Adolescents' vulnerability to disinformation: Its measurement and relationship to critical thinking and moral disengagement

La vulnerabilidad de los adolescentes frente a la desinformación: su medición y su relación con el pensamiento crítico y la desconexión moral

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Abstract:

Young adolescents are more vulnerable to disinformation owing to the time that they spend online and their content consumption habits. The consequences of this phenomenon can be serious, both for the individual and at a social and political level. To alleviate this situation, different agencies recommend healthy practices regarding consumption and exchange of information; from checklists to self-learning exercises for the development of critical thinking. This research proposes a tool for the identification of behaviours among adolescents when giving credibility to information or content and the motives that lead them to share it, contributing at times to the spread of misleading information. After an exhaustive process of design, piloting, and psychometric validation using an English-speaking sample (N = 417), a reliable instrument was obtained. We also measured its correlation with critical thinking and moral disengagement. The results lead us to conclude that this is a new tool with which to observe the information consumption behaviours of young people and thus measure their vulnerability to disinformation. Similarly, we have confirmed how greater critical thinking is positively re-

lated to more responsible consumption when giving credibility to content or news, and how moral disengagement is linked to the fact of sharing such items with greater ease.

Keywords: disinformation, young people, teenagers, scale, critical thinking, media literacy, moral disengagement.

Resumen:

Los jóvenes adolescentes son más vulnerables ante la desinformación por el tiempo que emplean conectados y sus hábitos de consumo de contenidos. Las consecuencias de este fenómeno pueden llegar a ser graves tanto a nivel individual como social y político. Para paliar esta situación, desde distintas instancias se recomiendan prácticas saludables para el consumo y el intercambio de información, desde listas de chequeo hasta ejercicios de autoaprendizaje para fomentar el pensamiento crítico. Esta investigación propone una herramienta con la que identificar los comportamientos de los adolescentes a la hora de darle credibilidad a una información o contenido y las motivaciones que les incitan a compartirlo, contribuyendo en ocasiones a la difusión de información engañosa. Tras un exhaustivo proceso de diseño, pilotaje y validación psicométrica en una muestra de habla inglesa (N = 417), se obtiene un instrumento fiable. Se mide también su correlación con el pensamiento crítico y la desconexión moral. Los resultados permiten concluir que estamos ante una nueva herramienta con la que observar los comportamientos de consumo de información de los jóvenes y medir así su vulnerabilidad desinformativa. Asimismo, se constata cómo un mayor pensamiento crítico se relaciona positivamente con un consumo más responsable a la hora de darle credibilidad a un contenido o noticia, y cómo la desconexión moral lo hace con el hecho de compartirlo con mayor ligereza.

Descriptores: desinformación, jóvenes, adolescentes, escala, pensamiento crítico, alfabetización mediática, desconexión moral.

1. Introduction

Despite supposedly being digital natives, or perhaps because of it, young people these days display an evident vulnerability to disinformation. Some studies go as far to show that children and adolescents do not even think about the reliability of the information to which they are exposed (Dumitru, 2020). This is combined with the fact that their self-perceived skills (overestimated) in identifying false or misleading information makes them even more vulnerable (Herrero-Diz et al., 2021). An overestimation, more-over, that increases when the young person compares themselves to people around them, producing the well-known "third-person effect" (Corbu et al., 2021). The explanation for this may lie in the development of a "survival skill" that has become necessary due to constant contact with information, which is impossible to analyse correctly (Greifeneder et al., 2021).

All of this affects young people's individual well-being. Thus, for example, the study by Plan Internacional (2021) reveals that

one in four young females feels physically unsafe as a result of disinformation, and 98% are worried because much of the false content in circulation aims to discredit or humiliate them. Likewise, 46% experience sadness, depression, stress, worry or anxiety as a consequence of the exposure to incorrect information and disinformation online.

In social and political terms, clearly this all has serious consequences for free and rational political deliberation, an essential ingredient in democracy (McKay and Tenove, 2021). Faced with this situation, institutions and the media endeavour to offer solutions leading to news or media literacy (Dumitru, 2020), mainly with two objectives: to discover the attraction and effectiveness of so-called fake news, and to provide users with defence strategies and mechanisms to fight it (Gómez-Calderón et al., 2020). Most young people do not even know that content can be checked, as they have no knowledge of the tools to do so (Pérez-Escoda et al., 2021).

Thus, several initiatives have been developed to help young people evaluate information and assess the credibility of content they receive (Dring, 2020). Initiatives concerning media literacy or news literacy that, in line with Jones-Jang et al. (2021), should be more than just an explanation of the disinformation phenomenon, and should lead to actively conducting an accurate search for information and show critical understanding, through knowing how to use fact-checking tools. Age is a key protective factor, according to Newman and Zhang (2020). This means that the earlier literacy is acquired, the better the defence strategies will be.

In this sense, there are numerous experiments in which young people address different information and content related to disinformation, using rubrics, questionnaires, checklists, etc. (McGrew, 2020; Tamboer et al. 2020; Herrero-Diz et al., 2021). Of special interest are those that differentiate between critical assessment strategies with an *ad hoc* design, for specific content, and general strategies that can be used regardless of the content. The former includes verification of the source or link, using common sense, checking the way it is written and/or distributed, and observing the context of the news. For general content, strategies could be added relating to analysis, assessment and deduction, verification of the writing style or the design, observation of the context, asking others and checking other sources. All of which is unusual among young people (Tamboer et. al, 2020).

Similarly, McGrew (2020) emphasises the importance of investigating a website's source, analysing information critically and locating reliable sources on the internet. To this effect, she suggests explicit training in fact-checking strategies that could help students to develop effective strategies. Guan et al. (2021) state that, in their opinion, good media literacy can counteract polarisation and conspiracy theories through the exercise of scepticism and critical thinking.

With the aim of helping young people not to place so much trust in algorithms, to improve their critical judgement and thereby reliably evaluate the content they receive, as proposed by Ackland and

Gwynn (2020), this research presents a new tool with which to assess adolescents' vulnerability to disinformation. It involves a psychometrically validated scale that measures certain information consumption habits which are indispensable in fighting disinformation. To this effect, earlier work has been used as a basis, mainly in relation to pre-existing approaches, such as C.A.R.S. (Harris, 1997); C.R.A.A.P. (Blakeslee, 2004); R.A.D.A.R. (Mandalios, 2013); or P.R.O.V.E.N. (Caulfield, 2017). They all propose lists of recommended habits or tasks for deciding whether or not to give credibility to content or alleged news item. On this basis, we suggest constructing a validated measure to observe certain behaviours that provide protection against disinformation.

Likewise, related to the fact of giving credibility to a piece of news or content, several authors state the importance of critical thinking (Jones-Jang et al., 2021; Tamboer et al., 2020; Guan et al., 2021). This is a construct that could be defined, in accordance with Paul and Scriven (2003), as the process of conceptualising, applying, analysing, synthesising and/or evaluating information gathered from observation, experience, reflection and reasoning, as a person's guide to actions and beliefs. Equally, numerous studies reveal the importance of improving students' skills in terms of how they think and analyse information and the key role of educational centres and teachers in the acquisition of critical thinking (Pithers & Soden, 2000).

In the same way, with reference to the second key behaviour of people that exac-erbates the effects of disinformation, that is to say, sharing information received without checking it, it would be of interest to associate this behaviour with the construct of moral disengagement (Bandura et al., 1996). This is a cognitive factor that is usually involved in behaviours that are morally questionable or clearly illegal. Bandura (2002) defines it as the process of disengagement from acquired values and standards in order to justify socially reproachable conduct using logical arguments, thereby avoiding shame or blame. This process would explain how people can exhibit unethical behaviour without experiencing discomfort. The action of spreading information without checking whether it is false, or even in the knowledge that it is, which is sometimes the case, is an act of social irresponsibility — the subject is either unaware of this or activates the above-mentioned process of moral disengagement. Specifically, this occurs through the implementation of one of its mechanisms, the "displacement of responsibility", which is defined by Bandura (2002) himself as the act of not assuming responsibility for one's actions, since this responsibility is displaced towards another person or groups of people. This is where the role of moral education, broadly defined as the help provided to young people so that they can acquire a set of beliefs and values relating to what is right and wrong (Halstead, 2010), may be a key element in the fight against disinformation. Specifically, with reference to raising awareness about the individual responsibility of checking certain content which is received before sharing it and thereby avoiding becoming a possible agent for spreading untruths.

Therefore, the main objective of this work is to create a scale, which has been psychometrically validated, that, for the first time, provides a tool that is useful and easy to use and which can be employed to measure adolescents' vulnerability to disinformation, taking into account their behaviours, habits and motives associated with content consumption. The hypotheses drawn from the above are as follows:

H1: The proposed scale of vulnerability to disinformation for young people demonstrates the necessary reliability and validity.

H2: There is a negative correlation between vulnerability to disinformation (giving credibility without checking) and critical thinking.

H3: There is a positive correlation between vulnerability to disinformation (sharing content without checking) and moral disengagement.

To prove these hypotheses, in line with DeVellis (2017), the study was conducted in the following two stages.

2. First stage: Creation and refining of the Scale of Vulnerability to Disinformation (SVD)

2.1. Procedure and participants

As mentioned above, firstly we conducted a literature review to detect the existing instruments to mitigate vulnerability to disinformation. We also included the perspective provided by the "Cuestionario sobre los Hábitos de los Estudiantes para Compartir *fake news* por el Móvil" (*Questionnaire on student habits when sharing fake news on mobile phones*) or CHECK-M (Herrero-Diz et al., 2020), which incorporates elements from the Ofcom Report (Ofcom, 2019), or the above-mentioned C.R.A.A.P. test (Blakeslee, 2004). We used this as a basis to develop the SVD, initially composed of 30 items grouped into two dimensions and 7 subdimensions.

– Dimension 1: "To give credibility to information or news that I receive on social media, internet or my mobile…" ("Credibility"), composed of: basic information check (5 items), quantitative reading level (6 items), further qualitative analysis of the content (4 items), thinking about possible intentions underlying the information (5 items).

– Dimension 2: "When I share information or news that I receive on social media, internet or my mobile…" ("Sharing"), composed of: fact-check (4 items), responsibility (3 items), and extrinsic motivation (3 items).

Subsequently, a content validity analysis was conducted on the instrument by means of expert judgement, in order to obtain evidence of validity based on the test contents (Sireci & Faulkner-Bond, 2014). Specifically, this involved journalists with expertise in fact-checking and digital content (N = 3) and educators and researchers in the field of Education (N = 2), with 3 men and 2 women, aged between 32 and 40 years old. The answers from one of them were rejected as being incongruous.

The experts used a 4-point Likert-type scale (from 1, not at all, to 4, extremely) to assess the dimensions in terms of the degree of representativity (i.e. if the elements created are representative of the dimension they are supposed to belong to) and relevance (i.e. the degree or importance of these elements in representing the facet of the dimension for which they were designed), as well as evaluating the items as regards comprehension (i.e. if the item is understood correctly), ambiguity (i.e. judgement on the possibilities of the item being interpreted in different ways) and clarity (i.e. to what extent the item is concise / accurate / direct) (Gwet, 2014).

Following this, the scale was piloted with a sample of 49 Spanish adolescents, 69.4% women, with an average age of 16.84 years (SD = .99). 34.7% (n = 17) were in their first year of upper secondary education, 20.4% (n = 10) were in their second year of upper secondary education, 1 was in the third year of lower secondary education (2%), 32.7% were in the fourth year of lower secondary education (n = 16), 4.1% (n = 2) were on a university degree course and 6.1% (n = 3) were in Vocational Training.

After the expert judgement and piloting, the initial instrument of 30 items was reduced to 25 distributed across the same two dimensions, eliminating subdimensions 19 under "Credibility" and 6 under "Sharing".

2.2. Data analysis and results

The expert judgement analysed representativity using Fleiss' Kappa coefficient (Fleiss et al., 2003). Overall agreement was calculated, as well as the degree of agreement for each dimension on the scale, using Landis and Koch (1977) as a reference, who considered agreement to be poor with values of K < .20, fair between .21 and .40, moderate between .41 and .60, substantial between .61 and .80 and, finally, almost perfect between .81 and 1.00.

As can be seen in Table 1, overall agreement between the experts for dimension 1 ("Credibility") was moderate (K = .45, < .001, 95% CI .34-.56) and almost perfect for dimension 2 ("Sharing") (K = 1.00, < .001, 95% CI .81- 1.19).

The significance of each item and comprehension, ambiguity and clarity were assessed using the Content Validity Index (CVI, Lynn, 1986) and the Content Validity Ratio (CVR, Lawshe, 1975). An in-depth analysis of the responses revealed that 10 items in dimension 1 created considerable doubt regarding the subdimension to which they corresponded (items 2, 3, 7, 8, 13, 14, 17, 19, 23 and 24). Additionally, the items "If it is a video, I only need to watch the first few seconds" and "I consider what relation the information has to other topical issues" did not attain the minimum value for statistical significance (CVR = .5, <.58), but the CVI was in fact acceptable for all the dimensions (CVI1 = .72, CVI2 = .75, CVI3 = .67, CVI4 = .90, CVI5 = .75, CVI6 = .75, CVI7 = 1). Concerning the evaluation of the items, they all demonstrated acceptable values in comprehension and clarity, although the item "I try to contact the author or find more information about him/her" proved to be ambiguous (CVI = .50).

TABLE 1. Results of agreement between raters.

Items	Agreement		
	K	p	95 % CI
Credibility	.45	<.001	.34-.56
1. Basic check	.45	<.001	.27-.63
2. Quantitative level	.29	.002	.11-.47
3. Further qualitative analysis	.23	.015	.05-.41
4. Intentions	.88	<.001	.70-1.07
Sharing	1.00	<.001	.81-1.19
5. Fact-check	1.00	<.001	.73-1.27
6. Responsibility	1.00	<.001	.73-1.27
7. Extrinsic motivation	1.00	<.001	.73-1.27

Note: K = Fleiss' Kappa; p = statistical significance; 95% Confidence Interval.

Lastly, the results of the pilot were considered to be satisfactory, as a Cronbach's alpha of .79 (>.70) was attained for the overall scale. Furthermore, 11 items demonstrated a discrimination index lower then .30 (DI9 = -.16, DI10 = -.17, DI11 = .27, DI19 = .16, DI23 = -.20, DI25 = .10, DI26 = .22, DI27 = .06, DI28 = -.06, DI29 = .12, DI30 = .18). These results led to the review of several items and to maintaining the two dimensions, "Credibility" and "Sharing", which comprise the refined scale.

3. Second phase: SVD reliability and evidence of validity

3.1. Procedure and participants

To validate the SVD, the sample of participants for the study was collected in 2021 using an online panel of British consumers, who signed the corresponding informed consent form. English was the first language of all the subjects. For this reason, the questionnaire was translated into this language using the process of back translation (Harkness & Schoua-Glusberg, 1998). After refining the incomplete responses, the valid sample of adolescents aged between 16 and 18 years old was ultimately composed of 417 participants. Applying a criterion of proportionality according to sex and age, 27.3% (n = 114) of the participants were 16 years old, 33.3% were 17 years old (n = 139), and 39.3% were 18 years old (n = 164). 50.8% indicated their sex as female (n = 212), 46% as male (n = 192), and 3.1% indicated "other" (n = 13). In relation to the level of studies, 36.9% (n = 154) were studying for lower secondary education exams (GCSE), 38.4% (n = 160) were studying for upper secondary education exams (GCE), 13.2% (n = 55) were not currently studying and 11.5% (n = 48) were studying vocational education and training (VET).

The study was conducted in accordance with the recommendations made by Organic Law 3/2018 and the Spanish Data Protection Agency. The project and the experimental protocol were approved by the Comité de Ética de la Universidad Loyola Andalucía (Loyola Andalucía University Ethics Committee). All of those surveyed gave their consent to participate in this study. Their parents' or tutors' informed consent was not required, as the participants were over 16 years old (Law 41/2002).

Qualtrics (www.qualtrics.com) was used for data collection and the recruitment of the adolescents. Qualtrics contacted them and sent them the link to the study for completion, which included control variables, including completion time. All the participants were rewarded financially, on the essential condition that they responded to all the questions and sent the questionnaire after completing it. The study was available from 21/04/2021 to 14/05/2021.

3.2. Measurement

Regarding the complete battery of questions in the questionnaire, the following variables were measured:

1. *Vulnerability to disinformation:* measured using the "Vulnerability to Disinformation Scale" (SVD), the refined version, described above and composed of 25 items on a 5-point Likert-type scale (from 1[never] to 5 [always]), grouped into two dimensions, "Credibility" (19 items) and "Sharing" (6 items).

2. *Moral disengagement:* evaluated using 12 Likert-type items (from 1, completely disagree, to 5, completely agree) included in the Moral Disengagement scale defined by Bandura et al. (1996). The items corresponding to the following mechanisms of moral disengagement were included: advantageous comparisons that individuals make concerning their own harmful behaviour (e.g., damaging property is not a major issue considering that other people do worse things), displacement of responsibility (e.g., if people live in poor conditions, they cannot be blamed for their aggression) and diffusion of responsibility (e.g., a young man who belongs to a gang cannot be blamed for the problems that the gang causes). The Cronbach's alpha for the 12 items was .79.

3. *Critical thinking:* this was measured using the subscale judgement/critical thinking, included in the questionnaire VIA-Y (*Values in Action for Youth*) by Park and Peterson (2006), which measures character strengths in adolescents. It consists of eight Likert-type items (from 1 = complete disagreement to 5 = complete agreement) and evaluates adolescents' perception of the information they use when taking decisions and the extent to which they reflect when deciding (e.g., when I take a decision, I consider the good and bad aspects of each option). The reliability of the sample was acceptable (α = .72).

In addition to these three measurements, the participants responded regarding the following sociodemographic vari-

ables: gender, age, area of residence and studies in progress at the moment of participating in the study.

3.3. Data analysis and results

Firstly, we analysed the validity of the construct, that is to say, the factorial structure of the instrument. To this effect, the total sample was randomly divided into two parts; one half with 219 people was used to conduct the Exploratory Factor Analysis (EFA) and the other half with 198 participants for the Confirmatory Factor Analysis (CFA).

At this preliminary stage, the matrix was suitable for factorisation (Osborne et al., 2014). Specifically, the KMO value (KMO = .86, >.70; Kaiser, 1970) confirmed the suitability of the sample for subsequent analysis and Bartlett's sphericity test was not significant (χ^2 = 2,297.3, gl = 300, p <.01). The mean score of the items ranged from 1.90 (SD = 1.05) and 3.58 (SD = 1.10); with near-normal values for asymmetry (-.81, .94) and kurtosis (-1.01, .503), but with multivariate kurtosis proving significant in Mardia's test (MK= 10.89, p <.01).

The EFA used "Unweighted Least Squares" (ULS) as the extraction method and the oblique rotation used was Promin (Lorenzo-Seva, 1999), given the data characteristics (see the results section) and the presumed correlation between the factors. Several checks were conducted to confirm that the optimal exploratory model was that composed of two factors, namely:

a) The Parallel Analysis based on the Minimum Rank Factor Analysis (PA-MR-FA) with an interval of 95% (Timmerman & Lorenzo-Seva, 2011), suggested the presence of two factors.

b) We analysed the degree of dominance of the general factor or closeness to unidimensionality (Ferrando & Lorenzo-Seva, 2019), observing that the data fitted a multidimensional model, as the "Explained Common Variance" (ECV) index was .755 (values of >.85 indicate that the model is essentially unidimensional; Rodríguez et al., 2016), and the UniCo index was .819 (values of >.95 suggest that the data may be considered to be unidimensional; Lorenzo-Seva, & Ten Berge, 2006).

c) The two-factor model showed a good fit ("Goodness of Fit Index", GFI = .965, >.95; Hooper et al., 2008). The saturation of the items in the factors is presented in Table 2, which shows that all the items demonstrate factor loadings that are over or very close to .40 in the same factor and below .30 in the other factor.

d) The model explained a variance of 42% (.31 for factor 1, and .11 for factor 2). Furthermore, the correlation between the two factors was acceptable (.38) (Ferrando & Lorenzo-Seva, 2014).

e) The construct's replicability or h-index (Hancock & Mueller, 2001) helped to confirm, based on values of over .70, that the latent variable was well defined by its indicators and could be stable in other studies.

TABLE 2. Scale of Vulnerability to Disinformation (SVD) for young people, and their factor weighting in the EFA (ULS and Promin rotation).

Item	Factors	
	F2	F1
I check whether the author of the content or notice is mentioned.		.503
I look at whether the website or medium is well-known.		.772
I check that the website address is reliable.		.608
When it is a video, I check who made it.		.569
I look at whether the information is recent.		.507
I check whether the photo matches the rest of the content.		.607
I try to contact the author or find more information about him/her.		.454
I compare the information with other sources.		.609
I only read the headline.*		.389
I need to read the whole news item or content.		.537
I consider whether the information contains data or figures from reliable sources.		.706
I check whether the information is well-presented (no spelling or grammar mistakes, misprints, etc.).		.654
I have doubts about a news item if the headline is excessively dramatic.		.415
I think about whether the content that has reached me bears any relation to reality.		.662
I can easily tell if the news or content is humorous or a joke.		.515
I think about whether the information is trying to influence my emotions (to make me laugh, get angry, feel outrage...).		.624
I analyse whether the content, apart from informing, has another purpose (political, ideological, financial...).		.680
I think about whether the information aims to harm someone or something.		.656
I can easily distinguish between what is information and what is an opinion.		.532
When a piece of information or content is funny, I immediately share it, without checking it.	.655	
If a piece of news makes me feel outraged or angry, I immediately share it, without checking it.	.608	
When I receive a piece of news that makes me happy, I share it quickly, without checking it.	.778	
When I share content, it is just to amuse myself and my friends.	.671	
I share news or content mainly to influence the opinion of others.	.620	
If I know that it is false, I share it to warn my contacts.	.454	

Note: * Reversed item

f) Concerning the quality and effectiveness of the estimated factor scores, it can be said that the results were acceptable (Marginal Reliability = .83 and .92 for factors 1 and 2, respectively, >.80). The constructs' replicability was satisfactory and, additionally, the "Expected Percentage of True Differences" index (EPTD; Ferrando et al., 2019) also presented acceptable values, with cut-off points of ≥90% (see Table 3); which indicates that the factor scores obtained may be used to evaluate people in an individual, differentiated or organised way.

TABLE 3. EFA indices, overall and by factors.

	Overall indices			Indices by factors						
		Closeness to unidimensionality			Correlations between factors		Construct replicability		Estimated factor scores	
Model	GFI	Unique	ECV		1	2	H-Latent	H-Observed	Marginal reliability	EPTD
2 factors	.965	.819	.755	F1	--	--	.827	.823	.827	89.6 %
				F2	.381		.918	.898	.918	93.4 %

Note: GFI: Goodness of Fit Index; ECV: Explained Common Variance; S: Bentler's simplicity index; L: Loading simplicity index; EPTD: Expected percentage of true differences.

Subsequently, we tested the factorial structure derived from the EFA (two-factor model with 25 items) by means of CFA, using "Weighted Least Square Mean and Variance" (WLSMV) as the estimation method. To evaluate the model fit, we analysed the Root Mean Square Error of Approximation" (RMSEA) and "Root Mean Square of Residuals" (RMSR) indices, which presented optimal values below .08 (Hooper et al., 2008), as well as the "Comparative Fit Index" (CFI) and the "Tucker and Lewis Index" (TLI), which are considered acceptable from .90 o .95 (Hooper et al., 2008). The model presented an acceptable fit, but two indices remained below the cut-off point (RMSEA = .068, 90% CI = .059–.077; CFI = .89; TLI = .88; SRMR= .072). The Modification indices (MI) provided information regarding a correlation that was likely to be included in the model (MI = 27.86) between item 20 ("If the information is funny, I share it immediately without checking it") and 22 ("If the information makes me happy, I share it quickly without checking it") in factor 2.

The model, including this parameter, improved slightly, to the extent that all the indices were above the cut-off point (RMSEA = .065, 90% CI = .057–.074; CFI = .90; TLI = .90; SRMR= .069). All the parameters were statistically significant (p <.05). Factor 1 presented factor

loadings which ranged from .26 (item 9) to .71 (item 14) ($M = .56$, $SD = .05$). The factor loadings in factor 2 ranged from .47 (item 21) to .67 (item 24) ($M = .58$, $SD = .07$). Additionally, the residual variances ranged from .50 to .94 and the proportion of explained variance for the items varied from .07 to .50. The correlation between both factors was .35, and the parameter that was included with the correlation between the errors in items 20 and 22 was .38.

Graph 1 shows the model, which reports the standardised and residual factor loadings, as well as the covariance between the latent variables.

GRAPH 1. Diagram of the resulting CFA. Standardised factor weightings, standardised errors in the items and covariance between factors.
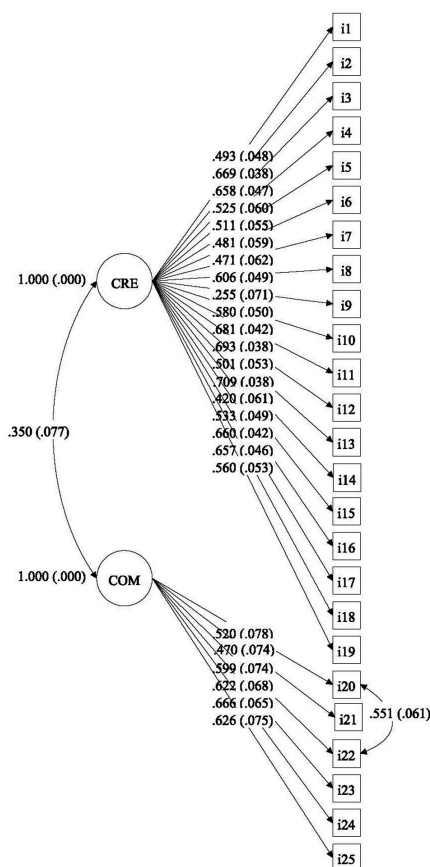
The reliability of the resulting factors was analysed using the Omega coefficient (ω), with satisfactory results (F1: $\omega = .88$, IC = .86–.91; F2: $\omega = .73$, CI = .69–.79), greater than .70 (Dunn et al., 2013); likewise, the item-total correlation was acceptable ($> .30$), ranging from .23 to .62 for factor 1 and from .39 to .60 for factor 2.

Furthermore, in line with the opinion of Fornell-Larcker (Fornell & Larcker, 1981) it can be stated that the scale has accept-

able convergent and discriminant validity (see Table 4). With reference to the former: a) the value of the "Average Extracted Variance" (AVE) stood at over .50 for both dimensions; b) the "Composite Reliability" index (CR) was greater than the AVE. As for the discriminant validity: a) the correlation between the factors was acceptable (r = .35 <.85), and b) the square root of the AVE (CV) for each construct was greater than the correlation between the constructs (r = .35, <.87 for F1, .72 for F2); and the AVE value for each dimension was greater than the squared correlation of the dimensions.

TABLE 4. Reliability, evidence of convergent and discriminant validity.

Construct	Reliability		AVE	Correlations between factors		Convergent validity	Discriminant validity
	ω	CV		1	2		
Credibility	.88	.87	.75	**.87**	.12	Yes	Yes
Sharing	.73	.72	.52	.35	**.72**	Yes	Yes

Note: ω = Omega; CV = Construct reliability; AVE = Average Variance Explained. Square Root of the AVE (in bold); correlation between the factors (lower diagonal); correlation to the square of the factors (upper diagonal).

Finally, we analysed the relation between the test scores (study variable) and other external variables (Elosúa, 2003) as complementary evidence of convergent and discriminant validity. We used the subscale "displacement of responsibility" from the Moral Disengagement scale by Bandura et al. (1996), and the subscale judgement/critical thinking from "Values in Action for Youth" (Park & Peterson, 2006). Both the dimensions of Credibility (F1) and Sharing (F2) showed a significant correlation with critical thinking (Park & Peterson, 2006). In line with expectations, the more an adolescent checks the credibility of a piece of news, the greater their critical thinking is (r = .45, p <.001); likewise, the more they share, the less critical thinking they demonstrate (r = -.14, p <.005). In terms of the correlation with moral disengagement, no significant association was observed with any of the factors, but if the individual focus is on the mechanisms of moral disengagement, it can be observed that the dimension Sharing (F2) demonstrated a positive correlation with "displacement of responsibility" (r = .14, p <.005) (see Table 5).

To implement the EFA and obtain the different indices involved in its interpretation, the Factor 11.5.1 program was used. The CFA was implemented using the Mplus program. The Omega reliability coefficient was calculated with the Jasp program, and the rest of the analyses were conducted with the SPSS program. A benchmark of ≤.05 for the level of significance was set in all the analyses.

TABLE 5. Validity based on the correlation between variables.

Con-struct	Critical thinking		Moral disengage-ment		Advanta-geous com-parison		Displacement of responsi-bility		Diffusion of responsibility	
	r	p	r	p	r	p	r	p	r	p
Credibility (F1)	.45**	< .001	.02	.668	-.05	.333	-.03	.566	.09	.062
Sharing (F2)	-.14*	< .005	.06	.242	.09	.083	.14*	< .005	-.01	.863

Note: r = Pearson's correlation; p= statistical significance; *significant correlation of <.005; **significant correlation of <.001.

4. Discussion and conclusions

Following the analyses described above, we can state that we have a new and effective tool to observe certain habits regarding consumption of seemingly informative content by adolescents, who are particularly vulnerable to disinformation (Ackland & Gwynn, 2020; Corbu et al., 2021). With the validation of the Scale for Vulnerability to Disinformation (SVD), we can therefore accept hypothesis H1. By reason of its simplicity and concision, this scale is also useful as an instrument for self-assessment, as well as being an excellent pedagogical tool, both within and outside the classroom. It has 25 items and two factors: giving credibility to an apparent news item or content (F1) and sharing it (F2), two sets of behaviours that therefore require two different coping strategies and interventions.

At the same time, the scale's performance was confirmed in relation to two other variables involved in vulnerability to disinformation: critical thinking and moral disengagement. The former proved to be positively linked to being more careful about giving credibility to content, as well as having a negative connection to the act of sharing. With moral disengagement, and specifically with displacement of moral responsibility, a positive connection appeared with the act of sharing certain content more readily. Therefore, hypotheses H2 and H3 can also be accepted, in line with Guan et al. (2021) and others.

As regards the limitations of this study, firstly it should be noted that, although the psychometric analyses were satisfactory, it would have been advisable to conduct or duplicate the initial pilot with an English sample as well, not only a Spanish one. Along these lines, it would be interesting to perform a second validation of the scale on the Spanish population, and in other languages. Work is already underway on this subject, in the interest of enhancing the universality of the tool.

To sum up, this instrument shows considerable potential for the measurement and (self-) assessment of young people's vulnerability to disinformation, and is extremely useful for the implementation

and assessment of training or literacy programmes to combat disinformation. Needless to say, neither adults nor the elderly are immune from being affected by disinformation, which leads to another future line of research into the validation of this SVD with other age groups. However, it is true that adolescence is a critical stage in many senses. We believe that this is when personality, political and social views, moral values, etc. are shaped; these are key aspects at a stage when, as described in the Media & Information Literacy Curriculum For Educators & Learners (MIL), young people show increasing mistrust of the media, science and institutions and a growing tendency towards hate speech, intolerance and polarisation (Grizzle et al., 2021). We should also bear in mind that they will soon come of age and, among other things, they will be eligible to vote. Therefore, it is not an exaggeration to consider it absolutely crucial, in all democratic societies, to fight the vulnerability to disinformation of the population in general, and specifically young people, as far as possible (Corbu et al., 2021).

The tool proposed in this study represents further progress in this sense and may be a useful instrument in responding to demands such as those outlined by Nieto et al. (2021) who, following research into Information Literacy Skills (ILS) among practising and future teachers of Primary and Lower Secondary Education (Spanish levels EP and ESO), concluded that they have difficulty in performing important information-processing tasks such as the search for and assessment of information, activities which "should

be specifically encouraged" (*Ibidem*, p. 491). This test invites us to conduct this assessment exercise and think about our habits when we access information and it concerns us directly. To some extent, it leads us to face the decisions that we take in relation to what we do with information, such as sharing it or trusting its authenticity.

In view of the foregoing, we can only defend the importance of the role of teachers in the fight against disinformation, as, along with journalists and librarians, "the triad of truth-workers" as recognised by Head and Wihbey (2017), they can contribute to educating citizens — users and consumers of information — to be responsible and critical. Proof of this can be seen in the positive effects on our young people which are beginning to appear after their participation in different teacher-guided activities. Training in media and information literacy affects them positively, and this has been demonstrated by the results of other projects such as the Civic Online Reasoning programme, by the University of Stanford, for the development of critical thinking among students in the United States, or News Wise (United Kingdom), which focuses on training students and teachers to combat disinformation. Research conducted into the benefits of these two initiatives reveals that students improved their skills when faced with vast amounts of information and were able to recognise the different types of deception. Once trained, the students took better decisions regarding the quality of the information to which they were exposed.

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