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Callous unemotional traits mediate the presence of challenging behaviors in adults with autism spectrum disorder and intellectual disability

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Background: Callous-unemotional traits (CUT) are an antisocial personality trait, which can be present in people with autism spectrum disorder (ASD), especially in relation to difficulties in empathy. These traits are related to challenging behaviors, such as aggressive behavior, which may occur in people with ASD.

Method: This study aimed to expand the understanding of the role of CUT in adults with ASD and intellectual disability (ID). Eighty-three adults with a diagnosis of ASD and ID participated in the study.

Results: Mediation analyses found that CUT indirectly mediated the relationship between ASD symptomatology and the frequency of self-injuries and stereotypies, but not aggression.

Conclusions: It is considered that CUT may have a protective effect on the presence of individual challenging behaviors in adults with ASD and ID. The apparent relationship between CUT and executive functioning was discussed. CUT traits may be considered as a variable to contemplate in relation to interventions in challenging behaviors in the ASD population, especially in those individuals who show aggression-related behaviors and who have a higher executive level.

Keywords: Callous – unemotional traits; autism spectrum disorder; challenging behaviors; adults; mediation analyses

Introduction

Callous-unemotional traits (CUT) are defined as a personality trait related to psychopathy within the DSM 5 (American Psychiatric Association (APA) 2013). Some of its manifestations may include lack of guilt, lack of empathy, callous use of others for personal gain, and lack of normal emotionality, especially reflected in lack of anxiety (Herpers *et al.* 2016). In addition, it has been shown that CUT are related to greater behavioral problems, such as aggressiveness (Squillaci and Benoit 2021, Wall *et al.* 2016) and lower quality of life (Herpers *et al.* 2016) in the general population.

The definition of CUT leads to consider the potential similarities between them and some of the defining features of Autism Spectrum Disorder (ASD), mainly in difficulties related to the ability of empathy (Pasalich *et al.* 2014, Rogers *et al.* 2006, Schwenck *et al.* 2012). However, despite this coincidence, previous research agrees in highlighting that there is a great difference in relation to the absence of empathy between people with ASD and people with high CUT. Empathy is divided

into cognitive empathy, related to skills such as emotion recognition and perspective taking, and affective empathy, characterized by sharing the emotions of others, emotional congruence or emotional affect induced by another person's situation (Schwenck *et al.* 2012, Zaki and Ochsner 2012). Affective deficits found in people with ASD are primarily related to cognitive recognition and processing of emotions, rather than to the ability to feel emotional distress or concern (Mazza *et al.* 2014), whereas, on the other hand, people with high CUT show deficits related to affective empathy (Klapwijk *et al.* 2016, Pasalich *et al.* 2014, Pijper *et al.* 2016, Vilas *et al.* 2021).

In relation to the ability of empathy in people with ASD, it is also acknowledged the explanation of the double empathy problem (López 2022, Milton 2012, Mitchell *et al.* 2021). This theory states that interpersonal communication of people with ASD is complex when it occurs with their peers without ASD, but it is efficient when interactions occur between people with ASD. It is not only that people with ASD have complexities in interaction, but that these difficulties are bidirectional: those without ASD tend not to understand

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people with ASD (i.e. when people with very different experiences of the world interact with one another, they will struggle to empathize with each other). Thus, the theory of the double empathy problem asserts that people with ASD have a unique mode or style of social interaction.

Although differences in empathy between people with ASD and those without an ASD diagnosis exist, research has highlighted that individuals with ASD may exhibit CUT to the same extent as individuals without ASD (Leno et al. 2015, Leno et al. 2021, Rogers et al. 2006), and that these traits also need to be attended to and considered to as they are for the non-ASD population. According to some studies, these features may play a significant role in ASD, particularly in relation to the characteristics of some of the defining features of ASD, such as difficulties in executive functioning, in those people with ASD who also has an Attention-deficit hyperactivity disorder (ADHD) diagnosis.

More specifically, Tye et al. (2017) found that CUT moderated executive functions in individuals with ASD and ASD and comorbid ADHD. They observed that boys with ASD and high levels of CUT performed better on conflict tasks (Go/No go), compared to those with ASD and low levels of CUT, thus relating CUT to better conflict management in people with ASD. However, it should be noted that the Tye et al. (2017) sample was not very large ($n = 18$ with ADHD, 29 with ASD and ADHD and 26 typically development), in addition to the fact that they only included male children (aged 8 to 13) without intellectual disability (ID).

It cannot be overlooked that individuals with ASD may exhibit challenging behaviors to a greater extent than their peers without ASD (Kirst et al. 2021, Nicholls et al. 2019). Furthermore, ADHD, which is included within the externalizing spectrum disorders (Graziano et al. 2019), and which is also related to the presence of CUT (Graziano et al. 2019, Zhang et al. 2021), is one of the most common comorbid disorders in this population, with some research indicating rates of up to 40.2% (Rong et al. 2021). Different studies have pointed out that the presence of ADHD in people with ASD aggravates the display of behavioral problems such as aggressive behaviors (Rong et al. 2021, Rosello et al. 2021).

In this regard, it is interesting to know the role played by CUT in the presence of behavioral problems in people with ASD, since the results of studies focused on populations with ASD highlight the positive association between CUT and aggressive behaviors (Ibrahim et al. 2019), as well as that these traits are associated with deficits in cognitive empathy (Pasalich et al. 2014, Vilas et al. 2021). Another remarkable result is the aforementioned that refers that the presence of elevated CUT is associated with better executive functioning (Bedford et al. 2019, Rogers et al. 2006, Tye et al.

2017), similar to that reported in studies focused on the general population (Dotterer et al. 2021, Platje et al. 2018, Wall et al. 2016). In view of the results, it seems that there is a positive relationship between the level of adaptability of people with ASD and the presence of CUT. However, most of this literature focuses on infantile-adolescent population without ID (Bedford et al. 2019, Ibrahim et al. 2019, Tye et al. 2017), so considering adult populations with ID represents a breakthrough in research in this area.

There is an urgent need to continue unraveling the ASD - CUT relationship (Herpers et al. 2016), especially considering the influence that these traits apparently have in the development and maintenance of behavior problems (Hawes et al. 2013, Platje et al. 2018, Squillaci and Benoit 2021, Wall et al. 2016), a very common reality in ASD. The main objective of this study is to analyze the role of CUT in relation to the frequency of behavioral problems in adults with ASD and ID, after controlling for the possible effects of the presence of elevated ADHD-related symptoms. In this sense, we sought to extend the study of CUT in ASD to the population with ID as a group that is at risk of exhibiting high rates of challenging behaviors.

Behaviors that people with ASD and ID may be more likely to display – self-injuries, aggressions and stereotypies (Nicholls et al. 2019, Turygin et al. 2013) – are chosen. Self-injuries dimension include behaviors such as self-biting, body hitting or teeth grinding. Examples of the aggressive behaviors considered include grabbing and pulling others, kicking others or destroying things. Finally, as stereotyped behavior is considered any voluntary act that occurs repeatedly in the same way but without causing physical damage (e.g. rocking, repetitive body movements, waving or shaking hands, pacing, jumping, bouncing, running etc.).

Thus, in addition to knowing the role of CUT in challenging behaviors such as aggressions, we sought to study its role in relation to problem behaviors less related to the social environment, in a population with high support needs. Considering that CUT are directly related to behavioral problems such as aggressions or rule breaking, in which one or more third parties are involved, it is possible to think that its effect will be different in relation to individual behavior problems, especially considering the lower adaptive level of the sample.

Therefore, it is hypothesized that (1) there would be a positive and significant relationship between ASD symptomatology, ADHD symptomatology, CUT, and challenging behaviors; that (2) the sample individuals would exhibit few CUT, given their high support needs; and that (3) CUT would directly mediate the relationship between ASD symptomatology and frequency of aggressions, and indirectly between ASD and frequency

of self-injuries and stereotypies, once the effect of ADHD symptomatology is controlled for, in this specific population.

Method

Participants

Eighty-three people (59 males and 24 females) aged 18 to 58 ($M=38.92$, $SD=10.184$) with a diagnosis of ASD and moderate to profound ID (32.5% moderate ID; 42.2% severe ID), according to DSM 5 criteria (American Psychiatric Association (APA) 2013), took part in the present study. This information was available in their medical records. The residence for the 56.6% of the sample was a community residential home for people with ASD, while the other 43.4% lived in a family home.

In order to participate people must be 18 or older and have a diagnosis of ASD and ID. A present diagnosis related to internalizing disorders (anxiety, depression) or the existence of recent medical conditions, such as any surgical intervention, at the time of the evaluation were proposed as exclusion criteria. Paper informed consent from participants or guardians was also requested, and anonymity was assured to all the participants by the research team.

Procedure

The research was approved by the ethics department of the Personality, Evaluation and Clinical Psychology Unit of the Faculty of Education of the Complutense University of Madrid (Spain).

First, detailed information about the research was provided to the coordinators of different care and training centers working with people with ID in Madrid (Spain). The management teams of these institutions informed potential participants about the research and requested informed consents from those interested in participating.

The research team completed the test battery. The psychoeducational professionals of the centers actively collaborated in the completion of the tests providing assistance to investigators when necessary. To ensure the accuracy of the data collected the research team provided a briefing on the objectives of the study and the battery of tests to the professionals collaborating in the data collection prior to the start of this collection.

Measures

Diagnostic Behavioral Assessment for Autism Spectrum Disorder-Revised (DiBAS-R, Sappok et al. 2014). It consists of 19 items referring to the two core characteristics of ASD. This other-report measure was used to assess the severity of ASD symptomatology in the sample group. A total score above 29 is indicative of a possible diagnosis of ASD. Its reliability for this research was very good ($\alpha=.880$).

Conners' Adult ADHD Rating Scales – Observer Report: Screening Version (CAARS-O: SV; Conners et al. 1999). It is an other-report test that consists of 30 items that encompass the main symptomatology of ADHD in adults. The total ADHD score was used to estimate the existing ADHD symptomatology in the sample, with very good reliability ($\alpha=.856$). It has been previously used in investigations with people with ID (La Malfa et al. 2008).

Behavior Problem Inventory – Short (BPI-S; Rojahn et al. 2012a, 2012b). This other report scale is formed by two subscales (frequency and severity) that refer to three very common challenging behaviors in people with ID. In this study, the frequency subscale was used for each of these behaviors. This subscale has five response alternatives (never, monthly, weekly, daily, hourly), and consists of 8 items for self-injuries ($\alpha=.427$), 10 items for aggressions ($\alpha=.757$) and 12 items for stereotypies ($\alpha=.771$).

Inventory of Callous-Unemotional Traits (ICU; Frick 2004). The ICU assesses CUT through 24 items completed by proxies, with four response alternatives ('not at all' to 'completely true'). Reliability ($\alpha=.824$) for this study is alike to that reported by similar studies focused on population with ASD (Bakker-Huvenaars et al. 2020, Leno et al. 2021). A score equal to or higher than 39 has been considered as an indicator of elevated CUT (Leno et al. 2021).

Statistical analyses

Version 27 of the SPSS statistical package for social sciences (IBM Corp., Released 2020) was used for correlational analyses. To demonstrate the association between ASD symptomatology, ADHD symptomatology, challenging behaviors and CUT, Pearson correlation analyses were performed. Next, simple mediation analyses were performed. Mediation and moderation analyses are used to test hypotheses about the mechanisms through which the effects operate in a relationship between an independent variable X and a dependent variable Y. In the present investigation we aimed at studying the effect of CUT on the presence of challenging behaviors. Model 4 in version 4.0 of the Process macro for SPSS (Hayes 2022) was used for this purpose. This model establishes the relationship between the independent variable X and the dependent variable Y through a mediating variable. In each analysis the effect of ADHD symptomatology was controlled for to eliminate its possible effect on the presence of challenging behaviors, and 10,000 bootstrapping samples were tested.

Results

Correlates of the callous unemotional traits

The purpose of the correlation analyses was to establish the association between the study variables. Table 1

Table 1. Means, standard deviation and Pearson's r correlation.

	2	3	4	5	6	M	SD	Range
1: ASD	.222*	.417**	.361**	.484**	.247*	37.46	8.159	13–51
2: ADHD		.340**	.300**	.367**	.251*	21.27	9.935	1–48
3: Self-injuries			.506**	.429**	-.041	3.73	3.636	0–14
4: Aggressions				.326**	.192	4.80	4.851	0–17
5: Stereotypies					-.036	16.01	9.832	0–39
6: CUT						32.02	11.358	18–59

Note: * $p < .050$; ** $p < .001$.

Table 2. Simple mediation model of CUT for ASD symptomatology and frequency of self-injuries.

Antecedent	Constant								
	M ₁ (CUT)			Y (Frequency of self-injuries)					
	Coef.	SE	p	Coef.	SE	p			
X (ASD symptomatology)	a ₁	.279	.151	>.050	a ₂	c'	.179	.044	<.001
M ₁ (CUT)	—	—	—	—	—	b ₁	-.069	.032	.034
C (ADHD symptomatology)	f ₁	.236	.124	>.050	f ₂	g ₁	.111	.036	.003
Constant	i _{M1}	16.521	5.820	.005	i _{M2}	i _y	-3.139	1.760	>.050
		R ² = .101					R ² = .280		
		F (2,80) = 4.522					F (3,79) = 10.255		

Note: i_{M1}, i_{M2} e i_y are regression intercepts. Coef.: regression coefficient; SE: standard error.

shows the results of these analyses. There was a positive and significant relationship between ASD symptomatology and ADHD symptomatology ($r = .222, p = .044$). Similarly, ASD symptomatology was positively associated with self-injuries ($r = .417, p < .001$), aggressions ($r = .361, p < .001$) and stereotypies ($r = .484, p < .001$). Finally, the relationship between ASD and CUT was also significant ($r = .247, p = .025$).

A positive and significant association was identified between ADHD symptomatology and self-injuries ($r = .340, p = .002$), aggressions ($r = .300, p = .006$) and stereotypies ($r = .367, p < .001$). This relationship was also significant with CUT ($r = .251, p = .022$).

Finally, and contrary to expectations, CUT were not significantly related to any of the behavioral problems ($p > .05$ in all cases). Thus, hypothesis 1 is partially confirmed.

Callous-unemotional traits in the sample

Looking again at Table 1, it can be seen that the mean scores obtained for the CUT was 32.02 (range 18–59); therefore, the mean score does not exceed the cut-off established to consider that the people in the sample exhibited high levels of these traits. Thus, the second hypothesis, which expected CUT to be low in populations with high support needs, is confirmed.

Mediation analysis for the frequency of challenging behaviors

The mediating role of CUT in the frequency of challenging behaviors was studied through three simple mediation analyses (model 4; Hayes 2022). The severity of ASD symptomatology was the independent variable (X), and the frequency of the behavior studied the dependent one (Y). The variable CUT was established as the mediator (M₁). In each analysis, the effect of

ADHD symptomatology was controlled (C). Table 2 shows the effects of the model for the frequency of self-injuries.

Regarding the results, the direct effect of ASD severity on the frequency of self-injuries ($c' = .179, SE = .044, p < .001$) and the total model effect ($c = .160, SE = .044, p < .001$) were statistically significant. The influence of the covariate ADHD symptomatology was not significant for CUT ($f_1 = .236, SE = .124, p = .060$). On the contrary, the covariate significantly influenced the frequency of self-injuries ($g_1 = .111, SE = .036, p = .003$).

Finally, it can be concluded that CUT are presented as a significant mediator between the severity of ASD and the frequency of self-injuries, as it is shown by its indirect effect ($a_1b_1 = -.019, SE = .013, 95\% CI [-.052, -.000]$). Figure 1 shows the plot of the resulting model.

Secondly, the mediating role of CUT on the frequency of aggressive behaviors was studied, following the same procedure as described. Table 3 specifies the direct, indirect and total effects of the resulting model.

Table 3 shows how the direct effect of ASD severity on the frequency of aggressions ($c' = .176, SE = .063, p = .006$) and the total effect of the model ($c = .183, SE = .061, p = .003$) were statistically significant. The influence of the covariate was also significant for the frequency of aggressions ($g_1 = .106, SE = .052, p = .043$).

Regarding the mediating variable, its indirect effect indicates that it could not be considered a significant mediator between ASD severity and frequency of aggressions ($a_1b_1 = .007, SE = .016, 95\% IC [-.024, .042]$). Figure 2 shows the graphical representation of the model obtained.

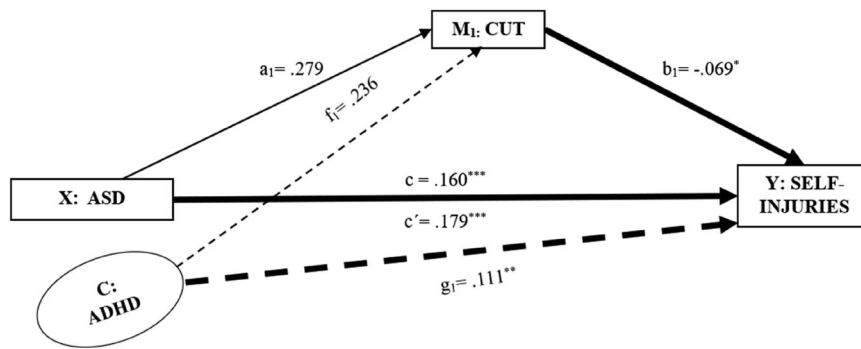


Figure 1. Simple mediation model representation of CUT on the relationship of severity of ASD symptomatology and frequency of self-injuries controlling for ADHD symptomatology. Note: a_1 = direct effect of severity of ASD symptomatology on CUT; b_1 = direct effect of CUT on the frequency of self-injuries; f_1 = effect of the covariate ADHD symptomatology on the mediating variable CUT; g_1 = effect of the covariate ADHD symptomatology on the dependent variable frequency of self-injuries; c' = direct effect of severity of ASD symptomatology on the frequency of self-injuries; c = total effect; * $p < .050$; ** $p < .010$; *** $p < .001$.

Table 3. Simple mediation model of CUT for ASD symptomatology and frequency of aggressions.

Antecedent		M ₁ (CUT)			Y (Frequency of aggressions)				
		Coef.	SE	p	Coef.	SE	p		
X (ASD symptomatology)	a_1	.279	.151	>.050	a_2	c'	.176	.063	.006
M ₁ (CUT)	—	—	—	—	a_1	b_1	.027	.045	>.050
C (ADHD symptomatology)	f_1	.236	.124	>.050	f_2	g_1	.106	.052	.043
Constant	i_{M1}	16.521	5.820	.005	i_{M2}	i_y	-4.947	2.500	.050
		$R^2 = .101$					$R^2 = .184$		
		$F(2,80) = 4.522$					$F(3,79) = 5.972$		

Note: i_{M1} , i_{M2} e i_y are regression intercepts. Coef.: regression coefficient; SE: standard error.

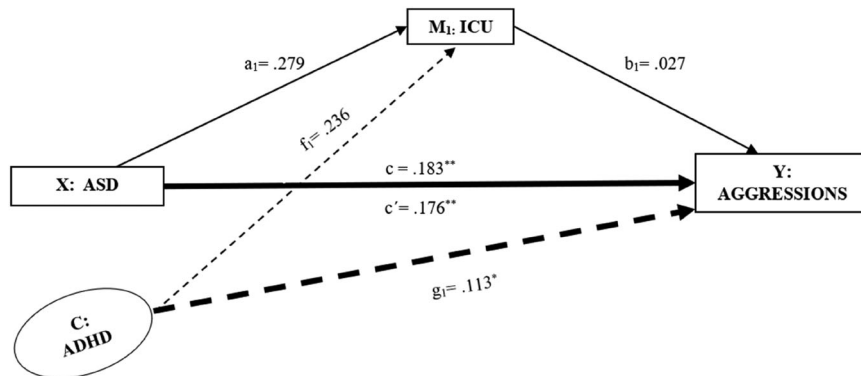


Figure 2. Simple mediation model representation of CUT on the relationship of severity of ASD symptomatology and frequency of aggressions controlling for ADHD symptomatology. Note: a_1 = direct effect of severity of ASD symptomatology on CUT; b_1 = direct effect of CUT on the frequency of aggressions; f_1 = effect of the covariate ADHD symptomatology on the mediating variable CUT; g_1 = effect of the covariate ADHD symptomatology on the dependent variable frequency of aggressions; c' = direct effect of severity of ASD symptomatology on the frequency of aggressions; c = total effect; * $p < .050$; ** $p < .010$; *** $p < .001$.

Finally, the mediating role of CUT in the frequency of stereotypies was analyzed. Table 4 shows in detail the statistics of the model.

As detailed in Table 4, the direct effect of ASD severity on the frequency of stereotypies ($c' = .566$, $SE = .114$, $p < .001$) and the total effect of the model ($c = .510$, $SE = .115$, $p < .001$) were statistically significant. Also, the influence of the covariate ADHD symptomatology significantly influenced the frequency of stereotypies ($g_1 = .317$, $SE = .093$, $p = .001$).

Focusing on the CUT it can be observed that this variable was presented as a significant mediator between the severity of ASD and the frequency of stereotypies ($a_1b_1 = -.056$, $ET = .034$, 95% IC [-.136, -.002]). In this sense, the relationship between the severity of ASD symptomatology and the frequency of stereotypies is better understood through the mediating role of CUT. Figure 3 shows the plot of the resulting model.

These results point that hypothesis 3, which described the mediating role of CUT in the relationship

Table 4. Simple mediation model of CUT for ASD symptomatology and frequency of stereotypies.

Antecedent	M ₁ (CUT)			Constant			Y (Frequency of stereotypies)		
	Coef.	SE	p	Coef.	SE	p	Coef.	SE	p
X (ASD symptomatology)	a ₁	.279	.151	>.050	a ₂	c'	.566	.114	<.001
M ₁ (CUT)	—	—	—	—	—	b ₁	-.201	.082	.016
C (ADHD symptomatology)	f ₁	.236	.124	>.050	f ₂	g ₁	.317	.093	.001
Constant	i _{M1}	16.521	5.820	.005	i _{M2}	i _y	-5.501	4.513	>.050
		R ² = .101					R ² = .353		
		F (2,80) = 4.522					F (3,79) = 14.395		

Note: i_{M1}, i_{M2} e i_y are regression intercepts. Coef.: regression coefficient; SE: standard error.

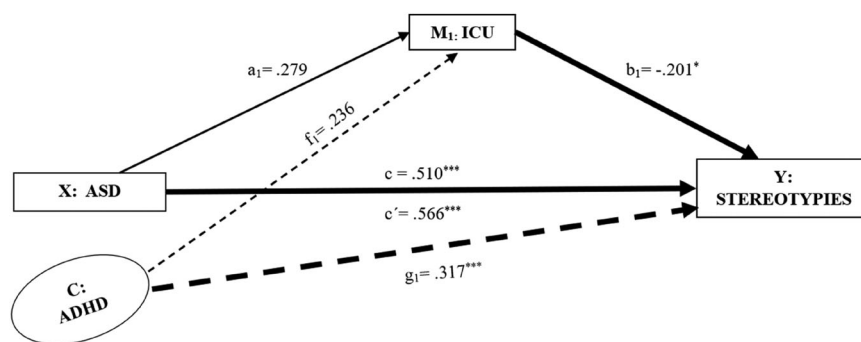


Figure 3. Simple mediation model representation of CUT on the relationship of severity of ASD symptomatology and frequency of stereotypies controlling for ADHD symptomatology. Note: a₁ = direct effect of severity of ASD symptomatology on CUT; b₁ = direct effect of CUT on the frequency of stereotypies; f₁ = effect of the covariate ADHD symptomatology on the mediating variable CUT; g₁ = effect of the covariate ADHD symptomatology on the dependent variable frequency of stereotypies; c' = direct effect of severity of ASD symptomatology on the frequency of stereotypies; c = total effect; * p < .050; ** p < .010; *** p < .001.

between the severity of ASD symptomatology and the frequency of challenging behaviors, is partially confirmed.

Discussion

The main objective of this research was to extend the study of the relationship of CUT in the presence of behavioral problems in a sample of adults with ASD and comorbid ID, in line with the proposals of the existing literature (Herpers et al. 2016). In view of the results, the proposed hypotheses could be largely confirmed.

First, a significant association between CUT, challenging behaviors and ASD and ADHD symptoms was expected. In this regard, it was found that CUT is positively and significantly related to ASD symptomatology and ADHD symptomatology reflecting the relationships between these variables (Graziano et al. 2019, Leno et al. 2015, Leno et al. 2021, Zhang et al. 2021). However, this association was not very strong, obtaining similar results to those of previous research (Svensson et al. 2018).

In contrast, no significant association was found between CUT and the different behavioral problems studied. Numerous studies have found this association in people with ASD, especially in relation to aggression (Ibrahim et al. 2019). However, these studies were focused on minor population without ID (children and

youth), so the different results in our study may be due, among other aspects, to the characteristics of the participants.

Referring to the CUT of the sample, the results were as expected, in that the score obtained did not exceed the cut-off established for the indication of elevated CUT (>39, Leno et al. 2021). However, these results should be considered with caution since the measurement instruments used may be insufficient. Although numerous investigations have employed them and highlighted their suitability for use in the ASD population (Bakker-Huvenaars et al. 2020, Leno et al. 2021), our study sample differs from these previous studies because it includes people with ID, and thus the test may not be adequately identifying these characteristics in people with ASD and comorbid ID.

Finally, it was highlighted the mediating role of CUT in relation to the different challenging behaviors studied. CUT were found to be indirect mediators of the relationship between the severity of ASD symptomatology and the frequency of self-injuries and stereotypies. However, no significant mediating role was found in relation to the frequency of aggressions. These results, reached in other investigations (Leno et al. 2015), lead us to different conclusions.

On the one hand, it may be that the presence of CUT has a protective effect on the presence of challenging behaviors in people with ASD and ID, mainly

those more individual or in which a third person is not involved (such as self-injuries or stereotypies), especially considering that CUT is related to behaviors typical of conduct disorders or antisocial personality (Platje et al. 2018, Squillaci and Benoit 2021, Wall et al. 2016). On the other hand, the presence of elevated CUT is related to good executive functioning (Platje et al. 2018) and to greater impulsive control (Graziano et al. 2019), even in population with ASD (Bedford et al. 2019, Wall et al. 2016). Considering the characteristics of the sample of the present study (population with ASD and ID), this approach can be sustained and assumed, since higher levels of ID are usually associated with greater difficulties in executive functioning (Danielsson et al. 2010, Rodrigues et al. 2019).

Furthermore, it is noteworthy that ADHD symptomatology did not influence the mediating relationship of CUT in any of the cases, agreeing with Leno et al. (2015), who indicated that hyperactivity did not influence CUT.

To conclude, we can confirm that CUT has a significant role in the presence of challenging behaviors in individuals with ASD and ID, which differs depending on whether the behavior exhibited is individual in nature (e.g. self-injury) or involves third parties (e.g. aggression).

Limitations and future research

Despite the interesting results obtained, some limitations should be considered. Firstly, the sample used, although important since few studies focus on this specific population, may be biased, since the participating centers have similar characteristics (care and residential). Also, as already mentioned, the existing tests for the assessment of CUT may be insufficient, since, although supported by previous literature, they may not adequately define these traits in the population with ASD, especially those who also have ID. Finally, there are variables that have not been considered and that may be influencing the results, such as, for example, executive functioning or the specific level of ID.

Research regarding the influence of CUT on challenging behaviors in adults with ASD and comorbid ID is very scarce and limited. To this effect, it would be interesting to extend the research to learn about the particularities of the executive functioning of the participants, and to establish associations between CUT and executive functions. Similarly, including different cognitive profiles could greatly clarify this association, as well as to establish a comparison with people with ID who do not have ASD.

Implications

CUT must be considered within the study of ASD, since this population can show some traits related to them, especially in relation to the ability of empathy.

The indirect mediating role of CUT in individual challenging behaviors, such as self-injuries or stereotypies, in people with ASD and ID leads us to think that this variable is related to other interesting factors in the study of ASD, such as executive functioning. Furthermore, we can affirm that CUT and its role in relation to the presence of challenging behaviors in ASD is variable depending on the population of the spectrum, especially considering the presence of comorbid ID. Consequently, CUT traits and its particularities can be considered in relation to interventions in behavioral problems in the ASD population, especially in those individuals who show behaviors related to aggressions and who have a higher executive level.

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