschool children.

This suggests that the combined presence of CU traits and CD symptoms lead to increased symptomatic manifestations in young children, as opposed to adolescents. This means that among preschool and elementary school children the concurrence of CU traits and CD symptoms leads to stronger manifestations, in comparison with adolescents, where this relationship is significantly weaker.

Gender can not be defined as moderator variable, which means that the quality and strength of the relationship between CU traits and CD symptoms is not affected, regardless if we study it from the perspective of the male or female population.

We found that teacher- or parent-reported answers resulted in increased correlations, than the children's self-reported answers.

This suggests that adults interpret CU traits and CD symptoms as being more severe, as opposed to how children perceptualize their own behavioral repertoire.

To summarize, our research results emphasize the importance of awareness for parents, educators and professionals, as well as the role of early and specific monitoring of symptoms in order to repel the damage of mental and social health indicators, and prevent later clinical disorders.

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