

## Dispositional critical thinking, positive youth development, and social contribution in Spanish emerging adults

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### KEYWORDS

Critical thinking  
Psychological well-being  
Social engagement  
Youth  
Cross-sectional

### ABSTRACT

Dispositional critical thinking has been linked to positive performance in different life domains, such as better academic performance and professional practice, as well as better psychological adjustment. This study had the aim to examine the associations between positive youth development, dispositional critical thinking, and social contribution in a sample of Spanish undergraduates and to test the mediational role of the 5Cs of positive youth development (i.e., confidence, competence, caring, character, and connection) in the relationship between dispositional critical thinking and social contribution. A cross-sectional study was conducted during the spring of 2024 by administering an online self-report. The sample comprised 370 students (67.2% women) aged from 18 to 29 ( $M = 21.29$ ;  $SD = 3.61$ ) enrolled at 10 universities in the region of Andalusia (Spain). The results showed a multiple partial mediation of character and caring in the relationship between dispositional critical thinking and social contribution. This model indicated that dispositional critical thinking was associated with more character and caring, and, in turn, these dimensions of positive youth development were associated with more social contribution. These results underline the need to promote dispositional critical thinking and the positive youth development components of character and caring to increase social contribution in undergraduate students.

## Pensamiento crítico disposicional, desarrollo positivo juvenil y contribución social en adultos emergentes españoles

### PALABRAS CLAVE

Pensamiento crítico  
Bienestar psicológico  
Compromiso social  
Juventud  
Transversal

### RESUMEN

El pensamiento crítico disposicional se ha relacionado con un rendimiento positivo en diferentes ámbitos de la vida, como un mejor ajuste académico y una mejor práctica profesional, así como un mayor bienestar psicológico. Este estudio tuvo como objetivo examinar las asociaciones entre el desarrollo positivo juvenil, el pensamiento crítico disposicional y la contribución social en una muestra de estudiantes universitarios españoles y probar el papel mediador de las 5Cs del desarrollo positivo juvenil (es decir, competencia, confianza, conexión, carácter y compasión) en la relación entre el pensamiento crítico disposicional y la contribución social. Se realizó un estudio transversal durante la primavera de 2024 mediante la administración online de un autoinforme. La muestra estuvo compuesta por 370 estudiantes (67.2% mujeres) de entre 18 y 29 años ( $M = 21.29$ ;  $DE = 3.61$ ) matriculados en 10 universidades de la comunidad autónoma de Andalucía (España). Los resultados mostraron un modelo de mediación parcial múltiple de las dimensiones de carácter y compasión en la relación entre el pensamiento crítico disposicional y la contribución social. Este modelo señaló que el pensamiento crítico disposicional se asociaba con más carácter y compasión y, a su vez, estas dimensiones del desarrollo positivo juvenil se asociaban con más contribución social. Estos resultados subrayan la necesidad de promover el pensamiento crítico disposicional y los componentes del carácter y compasión para aumentar la contribución social en los estudiantes universitarios.

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Critical thinking (CT) is considered a metacognitive process comprising various skills, including analysis and inference (Dwyer, 2017). This process, characterized as purposeful and reflective judgment, allows a logical problem solution or a logical conclusion (Dwyer et al., 2014). A panel of 46 experts developed the Delphi Report (Facione, 1990). The panel defined CT as a purposeful, self-regulatory process resulting in interpretation, analysis, evaluation, inference, and explanation of evidential, conceptual, methodological, criteriological, or contextual considerations.

Dwyer et al. (2014) underlined the importance of CT for gaining a more complex understanding in educational settings and for better problem solving and decision making in social contexts. Thus, CT is becoming more necessary in daily life and may require further instruction in higher education. Other authors have reflected on the nature of CT as ability, disposition, or both (Krupat et al., 2011), which, in turn, underlines the difference between teaching knowledge and skills, compared with teaching attitudes or disposition to think critically (Ennis, 1993). Different assessment tools have been developed for CT based on the distinction between skills and dispositions. Butler (2024) stated the following: “Disposition to use one’s CT skills is as important as the skills themselves. If a person understands the skills involved in thinking critically but fails to deploy those skills when the situation warrants, they would not be classified as a critical thinker” (p. 3). The recognition that the assessment of cognitive skills is insufficient to account for CT has marked the growth in dispositional instruments. Although different taxonomies have been developed to describe CT dispositions, some common elements may be highlighted, such as the concepts of curiosity, open-mindedness, and reflective thought. Following this multidimensional nature, Sosu (2013) validated an instrument for assessing dispositional CT, with two components, i.e., critical openness (i.e., the tendency to be actively open to novel ideas and critical in assessing these ideas and changing ones considering proper evidence) and reflective skepticism (i.e., the predisposition to learn from experiences in the past and to question the evidence). However, recent evidence with samples from undergraduates in the US (Yocket, 2016) and Spain (Bravo et al., 2020) defends a one-factor structure, integrating critical openness and reflective skepticism into a unique factor of dispositional CT. Further research is still needed to examine this factor structure in different samples as well as the diverse correlates in well-being or social adjustment.

Overall dispositional CT is expected to be linked to better personal adjustment because it allows one to use CT skills to understand context and develop adaptive behaviors to deal with different challenges and problems throughout life. Thus, dispositional CT has been linked to positive performance in different life domains, such as better academic achievement and professional development, more resilient behavior and less anxious symptoms (Garcia-Moro et al., 2023; Sosu, 2013). Further research is needed to examine the correlates of dispositional CT in relation to psychological well-being. Recently, Ollinheimo and Hakkarainen (2023) examined CT as a realization of cooperative experiences with rational dialogues and reflected on its impact on mental and social well-being by improving and maintaining

individual self-directedness while simultaneously considering the well-being of others. In this line, some research evidence has been found worldwide concerning the influences of dispositional CT on well-being. A longitudinal study on Turkish undergraduates found a positive association between dispositional CT and perceived emotional intelligence, especially self-motivation (Kaya et al., 2018). In another study on Turkish undergraduates, dispositional CT was associated with higher meaning in life and, in turn, higher life satisfaction (Celik et al., 2015). In a study on adolescents in Iran, CT was linked to an increased internal locus of control and psychological well-being (Rezaei et al., 2013). In Mexico, Vazquez-Parra et al. (2023) concluded that CT may positively influence student well-being and academic performance. Thus, dispositional CT was found to be associated with positive outcomes in psychological well-being, performance and some personal strengths. Further research is still needed to model the relationships between dispositional CT, psychological well-being and performance outcomes in different social contexts, by examining the mediational mechanisms.

The current research followed a positive perspective of psychological well-being to guide intervention design in youth samples (Kia-Keating et al., 2011). The model of positive youth development (PYD) presents a strength-based view of youth transition to adulthood, which is incorporated into the Relational Developmental Systems theory (RDS theory; Lerner, 2005). The RDS theory argues that PYD emerges due to the adaptive self-regulation between personal strengths and social/contextual resources (Benson et al., 2006; Gomez-Baya et al., 2022; Lerner et al., 2018). Following this theory, the interaction between the development of youth personal strengths and the presence of nurturing contextual assets increases the probability of PYD, and PYD is in turn positively associated with social contribution (Geldhof et al., 2013; Overton, 2015). Based on RDS theory, PYD plays a mediational role in the relationship between internal and external assets and the promotion of contribution to others.

Lerner (2005) conceptualized a 5Cs model of PYD, differentiating five thriving indicators that are positively interrelated and connected to better psychological well-being, i.e., confidence (positive self-worth), competence (positive self-efficacy in different life domains), character (adequate internalization of social rules), caring (sympathy and empathy toward others), and connection (positive relationships with others). The RDS model includes a sixth dimension called “contribution”, which refers to the youth’s contributions to their social context (for example, families, friends, neighbors, and community), as which resulted from the satisfaction of the 5Cs (Gomez-Baya et al., 2019; Lerner et al., 2014a). According to Lerner et al. (2014a), social contribution and engagement “develops within the context of adaptive developmental regulations” (p. 69) and youth contributions to family, community, and civil society “constitutes their contributions to the individual context exchanges marking positive integration between people and society” (p. 69). Thus, dispositional CT could be considered a personal strength, which may be an antecedent of PYD, which in turn may promote social contribution. The analysis of the association between disposi-

tional CT, the 5Cs of PYD and social contribution may guide the intervention design to foster individual and social well-being in the transition to adulthood (Lerner et al., 2014b).

In Spain, some research has provided evidence for the 5Cs model of PYD in adolescent and youth samples (Gomez-Baya et al., 2019), as well as for the dispositional CT model (Bravo et al., 2020). The study by Gomez-Baya et al. (2019) in Spanish youth showed that connection, character, and caring were the PYD dimensions more strongly related to social contribution and reported some gender differences in these variables, with women reporting higher scores in all of them. Thus, this research highlighted the importance of controlling gender in the analysis of these associations with PYD. According to the systematic review by Silke et al. (2018), gendered socialization in which women are taught to be more expressive and sensitive, displaying more caring toward others, may explain the gender effects between empathy traits and prosocial responding. Female behaviors are influenced by gender stereotypes, which encourage higher levels of emotional, altruistic, and compliant prosocial behaviors (Gomez-Baya et al., 2025). Recent efforts in Spain have emphasized the importance of CT practices (Rivas & Saiz, 2023) and the promotion of social responsibility within educational institutions (Gutierrez-Ujaque & Fernandez-Rodrigo, 2021), but national-level initiatives are still needed to evaluate dispositional CT and its correlates. Only Vendrell-Moranco et al.'s work (2024) has provided some evidence concerning CT in Spanish undergraduates. They concluded that more self-perceived CT and decision making predicted increased CT, argument analysis, and problem solving.

Thus, more evidence is needed to examine dispositional CT in Spanish youth and the relationships with psychological and social well-being. Furthermore, a national report underlined that Spain needs better youth policies to promote social participation. Data indicated that only 27.5% of Spanish youth collaborate with an NGO or association, and up to 61.5% show little to no interest in politics (Comas Arnau, 2010; INJUVE, 2021). In the region of Andalusia, participation in solidarity and altruistic organizations is limited. Charitable or welfare associations are the most popular among young Andalusians, with a participation rate of around 10%. Environmental (4.5%), civic (4.1%), human rights (3%), and pacifist (1.9%) associations have very low participation rates. Finally, political associations and those defending specific private interests have the lowest levels of membership among young Andalusians (Andalusian Institute for Youth, 2012).

Considering the scarcity of studies on dispositional CT in university contexts in Spain and given the need to encourage young people's social contribution, further research is required to integrate these variables into a PYD model for guiding interventions in universities.

### *The present study*

First, this study aimed to analyze the associations between PYD, dispositional CT, and social contribution in a sample of undergraduates enrolled at universities in Andalusia, Spain. Hypothesis 1: Positive associations between dispositional CT,

PYD, and social contribution are expected (Lerner et al. 2014a; Ollinheimo & Hakkarainen, 2023). Second, this work aimed to test the mediational role of the 5Cs of PYD in the relationship between dispositional CT and social contribution. This is the first study, to the best of the authors' knowledge, to explore dispositional CT as a predictor of PYD and social contribution. Hypothesis 2: The mediational role of PYD between dispositional CT, as a personal strength, and social contribution is expected based on the postulates of RDS theory (Lerner et al., 2018). Hypothesis 3: Dispositional CT is a personal strength that may foster PYD, and in turn PYD is expected to be a mediator linked to further social contribution (Lerner et al., 2018). Third, this study aims to explore which dimensions of PYD are the strongest mediators for social contribution, and the gender moderation in the association. Hypothesis 4: Socially-oriented PYD dimensions (i.e., caring and character) would be the strongest mediators (Gomez-Baya et al., 2019). Hypothesis 5: Caring and character would have a greater effect among females (Gomez-Baya et al., 2019; Silke et al., 2018).

## **Method**

### *Participants*

The sample comprised 370 students (67.2% women, 31.4% men, and 1.4% non-binary) aged from 18 to 29 ( $M = 21.29$ ;  $SD = 3.61$ ). These participants were enrolled at 10 universities in Andalusia (Spain): the University of Almeria (4.1%), the University of Cadiz (3.6%), the University of Cordoba (9.6%), the University of Granada (15.9%), the University of Huelva (3.5%), the University of Jaen (9.9%), the University of Malaga (15.9%), the University of Seville (27.9%), the University Pablo de Olavide (Seville, 6%), and Loyola University (Cordoba and Seville, 3.6%). Most participants lived with their parents (49.5%) or flatmates (30.5%), and lived in cities with more than 300,000 inhabitants (38.4%) or between 50,001 and 300,000 (31.1%). Furthermore, 54.5% were not in a couple, and 65.6% were studying and not currently looking for a job. Concerning the degree areas, 19.2% were enrolled in a degree in arts and humanities, 29.6% in sciences/engineering, 11.5% in health sciences, and 39.7% in law or social sciences. Up to 50% of the participants were enrolled in their first or second academic year, 42.6% were enrolled in their third course, and 7.4% were in their fourth or higher year.

### *Procedure*

A cross-sectional study was performed during the spring of 2024. An online self-report was administered to a sample of undergraduate students. Concerning the data collection procedure, the selection of the academic year and the degree programs were randomly conducted in each participating university. Different professors from each university were contacted to share the online questionnaire with their students. The questionnaire took around 30 minutes to fill in. Written informed consent was obtained from all the students, who did not receive any reward. This study was conducted respecting the Declaration of Helsinki and

after receiving the approval of the Institutional Review Board of the University of Huelva (protocol code UHU-1259711 and date of approval 10 January 2019) for studies involving humans.

### Measures

**Social contribution.** Five indicators to assess the contribution to family, peers, and community from the positive youth development cross-national project by Wiium (2018) were used. This scale was adapted to Spanish by Gomez-Baya et al. (2019) with acceptable psychometric properties. The question “How many hours do you spend in a typical week...?” introduced the following five items: volunteering or doing something without pay to make your community a better place; helping friends or neighbors; helping your family; mentoring others or advising peers; and participating in university committees or government. Five response options were offered, concretely: 0 = 0 hours, 1 = 1 hour, 2 = 2 hours, 3 = 3-5 hours, and 4 = 6 or more hours. A mean score was calculated with the five indicators. Questionable internal consistency was observed ( $\alpha = .57$ ;  $\omega = .6$ ), which may be due to the differences in the indicators included in the measure.

**Dispositional CT.** The *Critical Thinking Disposition Scale* (CTDS) developed by Sosu (2013) and adapted to Spanish by Bravo et al. (2020) was used. CTDS was found to be a valid and reliable measure for Spanish students enrolled at high school and university. The scale is composed of 11 items that assess two dispositional domains, i.e., critical openness (7 items), defined as “the tendency to be actively open to new ideas, critical in evaluating these ideas and modifying one’s thinking in light of convincing evidence”, and reflective skepticism (4 items), which refers to “the tendency to learn from one’s past experiences and be questioning of evidence” (Sosu, 2013, p. 115). The sample items for critical openness and reflective skepticism were “I usually try to think about the bigger picture during a discussion” and “I often re-evaluate my experiences so that I can learn from them”, respectively. Five response options are presented in a Likert-type scale, ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. An overall score for CT disposition was created by calculating the mean score of the 11 items. Separate mean scores were also created for the two dimensions based on their respective items. Notable reliability was observed in the overall score ( $\alpha = .78$ ;  $\omega = .78$ ), as well as in the dimensions of critical openness ( $\alpha = .65$ ;  $\omega = .66$ ) and reflective skepticism ( $\alpha = .7$ ;  $\omega = .71$ ).

**Positive Youth Development.** The PYD short form developed by Geldhof et al. (2014) and adapted to Spanish language by Gomez-Baya et al. (2019) was administered. Gomez-Baya et al.’s work (2022) showed adequate reliability in the overall scale and factorial validity with the original 5-factor structure. This questionnaire is comprised of 34 items distributed into 5 subscales following the 5Cs dimensions: confidence (6 items, i.e., “I like my physical appearance”); competence (6 items, i.e., “I have a lot of friends”); character (8 items, i.e., “I never do things I know I shouldn’t do”); caring (6 items, i.e., “It bothers me when bad things happen to other people”); and connection (8, i.e., “I am a useful and important member of my

family”). Following a 5-point Likert-type scale, different response options for the items were used in each subscale. competence and confidence: 1 = *Strongly disagree* to 5 = *Strongly agree*; character: 1 = *Not at all important* to 5 = *Very important*; caring: 1 = *Not at all* to 5 = *Very much*; and connection: 1 = *Never or almost never* to 5 = *Always*. A mean score of the five dimensions was calculated to study the overall PYD score. In the present study, the five-factor structure was tested (KMO = .67, Bartlett  $\chi^2 = 436.34$ ,  $p < .001$ ) and supported with confirmatory factor analysis, Satorra-Bentler  $\chi^2 = 1.33$ ,  $p = .249$ , CFI = .999, SRMR = .022, RMSEA = .03. Adequate internal consistency was observed in the overall scale ( $\alpha = .86$ ;  $\omega = .85$ ), and acceptable reliability was observed in the separate dimensions of the 5Cs (character:  $\alpha = .66$ ,  $\omega = .66$ ; competence:  $\alpha = .67$ ,  $\omega = .69$ ; confidence:  $\alpha = .74$ ,  $\omega = .77$ ; connection:  $\alpha = .75$ ,  $\omega = .75$ ; caring:  $\alpha = .79$ ,  $\omega = .78$ ).

### Data analysis

First, descriptive statistics were examined for the 5Cs of PYD, the overall PYD score, the overall CT disposition and its components of critical openness and reflective skepticism, and social contribution. Second, bivariate Pearson correlation analyses were conducted between the study variables. Third, three hierarchical regression analyses were separately performed to explain the overall CT disposition and its components of critical openness and reflective skepticism, based on the 5Cs of PYD, and controlling for demographics (i.e., gender, age, cohabitation, habitat, couple status, labor situation, degree area, and academic year). Standardized coefficients and  $R^2$  values were presented in each regression analysis. Durbin-Watson statistics were calculated to examine the autocorrelation in the residuals. An acceptable range for Durbin-Watson score is 1.5 - 2.50. These analyses were conducted with SPSS 21.0.

Fourth, a partial mediation model was tested to explore the mediation role of the 5Cs of PYD in the relationship between dispositional CT and social contribution. In a partial mediation model, the relationship between X and Y is expected to be direct and also indirect through the effect on mediator between X and Y. Total, direct, indirect, and total indirect effects were described in the multiple mediation model. Z-scores and confidence intervals were presented in the effects included in the model. This regression-based mediational model was developed and tested using JASP 0.18.3.0., following Hayes’s indication (2017). This mediational analysis followed a causal inference approach to integrate the relationships included in the model (Hayes, 2009). Finally, gender moderations in all the separate paths (X  $\rightarrow$  Y; X  $\rightarrow$  Mediator; Mediator  $\rightarrow$  Y) integrated in the mediational model were examined by applying the model 59 in the macro Process (Hayes, 2009).

## Results

### Descriptive statistics and bivariate correlations

Table 1 presents the descriptive statistics of the study variables. Results indicate moderate-high mean scores for PYD and

dispositional CT but a low score for social contribution. Concerning the 5Cs, the highest means in caring and character and the lowest for competence.

Table 1 also shows the bivariate zero-order correlations between the study variables and the internal consistency reliability of the respective measures. Positive associations were observed between overall dispositional CT (and its components of critical openness and reflective skepticism), PYD (and the separate 5Cs), and social contribution.

### Hierarchical regression analyses

Table 2 describes the results of the three hierarchical regression analyses to explain critical openness, reflective skepticism, and overall dispositional CT, respectively, based on the 5Cs and controlling for the demographics. Concerning the effects of the 5Cs, the results indicate that character and caring had significant positive effects on overall dispositional CT and its components of critical openness and reflective skepticism. No significant effects were observed for competence, confidence, and connection. Regarding control variables, the degree of study

**Table 1**

*Descriptive statistics and bivariate correlations among all study's variables*

	Min.	Max.	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Character	1.25	5	3.87	0.47	(.66)									
2. Competence	1.17	4.67	2.86	0.66	.24***	(.67)								
3. Confidence	1	5	3.68	0.65	.45***	.56***	(.74)							
4. Caring	1	5	4.17	0.59	.44***	.01	.07	(.79)						
5. Connection	1.5	5	3.52	0.63	.41***	.39***	.46***	.17**	(.75)					
6. Overall PYD	1.25	4.68	3.62	0.41	.71***	.68***	.77***	.47***	.73***	(.86)				
7. Critical openness	2	5	3.95	0.49	.34***	.15**	.13*	.29***	.21***	.32***	(.65)			
8. Reflective skepticism	1	5	4.01	0.65	.35***	.1*	.12*	.29***	.13*	.28***	.59***	(.7)		
9. Dispositional CT	2	5	3.97	0.49	.39***	.14**	.14**	.33***	.2***	.34***	.92***	.86***	(.78)	
10. Social contribution	0	3.2	1.37	0.56	.32***	.14**	.08	.26***	.26***	.3***	.22***	.17**	.22***	(.57)

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

**Table 2**

*Hierarchical regression analyses*

	Critical openness $F = 6.51$ ; $p < .001$ ; $R^2 = .2$ $DW = 1.99$		Reflective skepticism $F = 5.29$ ; $p < .001$ ; $R^2 = .17$ $DW = 2.17$		Dispositional CT $F = 7.59$ ; $p < .001$ ; $R^2 = .23$ $DW = 2.1$	
	<i>t</i>	$\beta$	<i>t</i>	$\beta$	<i>t</i>	$\beta$
Gender	2.23	0.12	-0.19	-0.01	1.38	0.07
Age	-1.06	-0.06	0.53	0.03	-0.42	-0.02
Cohabitation	1.61	0.08	-0.06	-0.01	1.02	0.05
Habitat	1.32	0.07	-0.23	0.01	0.98	0.05
Couple status	-0.17	-0.01	0.85	0.05	0.31	0.02
Labor situation	0.94	0.05	0.8	0.04	1.04	0.05
Degree area	-2.49	-0.13*	-1.77	-0.09	-2.52	-0.13*
Academic year	0.16	0.01	0.75	0.04	0.47	0.03
Character	3.84	0.25***	4.6	0.3***	4.84	0.31***
Competence	1.76	0.11	0.92	0.06	1.64	0.1
Confidence	-1.69	-0.11	-1.26	-0.08	-1.76	-0.11
Caring	3.4	0.2**	2.86	0.17**	3.68	0.21***
Connection	1.5	0.09	-0.02	-0.01	0.98	0.06

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

exhibited a minor effect on critical openness, with the highest mean score for arts and humanities ( $M = 4.05$ ;  $SD = 0.56$ ) and the lowest for law and social sciences ( $M = 3.87$ ;  $SD = 0.46$ ). The regression analysis reached an explained variance of 23% for overall dispositional CT, with a greater  $R^2$  value for critical openness. The Durbin-Watson (DW) statistics were between 1.99 and 2.17 in these regression analyses, which indicated no remarkable autocorrelation.

### Mediation analysis

Table 3 presents the results of the mediation analysis. This mediation analysis tested the mediation of the PYD dimensions of character and caring in the relationship between dispositional CT and social contribution. The results indicate a significant and positive total effect of dispositional CT on social contribution, although this relationship was not significant after including the

**Table 3**

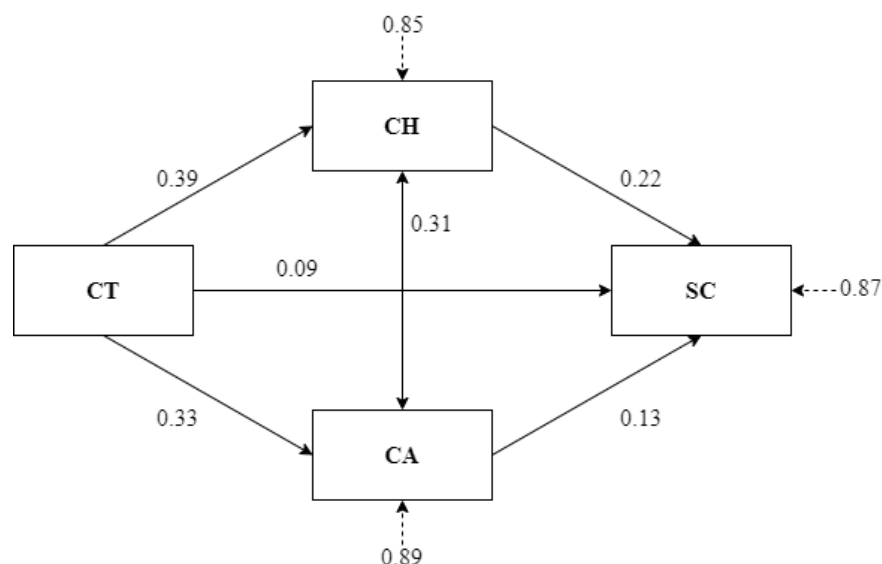
### Mediation analysis

	$\beta$	SE	Z	p	LLCI	ULCI
Direct effect						
CT->SC	0.09	0.05	1.71	.088	-.01	.2
Indirect effects						
CT-> CH ->SC	0.09	0.02	3.53	<.001	.04	.13
CT-> CA ->SC	0.04	0.02	2.21	.027	.01	.08
Total effect						
CT->SC	0.22	0.05	4.33	<.001	.12	.32
Total indirect effect						
CT->SC	0.13	0.03	4.77	<.001	.08	.18
Residual covariance						
CH<->CA	0.31	0.05	6.52	<.001	.22	.41
Path coefficients						
CH->SC	0.22	0.06	3.93	<.001	.11	.33
CA->SC	0.13	0.06	2.34	.019	.02	.24
CT->SC	0.09	0.05	1.71	.088	-.01	.2
CT->CH	0.39	0.05	8.03	<.001	.29	.48
CT->CA	0.33	0.05	6.59	<.001	.23	.42

Note. CT: dispositional critical thinking; CH: character; CA: caring; SC: social contribution.  $R^2$ : SC = .12; CH = .15; CA = .11.

**Figure 1**

### Mediation analysis paths



Note. CT: dispositional critical thinking; CH: character; CA: caring; SC: social contribution.

mediators (i.e., direct effect). Significant indirect effects were observed for character and caring. Thus, more dispositional CT was related to more character and more caring, and, in turn, higher scores in these PYD components were linked to higher social contribution. A stronger indirect effect was observed for character. Furthermore, character and caring were positively interrelated. Figure 1 describes the standardized coefficients in the relationships included in the mediation model. Dispositional CT had positive effects on character and caring, and character and caring had positive effects on social contribution.

Finally, gender moderations in the relationships included in the mediational model were explored to examine the differences in the associations among the variables between male and female youth. No gender moderations were found in the relationship between dispositional CT and social contribution,  $\beta = -0.05$ ,  $p = .68$ , neither between caring and social contribution,  $\beta = -0.18$ ,  $p = .086$ , nor between character and social contribution,  $\beta = -0.11$ ,  $p = .295$ . No significant gender moderations were observed in the effects by dispositional CT on caring,  $\beta = -0.12$ ,  $p = .265$ , and character,  $\beta = -0.06$ ,  $p = .589$ .

## Discussion

This study aimed to analyze the associations between PYD, dispositional CT, and social contribution in a sample of undergraduates enrolled at universities in Andalusia (Spain), and to examine the mediational role of the 5Cs of PYD in the relationship between dispositional CT and social contribution. Positive associations between dispositional CT, PYD and social contribution were observed, as we expected in Hypothesis 1, based on the works by Ollinheimo and Hakkarainen (2023) and Lerner et al. (2014a). Some works have shown the effects of dispositional CT on well-being in China (Ding, 2024) and on life satisfaction in Turkey (Celik et al., 2015).

Furthermore, PYD mediated the relationship between dispositional CT and social contribution. This mediational model is consistent with our hypothesis 2 based on the RDS theory (Lerner et al., 2018; Overton, 2015), which describes the personal and contextual assets that should be fostered to promote PYD and considers social contribution as an outcome of the satisfaction of the 5Cs of PYD. The present work provides novel evidence for the association between dispositional CT and PYD dimensions. No remarkable differences in the results were observed between the dimensions of dispositional CT (i.e., critical openness and reflective skepticism), which is consistent with the works by Yocket (2016) and Bravo et al. (2020). Furthermore, the positive association between PYD and social contribution is in line with the PYD model presented by Lerner et al. (2014). Another novel result of this paper is the mediational model tested between dispositional CT, PYD, and social contribution. These results are consistent with our Hypothesis 3.

As a remarkable contribution of the present manuscript, two dimensions of PYD emerged as the strongest mediators. The mediation model showed that the relationship between dispositional CT and social contribution was totally mediated by the PYD dimensions of character and caring; hence, dispositional

CT was associated with more character and caring, and, in turn, these PYD dimensions were associated with more social contribution. Character and caring are the most socially oriented dimensions of PYD, reflecting respect for social values and empathic concern. These results are in line with Hypothesis 4, based on the conclusions by Gomez-Baya et al. (2019) concerning the effects by these dimensions of PYD on social contribution. In contrast, other dimensions—such as competence and confidence—represent subjective assessments of self-efficacy and self-esteem, while connection indicates the level of personal satisfaction with social relationships, did not show a significant mediational role. Previous works included other correlates and mediators of dispositional CT, such as locus of control (Rezaei et al., 2013), mindfulness (Ding, 2024), and emotional intelligence (Kaya et al., 2018), but not the differential role of the PYD dimensions. The importance of dispositional CT for the development of character (respect for social norms) and caring (sympathy and empathy toward others), and, in turn, to foster contribution to others, is consistent with Ollinheimo and Hakkarainen's argumentation (2023). These authors described a bidirectional system between cooperation and CT across human development. The cooperative principles of CT may improve individual well-being and self-directedness alongside the pursuit of the common good and consideration for others' well-being. This association is also consistent with the RDST model about adaptive self-regulations between the individual and the context (Lerner et al., 2014b). More dispositional CT may enable stronger individual contribution at all societal levels (i.e., family, friends, neighbors, and the general community) by strengthening character and caring. Furthermore, it may create a foundation for individual mental health and social welfare in youth. Finally, this model was consistent across both genders, indicating that the role of dispositional CT and positive development in explaining social contribution is similar in young men and women. This result did not support the hypothesis 5 based on the differential effects by gender identified by Silke et al. (2018). This suggests that differences may exist in the scores in the variables, but not in the relationships among them.

## Limitations and practical implications

Some limitations should be acknowledged. Because this study followed a cross-sectional design, the conclusions are based only on associations between variables, and neither directionality nor causality can be inferred. Some methodological improvements may be recommended for future studies, such as longitudinal studies, mixed methods or observational or behavioral CT assessments. Further research is recommended to examine the prospective associations between dispositional CT, PYD, and social contribution in the youth life stage. Moreover, the information collected by self-reports was based on the participants' subjective assessments, which may bias the results (Behar-Horenstein et al., 2011). Different measurement methods should be administered in future research. The associations between the variables could have been biased by the assessment method because the three variables were assessed via

self-reporting, and the participants showed a similar response tendency. Observational measures of CT are recommended to examine performance skills rather than dispositions (Sumarni et al., 2018). Furthermore, the internal consistency of the social contribution measure was relatively low, which may affect the robustness of the results. A more comprehensive assessment is recommended for social contributions or related variables, such as prosocial behavior. Concerning the sample composition, two-thirds of the sample were women, which may have biased the results. Further research may examine gender-balanced samples. Furthermore, future studies should employ larger sample sizes and collect data from all regions of Spain. Because only emerging adults from Andalusia were recruited as participants, the results of this study can only be generalized to that region. Finally, a mixed study is also recommended to obtain a deeper understanding of the interrelations between the variables by using focus groups or individual interviews (Garcia-Moro et al., 2024).

Despite the acknowledged limitations, some implications for practice may be derived from the results of the present study. More efforts are recommended for CT instruction in higher education because it allows for deeper information understanding, better academic performance, more active citizenship, and better labor integration (Dwyer & Eigenauer, 2017; Geijsel et al., 2012). The design of CT promotion programs in higher education should integrate CT perspectives and conceptions from both educators and students. As Dwyer et al. (2017) indicated, student perspectives on CT are broader, less abstract, more concrete, and more focused on utility and functions. Thus, the application of CT to real-world problems, considering personal well-being and lifelong formation, is highly needed (Saiz & Rivas, 2023). CT is also a remarkable value for future professional development and labor integration (Bamber & Murphy, 1999; Fu, 2023). Some pedagogical initiatives have arisen to teach CT and promote emotional well-being (Dwyer, 2017; Gratton, 2001), many of which have been developed in higher education (Alsaleh, 2020). In Spain, the DIAPROVE Critical Thinking training program in university contexts applied problem-based and cooperative learning strategies, with a total time duration of 55-60 h for 16 weeks with a group of approximately 30-35 students. This program consisted of six blocks, with activities about a) the nature of CT, b) problem-solving strategies, c) causal explanations, d) deductive thinking, e) argumentation techniques, and f) decision making strategies. In a quasi-experimental design, Rivas and Saiz (2023) showed that this program effectively increased CT in the experimental group.

Following these promising results, further intervention initiatives should be encouraged in universities in Andalusia (Spain). They could be complemented with programs to foster PYD and social contribution. Moreover, curriculum development in higher education institutions in Andalusia (Spain) and other European contexts could benefit from policies that emphasize the importance of CT, well-being and youth participation in the civil society. In this line, the European Commission highlights that civil society organizations can collaborate with European Universities to foster civic participation. This

collaboration enables students, academics, community members, and other relevant groups to join forces in tackling societal issues and enhancing community well-being. Civic engagement can take many forms, such as participating in challenge-driven initiatives like hackathons and living labs, or through hands-on experiences like internships, volunteer work, or field studies. These joint efforts also contribute to the development of innovative teaching methods grounded in real-world challenges (European Commission, 2023). Thus, university programs to promote civic engagement should be oriented towards the needs of, in this case, the Andalusian context and be integrated within the lines of work of social organizations in the community, such as NGOs and local governments. Further youth participation is needed in solidarity and altruistic organizations in Andalusia, Spain, mainly in charitable or welfare associations, and environmental, politic, and human rights organizations. The offices of the university vice-rectors for volunteering and social action may collaborate with the offices of the vice-rectors for students and academic planning, to provide enriching experiences for their students that contribute to the transfer of knowledge and skills to the community.

### Conclusion

In conclusion, this work has given supportive evidence for the positive associations of dispositional CT with the 5Cs of PYD and social contribution. This research has pointed out that dispositional CT is associated with social contribution via its positive effects on the character and caring dimensions of PYD. These results underline the need to foster dispositional CT, character, and caring to promote social contribution in undergraduate students in Andalusia (Spain).

### Author contributions

Conceptualization: D.G.-B., C.B., F.J.G.-M.

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Methodology: D.G.-B., R.M.-B.

Validation: R.M.-B.

Formal analysis: D.G.-B., C.B.

Research: D.G.-B., F.J.G.-M.

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Acquisition of funds: D.G.-B.

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## Declaration of interests

The authors declare that there is no conflict of interest.

## Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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