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Contenido

Editorial

La insoportable levedad metodológica de la psicología

DURANTE LOS últimos años, como parte de la línea editorial de la Revista Colombiana de Psicología, hemos buscado crear un espacio para publicar investigaciones que apuesten por sofisticar la apuesta metodológica de la psicología. Esto ha implicado fundamentalmente dos procesos: primero, rechazar investigaciones que usen metodologías tradicionales pero desactualizadas. Por ejemplo, estandarizaciones de pruebas que usan análisis factoriales exploratorios y alfas de Cronbach, pero no análisis factoriales confirmatorios. Segundo, invitar a los autores a que incorporen en su arsenal metodológico técnicas de crecimiento impacto en otras disciplinas. Estas técnicas son tres: mecanismos de estimación causal como la variable instrumental o la regresión difusa que son hoy en día el estándar en economía y pruebas médicas; técnicas de aprendizaje máquina de creciente uso en estadística y ciencias de la computación; y el desarrollo de modelos matemáticos que, aunque tienen una larga tradición en psicología (e.g., Weber-Fechner, Teoría de Prospecto), han dejado de ser parte de la práctica de la investigación psicológica. A esta lista podríamos agregar múltiples desarrollos que no se han incorporado a la producción académica actual en Latinoamérica, como, por ejemplo, el uso de IRT, DIF o series de tiempo.

Nos ha sorprendido la baja respuesta de parte de la comunidad. Es como si existiera, en gran parte de los investigadores en psicología, la idea de que se puede seguir publicando indefinidamente con técnicas que se desarrollaron décadas o siglos atrás y que nos enseñaron en el pregado. Más aún, hemos observado que en muchos espacios el uso de estas metodologías es percibido como una moda pasajera y que lo que vale la pena es seguir haciendo estudios de grupo tratamiento vs grupo control, y utilizando t's de student y regresiones lineales para los artículos. Lo que es preocupante es que está tendencia es perpetuada por investigadores que se perciben a si mismos como defensores del rigor y de la psicología científica. Y probablemente lo son: defienden la psicología científica que se desarrolló antes de los 70s del siglo pasado y que se enseña aquí a partir de traducciones de libros de texto que se realizaron en los 90s. Si esta tendencia no cambia la psicología va a seguir perdiendo su capacidad de interpelar y dialogar con otras disciplinas de mayor rigor metodológico e impacto social.

Artículos

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Consumer Locus of Control Scale: Validity and Measurement Invariance Evidence in Low and High Socioeconomic Status Groups

Consumer Locus of Control Scale

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SCIENTIFIC RESEARCH ARTICLE

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Consumer Locus of Control Scale: Validity and Measurement Invariance Evidence in Low and High Socioeconomic Status Groups

Abstract

Consumer locus of control is a key factor in purchase decisions, where consumers perceive outcomes as either dependent on or external to their own actions. These beliefs vary among individuals from different socioeconomic backgrounds, except when it comes to consumption. However, the assumption of measurement invariance across all socioeconomic groups has not been proven. To address this, a study was conducted to develop, validate, and test the invariance of the Consumer Locus of Control Scale. The first study (N = 300) involved exploratory factor analysis and reliability testing. The second study (N = 309) examined confirmatory factor analysis, convergent and discriminant validity, and measurement invariance. Results showed high explained variance and internal consistency. The five-factor structure demonstrated a good fit, supporting the scale's structural validity. Furthermore, the scale was invariant between high and low socioeconomic groups. This study provides valuable evidence for the reliability and validity of the Consumer Locus of Control Scale.

Keywords: Consumer behavior, economic psychology, locus of control, measurement invariance, psychometric analysis, socioeconomic status.

Escala de Locus de Control del Consumidor: Evidencias de Validez e Invariancia de Medición en Grupos de Estatus Socioeconómico Bajo y Alto

Resumen

El locus de control del consumidor es un factor clave en las decisiones de compra, donde los consumidores perciben los resultados como dependientes o externos a sus propias acciones. Estas creencias varían entre individuos de diferentes niveles socioeconómicos, excepto cuando se trata del consumo. Sin embargo, la suposición de la invariancia de las medidas en todos los grupos socioeconómicos no ha sido probada. Para abordar esto, se llevó a cabo un estudio para desarrollar, validar y probar la invariancia de la Escala de Locus de Control del Consumidor. El primer estudio (N = 300) involucró un análisis factorial exploratorio y pruebas de confiabilidad. El segundo estudio (N = 309) examinó un análisis factorial confirmatorio, validez convergente y discriminante, y la invariancia de las medidas. Los resultados mostraron una alta variación explicada y consistencia interna. La estructura de cinco factores demostró un buen ajuste, respaldando la validez estructural de la escala. Además, la escala fue invariante entre grupos socioeconómicos altos y bajos. Este estudio proporciona evidencia valiosa para la confiabilidad y validez de la Escala de Locus de Control del Consumidor.

Palabras clave: Análisis psicométrico, comportamiento del consumidor, estatus socioeconómico, invariancia de medición, locus de control, psicología económica.

IMAGINE YOU are in the supermarket and realize that the brand you used to purchase no longer produces your favorite product. Now, you are in front of the shelf, and you find more than 30 different brands of that product. Which one would you choose? More importantly, why would you say you chose it? Is it because everybody else was buying it, because it caught your attention by chance, because the salesperson suggested it to you, or just because of your actions? The variety of these responses may reflect consumers' perceived control beliefs about their purchases, as either contingent upon or external to consumer efforts. To understand how this perceived control interacts with consumer responses, it is important to have evidence regarding reliable and valid ways to assess the construct. When assessing the construct of consumer locus of control, some issues have been observed. Some studies incorporate general measures of the construct when discussing consumer responses (e.g., Cheng et al., 2020). Conversely, others as Busseri et al. (1998) have assessed it with a specific consumer-oriented Locus of Control Scale to evaluate the effect of the construct on consumer behavior. However, although this scale has been widely used, scale consistency and fitness have shown poor psychometric indices in different contexts (see Mansilla Chiguay et al., 2016). Hence, we present the development and evaluation of a novel and culturally oriented scale to examine the individual differences in perceived control beliefs in consumer scenarios.

Locus of control is defined as the learned belief that results are contingent upon actions that individuals perform or are controlled by external forces (Rotter, 1966; Rotter & Mulry, 1965). Originally, the construct was composed of a continuum where, on one hand, the internal locus of control highlights the attributions pertaining to intelligence and identification abilities of the individual as a trigger to obtain results; and on the other hand, the external locus of control refers to attributions derived from fatalism, luck, faith, and powerful others (Rotter & Mulry, 1965). Locus of control is a relevant construct in different disciplines because it has shown predicted evidence with different behaviors. For instance, an internal locus of control enhances trust in crowdfunding (Rodriguez-Ricardo et al., 2019), and the higher the external locus of control, the lower the health insurance literacy (O'Connor & Kabadayi, 2020). In economic preferences and consumer studies locus of control has been one of the most important personality variables (Becker et al., 2012). Internal locus of control has been associated with higher income and financial socioeconomic resources (Perry & Morris, 2005), higher saving behaviors (Cobb-Clark et al., 2016), behavior based on comparisons and planning, cautious and strategic consumer orientations (Busseri et al., 1998), information search behavior (Srinivasan & Tikoo, 1992), green consumption (Cheng et al., 2020), and higher attachment to planned and purposeful purchases, which is in turn reflected in lower spending (Busseri et al., 1998). A higher external locus of control has been linked to higher positive attitudes toward indebtedness (Mansilla Chiguay et al., 2016) and consumer behavior as impulsivity and seeking immediate gratification (Becker et al., 2012).

The main challenge in the study of locus of control is to identify evidence for reliable and valid ways to assess the construct. In the specific field of consumer behavior, locus of control has been proposed to cover what is related to control beliefs concerning consumer experiences and purchase behaviors using the Consumer Locus of Control Scale (Busseri et al., 1998). This scale evaluates internality and externality of control, showing internal consistency indices of .76 to .77 in two subsamples, while jointly explaining 25% of the variance. The scale has been shown to be beneficial in predicting purchase intentions and a better predictor of relevant behaviors than other scales, as measurements of economic locus of control (Furnham, 1986) and general locus of control (Rotter, 1966). Hence, evidence has been provided to support specificity as an improved alternative

to measurements as suggested by Georgiou and Bradley (1992). The problem arises when the measurement is used in regions or cultures other than those for which they were created. The proof of this problem was found when psychometric properties of the Spanish-translated version of the Consumer Locus of Control Scale created by Busseri et al. (1998) were assessed when applied in a different cultural context than intended (Mansilla Chiguay et al., 2016). It showed neither optimal fit indices in the confirmatory factor analysis (CFA), nor an alternative structure using exploratory factor analysis (EFA). Due to the lack of evidence on adequate psychometric properties, it may be preferable to identify a new way to assess the consumer locus of control construct. An alternative may be to understand the way in which the construct, in general terms, has been identified in the target population.

Although the construct of locus of control was first proposed as having a bipolar dimensional form of internality–externality (Rotter, 1966), this does not seem to adequately distinguish elements that have been shown and conceptualized differently. Evidence has been provided for the construct's multidimensionality (Levenson, 1974) by separating fatalism and powerful others into different dimensions, eventually achieving a clearer understanding of the phenomenon. This has served as a basis to explore dimensions that are as exclusive as possible, ensuring better consistency and a better explanation of the construct. Recent studies have reinforced the multidimensionality of constructs. For instance, for the locus of control of athletes' eating behaviors, primary group influences (i.e., parents and family), and secondary group influences (i.e., friends) have been identified as subscales (Paquet et al., 2016).

A key element that stands out in the study of locus of control is the recognition of idiosyncratic elements permeating the environment. Elements are influenced by the characteristics of inhabitants when elaborating an adequate measure of the construct. For example, in collectivistic cultures like Mexico, harmonious and affective relationships are prioritized more than personal achievement and development (Soler-Anguiano & Díaz-Loving, 2017). Against this cultural background, a dimension named affective locus of control was found (Díaz-Loving & Andrade-Palos, 1984) which was not previously reported. Affective locus of control refers to situations in which individuals modify their environment through affective relationships. Therefore, this dimension provides an understanding of the harmony dynamics among members of determined groups.

Having recognized a new element in the construct, La Rosa (1986) explored locus of control in the Mexican context to identify evidence of new idiosyncratic dimensions. The results of his study converged with the dimension of internality proposed by Rotter (1966), with the segmentation of external elements of fatalism and powerful others (Levenson, 1974), and with that referring to affective control (Díaz-Loving & Andrade-Palos, 1984). Given the foregoing, La Rosa's (1986) locus of control scale was shown to have more conceptual clarity, better structural configuration, and acceptable psychometric properties. This was reflected in an explained variance of 46% and the internal consistency of its five dimensions ranging from .78 to .89. These dimensions seem to remain a common denominator in studies with Mexican populations on locus of control measurements, such as those related to subjective well-being (Velasco Matus et al., 2015), and partner choice (Padilla-Bautista et al., 2018).

Thus, it may be suggested that scales need to be culture-specific, as a single construct may be understood differently in different cultures. It may be useful to step back to explore the construct or adapt it from those measures that have shown more accuracy on target populations, as this could help to better explain the phenomena in the places where they are developed. In this regard, the present study proposes the development of an idiosyncratic measure of locus of control based on a general instrument created in Mexico (La Rosa, 1986) and

uses the conceptual definitions to develop a scale that is specific to consumer domains.

Study 1

In the first study, we created items and assessed evidence of their validity and internal consistency.

Method

Participants

The research included 300 employed individuals who earned an income. They were selected using non-random convenience sampling. The age range of the participants was from 18 to 66 years (M = 33.66, SD = 11.33). Women and men constituted 56.6%, and 43.4% of the sample, respectively. Fifty-one percent of the participants had completed university studies, 39.9% had completed high school studies, 9.4% had completed elementary and secondary studies, and the rest had completed postgraduate studies. All participants provided verbal and written informed consent and voluntarily agreed to participate.

Instruments

Based on how La Rosa (1986) approached the locus of control construct, 30 items were created that focused on consumer behaviors. In the existing scale by La Rosa (1986), 46% of the variance was explained. La Rosa's scale has the following dimensions: 1) Internal/instrumental (α = .82), which refers to the perception of control that individuals have according to their effort, work, and capacities (e.g., *my future depends on my actions*); 2) Affective (α = .83), which refers to the perception of control according to individuals' affective relationships with others (e.g., *if my boss likes me, I can get better positions at my job*); 3) Fatalism/luck (α = .89), which refers to beliefs about an orderly world, where reinforcers depend on random factors as luck and destiny (e.g., a good job is a matter of luck); 4) Macrocosm powerful (α = .87), which refers to entities who have the power to control, are distant from the person, and have an impact on their lives (e.g., *the problem of pollution is in the hands of the government and what I do does not change anything*); and 5) Microcosm powerful (α = .78), referring to people who have power and are close to the individual, as an employer, mother, or father (e.g., *success at work will depend on the people who are above me*).

All the items were reviewed, evaluated, and, where appropriate, improved upon by three judges who were experts in psychometrics. Items that were judged by the experts as displaying poor or ambiguous content validity were removed. Once the item pool was formed, a pilot study was conducted with 20 people to identify and make additional adjustments to the items. The response format was based on a seven-point Likert-type scale (1 = totally disagree to 7 = totally agree). Additionally, a sociodemographic section was included where the participants were asked about their age, gender, and place of residence.

Procedure

Data were collected from public places (e.g., streets, public squares), homes, and universities. Individuals were informed that the survey was intended to further the scientific understanding of daily economic exchanges. Before starting the survey, informed consent was obtained from the participants, indicating that they had read and understood the explanations and were voluntarily participating in the study. In addition, participants were informed that their data would be kept anonymous and confidential. The study and consent procedures were performed in accordance with the ethical standards of the Declaration of Helsinki (1964).

Data Analysis

Data were analyzed using IBM SPSS version 25 ® (IBM Corp., 2017). First, the distribution and high-low discrimination of the data were assessed through descriptive statistics of each item and independent-samples t-tests. Next, construct validity and internal consistency were assessed using EFA and Cronbach's alpha.

Results

Descriptive Statistics and Item Discrimination

Skewness indices were assessed for each item, with scores ranging from -1.13 to 1.34, all within the acceptable range. The kurtosis indicators ranged between -0.97 to 1.87. Item LC9 was removed from future analyses due to the index not falling within the acceptable range. Subsequently, the total score of the scale was obtained by identifying quartiles to create a new variable that divided the high and low scores. Once the variable was created, the discrimination of the items was analyzed. Under this criterion, items LC10 and LC19 did not discriminate; as a result, these items were eliminated from future analyses. The remaining items showed statistically significant differences: item LC9 at $p < .05$ and the rest at $p < .001$.

Exploratory Factor Analysis

To obtain construct validity evidence, an EFA was performed with the maximum likelihood extraction method and varimax orthogonal rotation without forcing a determined number of factors. Items with factorial weights lower than .40 or factorial weights in two or more factors with differences of .20 were eliminated. A five-factor composition with eigenvalues greater than 1 explained 60.64% of the total variance (Table 1). The factorial solution converged in six iterations, showing an adequate Kaiser–Meyer–Olkin coefficient of .845: Bartlett = 1852.41 ($df = 171$), $p < .001$. Cronbach's alpha coefficients indicated satisfactory internal consistency, and the correlations between factors also showed low to moderate coefficients (see Table 1).

Table 1

Subscales, Factor Loadings, Internal Consistency Indices, Inter-factor Correlations, and Descriptive Statistics of Consumer Locus of Control Scale

Items	Divinity	Social	Situational	Internal	Affective
LC26 The purchases I make are because God wants it that way	.877	.049	-.096	-.002	-.034
LC22 Only God knows what awaits me when making my purchases	.772	.002	.005	.050	.048
LC24 God only knows what awaits me on offers	.718	-.085	.115	-.025	.033
LC6 I prefer to purchase what family and friends suggest to me	-.047	.745	-.048	-.019	.053
LC5 The opinion of relatives guides my purchases	.070	.694	-.136	.177	-.032
LC7 I choose the products I purchase because others use them	.022	.525	.037	-.084	.104
LC3 I purchase only if a loved one is with me	-.053	.502	.118	-.038	.033
LC20 I have purchased products that I have found by chance	-.171	-.099	.648	.075	.012
LC11 The things I have bought have been because fate has put them in my way	.143	.115	.611	-.043	-.068
LC15 I am predestined to purchase certain products	.105	-.110	.594	.043	-.027
LC17 My purchases depend on my luck	.224	.034	.587	-.041	.076
LC4 Buying is the result of finding the products by accident	-.053	.297	.512	.009	-.062
LC27 My abilities determine the results when making my purchases	.111	-.004	-.082	.782	-.117
LC29 My purchases depend on my skills	.079	-.029	-.044	.588	.128
LC14 My purchases are determined by my actions	-.117	.164	.162	.489	-.100
LC21 I influence the results I have when buying	-.146	-.118	.228	.448	.227
LC18 Buying is the result of treating sellers well	-.003	.058	-.019	.104	.646
LC12 Flirting with the seller helps you get better prices when buying	-.005	.212	-.091	-.073	.608
LC16 Getting sad in front of the seller helps to get better prices	.078	-.008	.060	-.026	.606

Items		Divinity	Social	Situational	Internal	Affective
	Total					
Items number	19	3	4	5	4	3
% Explained variance	60.64	28.77	10.35	8.99	7.20	5.31
Cronbach's alpha	.84	.83	.72	.75	.68	.70
inter-factor correlations		Divinity	Social	Situational	Internal	Affective
Social		.30**	1			
Situational		.47**	.37**	1		
Internal		.17**	.13**	.28**	1	
Affective		.43**	.49*	.46**	.26**	1
Mean (theoretical mean = 3.5)		2.16	2.72	3.01	4.22	2.42
Standard deviation		1.25	1.10	1.08	1.17	1.19

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

The associations between factors showed low coefficients among the internal locus of control with the rest of the factors. In contrast, affective, divinity, social, and situational locus of control showed medium association coefficients.

Study 2

CFA was performed to assess the measurement model proposed in study 1.

Method

Participants

A total of 309 gainfully employed people participated in the study. They were recruited using non-random convenience sampling (Table 2). All participants provided verbal and written informed consent and voluntarily agreed to participate.

Table 2

Demographic and Socioeconomic Characteristics of the Study 2 Sample

Variables		Total N = 309 %
Sex		
	Women	46.3
	Men	53.7
Educational level		
	Postgraduate	6.8
	University	61.5
	High school	24.9
	Elementary and secondary	6.2
	No studies	0.6

Variables		Total N = 309 %
Socioeconomic status		
High		67
	A/B	43.7
	C+	23.3
Low		33
	C	20.1
	C-	8.7
	D+	2.9
	D	1.3
		M **SD**
Age		32.95 13.55

Instruments

The scale used was designed by the authors of this study. It has 19 items divided into five factors with a seven-point Likert-type scale response format (1 = totally disagree to 7 = totally agree).

The Socioeconomic Level Questionnaire was assessed and classified according to the criteria established by the Mexican Association of Market Research Agencies (AMAI in Spanish) (AMAI, 2020). The questionnaire measures and classifies Mexican households based on their ability to meet members' needs. It comprises six questions, as the highest academic degree attained by the parents and number of rooms and bathrooms. Individuals who have undertaken professional studies, invest the most in education, and spend the least on food are categorized as A/B. Level C+ includes households that have at least one vehicle and Internet access, and dedicate a higher proportion of their income to food and transport. Level C includes households whose members have completed more than an elementary education and who spend less on education. Level C- is formed by households with little Internet access and that dedicate approximately half of their income to food, transportation, and communication. Level D+ includes households with almost no Internet access and less than half of their income earmarked for food. Households categorized at Level D are those wherein less than half of the members have completed elementary education. Level E has households with almost zero Internet access at home and that spend just over half of their income on food. Additionally, a sociodemographic data section was included where the participants were asked about their age, gender, and place of residence.

Procedure

Data were collected from public places, homes, and universities. Individuals were informed that the survey was intended to further the scientific understanding of daily economic exchanges. Before starting the survey, informed consent was obtained from the participants, indicating that they had read and understood the explanations and were voluntarily participating in the study. In addition, participants were informed that their data would be kept anonymous and confidential. The study and consent procedures were performed in accordance with the ethical standards of the Declaration of Helsinki (1964).

Data Analysis

Data were analyzed using AMOS version 24® (Arbuckle, 2016) and IBM SPSS version 25 (IBM Corp., 2017). First, CFA with maximum likelihood estimation was used to assess the model fit of the five-factor structure, theoretical one-factor structure (Rotter, 1966), and theoretical two-factor structure (Levenson, 1974) for the Consumer Locus of Control Scale. The following model fit indices were assessed in the present study: the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA) and its 90% confidence intervals, and the standardized root mean square residual (SRMR). CFI and TLI values above .95 are commonly interpreted to indicate excellent model fit, whereas values in the range of .90 to .95 indicate acceptable fit. SRMR values close to .8, and RMSEA values close to .6 represent excellent fit (Hu and Bentler, 1999; van de Schoot et al., 2012). Results of the chi-square test ($\chi 2$) were also reported; however, the chi-square test statistic can be considered unreliable in the context of larger sample sizes (Byrne, 2001).

To assess reliability, and convergent and discriminant validity, the composite reliability (CR), maximal reliability (MaxR(H)), average variance extracted (AVE), and square root of average AVE were used. CR and MaxR(H) values above .70 were used given that they are commonly interpreted as indicating good reliability. AVE values above .50 are interpreted as having a good value; however, this ave index has been identified as a strict criterion (Henseler et al., 2015; Malhotra and Dash, 2011).

Socioeconomic characteristics, as income and financial resources, have shown a significant effect on locus of control (Perry & Morris, 2005), and high socioeconomic status has been predicted to

lead to higher levels of internal locus of control than low socioeconomic status. To evaluate these differences, two groups were created in this study based on their socioeconomic status. One group was created by clustering participants belonging to the A/B and C+ socioeconomic levels representing high socioeconomic status. Another group was created by clustering participants belonging to the C, C-, D+, and D socioeconomic levels, which represent low socioeconomic status. These low and high clusters were assigned as proposed by the AMAI (2020). Before evaluating the comparison, measurement invariance across socioeconomic groups was assessed. Invariance was tested at configural (same structure across groups), metric (same factor loadings across groups), and scalar levels (same item intercepts across groups). These models were compared using $\Delta\chi 2$, Δdf, ΔCFI, $\Delta RMSEA$, and $\Delta srmr$. Based on van de Schoot et al. (2012), $\Delta\chi 2$ must be statistically insignificant to show invariance. Similarly, when the sample size is ≤ 300 or when sample sizes are unequal, a change of ≤ .005 in CFI, supplemented by a change of ≤ .010 in RMSEA or a change of ≤ .025 in SRMR indicates invariance (Chen, 2007).

Results

Confirmatory Factor Analysis

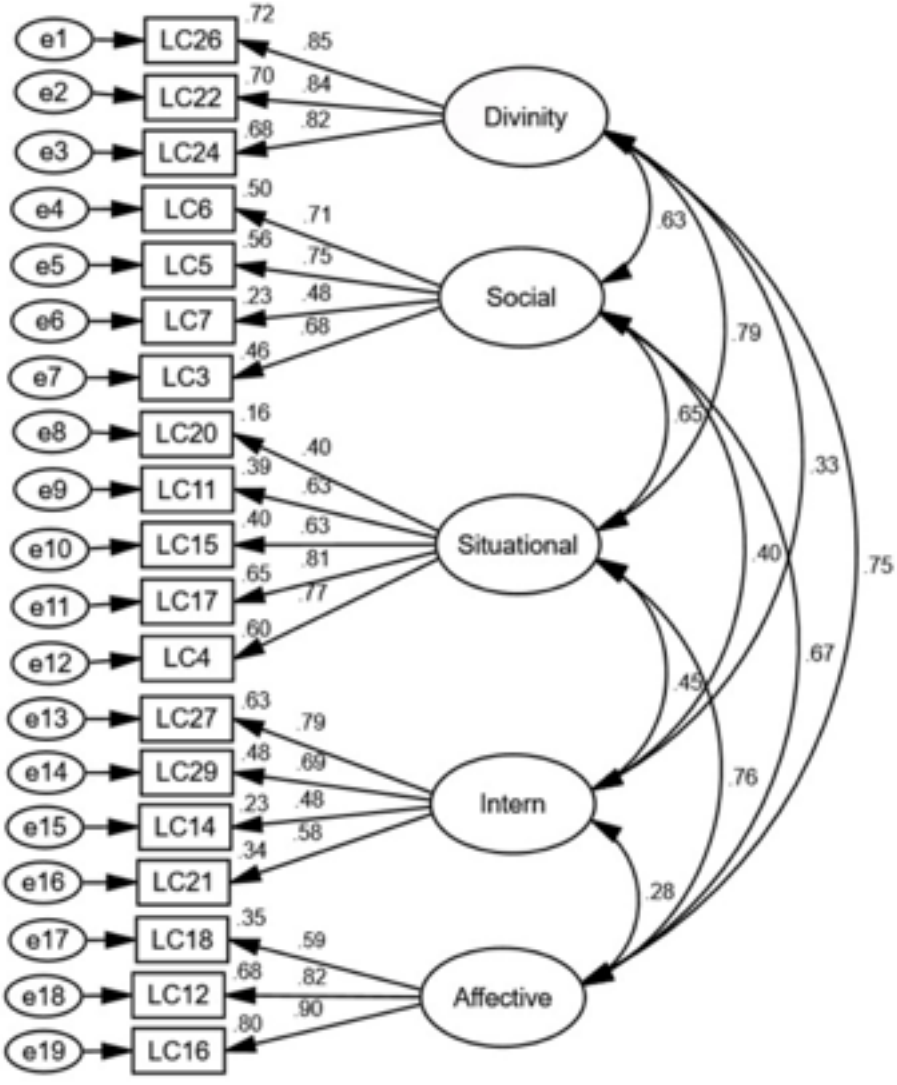
The locus of control construct has been identified as having different structures, as a unidimensional internal–external structure proposed by Rotter (1966) and found for the Consumer Locus of Control Scale when used in a Canadian population (Busseri et al., 1998). In addition, other studies have identified internality and externality as different dimensions, along with diverse models that include various external factors (e.g., Levenson, 1974; Paquet et al., 2016). Accordingly, to assess the best structure, the model fit of the five-factor structure identified in the present study was compared with that of unidimensional and two-factor models previously reported. First, structural validity evidence of the five-factor Consumer Locus of Control Scale through model fit was assessed using CFA (Fig. 1). Then, to identify the best factor structure of the construct, two different models were tested for the best goodness-of-fit index values. First, a two-factor model was established in which items belonging to the divinity, situational, social, and affective factors were grouped in one dimension, while internal factors were set alone. In contrast, a one-factor model was established in which all items were grouped in one dimension. The model fit of the three models highlighted that the five-factor structure of the Consumer Locus of Control Scale was the only one that showed a good fit with the data (see Table 3). These results provide structural validity evidence for the consumer locus of control construct's multidimensionality.

Table 3

Model Fit for Unidimensional, Two-Factor, and Five-Factor Structure Confirmatory Factor Analysis of the Consumer Locus of Control Scale

Model	$\chi 2$	CFI	TLI	RMSEA (90% CI)	SRMR
Unidimensional	756.60	.755	.725	.114 (.106 - .122)	.088.
Two-factor	557.16	.836	.814	.093 (.085 - .102)	.068.
Five-factor	271.90	.947	.937	.054 (.045 - .064)	.055

Figure 1
Confirmatory Factor Analysis of the Consumer Locus of Control Scale



Convergent and Discriminant Validity Evidence

Reliability and convergent and discriminant validity were assessed based on CR, MaxR(H), AVE, and the square root of AVE (Table 4). All scales showed adequate reliability. Regarding convergent validity, AVE values of the social, situational, and internal dimensions showed low values; however, it has been suggested that ave is a strict criterion, and therefore, CR values are enough to confirm the evidence of convergent validity (Malhotra & Dash, 2011). The scale was also found to have good discriminant validity because the square root of AVE was higher than the correlations of the dimensions (Hair et al., 2018).

Table 4
Reliability, Convergent and Discriminant Validity Evidence of the Consumer Locus of Control Scale

	CR	AVE	MaxR(H)	Affective	Divinity	Social	Situational	Internal
Affective	.82	.60	.87	.78				
Divinity	.87	.69	.87	.76*	.83			
Social	.75	.43	.77	.66*	.63*	.66		
Situational	.79	.44	.83	.75*	.79*	.65*	.66	
Internal	.73	.41	.77	.28*	.32*	.39*	.44*	.64

a Values in the diagonal represent the square root of ave

*p < .001

Measurement Invariance by Socioeconomic Status

The measurement model was assessed based on socioeconomic invariance. For this, the configural, metric, scalar, and residual invariance were evaluated using multigroup modeling (Table 5). In accordance with these results, it may be said that socioeconomic status-based differences that will be detected using the scores obtained from the measurement tool are not detected by any defect in the measurement. From this procedure, configural, metric, and scalar invariance are ensured, but not residual invariance. Overall, strong invariance indicators were determined according to Widaman and Reise (1997).

Table 5
Testing for Factorial Invariance Across Socioeconomic Status Groups

Model	χ2	df	CFI	RMSEA (90% IC)	SRMR	Model Comparison	Δχ2	Δdf	ΔCFI	ΔRMSEA	ΔSRMR
(M0)	476.93**	284	.925	.047 (.040 - .054)	.088						
(M1)	495.98**	298	.923	047 (.039 - .054)	.088	M0 – M1	19.35	14	.002	.000	.000
(M2)	539.44**	332	.919	.045 (.038 - .052)	.093	M1 – M2	43.46	34	.004	.002	.005
(M3)	584.09**	351	.909	047 (.040 - .053)	.095	M2 – M3	44.64*	19	.010	.002	.002

a M0 = configural, bM1 = metric, cM2 = scalar, dM3 = residual.

* p < .05, ** p < .001

In the present study, comparisons of consumer locus of control were examined in terms of low and high socioeconomic status. To assure the assumptions, first, we assessed the skewness and kurtosis Z-values (Cramer 1998; Cramer & Howitt 2004; Doane & Seward 2011), and a visual inspection of their histograms, normal Q-Q plots, and box plots showed that the dimensions of the locus of control scale were normally distributed for the low and high socioeconomic status groups. The divinity dimension showed Zskewness = 1.435 and Zkurtosis = 1.219 for low socioeconomic status group, and Zskewness = 1.579 and Zkurtosis = 1.820 for high socioeconomic status group, The social dimension showed Zskewness = 0.845 and Zkurtosis = 0.393 for low socioeconomic status

group, and Zskewness = 0.759 and Zkurtosis = 0.570 for high socioeconomic status group, The situational dimension showed Zskewness = 0.527 and Zkurtosis = -0.240 for low socioeconomic status group, and Zskewness = 0.616 and Zkurtosis = 0.063 for high socioeconomic status group, The internal dimension showed Zskewness = 0.092 and Zkurtosis = -0.533 for low socioeconomic status group, and Zskewness = 0.040 and Zkurtosis = -0.433 for high socioeconomic status group, and the affective dimension showed Zskewness = 1.384 and Zkurtosis = 1.668 for low socioeconomic status group, and Zskewness = 1.428 and Zkurtosis = 1.780 for high socioeconomic status group.

A marginal difference was found in terms of internal locus of control, where the high socioeconomic status group demonstrated a higher internal locus of control compared with the low socioeconomic status group (Table 6).

Table 6
Comparison of consumer locus of control between low and high socioeconomic status groups

	Socioeconomic status				Confidence Interval 95%			
	Low		High					
	M	*SD*	*M*	*SD*		t (gl)	d	1 – β
Divinity	2.12	1.61	2.02	1.50	[-0.26, 0.47]	0.554(307)	0.06	0.63
Social	2.42	1.28	2.47	1.17	[-0.34, 0.23]	-0.369(307)	0.04	0.72
Situational	2.86	1.34	2.90	1.35	[-0.35, 0.28]	-0.220(307)	0.02	0.82
Internal	3.69	1.49	4.01	1.46	[-0.66, 0.03]	-1.740(307)*	0.21	0.51
Affective	2.12	1.34	2.03	1.32	[-0.22, 0.41]	0.580(307)	0.06	0.61

* p = .081

General discussion

The present study aimed to create a Consumer Locus of Control Scale and assess its psychometric properties from a culturally oriented perspective. The Consumer Locus of Control Scale presents a conceptually coherent and theoretically sound construct, highlighting validity and reliability evidence. The consumer locus of control construct shows conceptual correspondence with the existence of beliefs that guide and determine the attribution of the results that individuals obtain, in line with the conceptualization originally proposed by Rotter (1966). The factorial composition of the Consumer Locus of Control Scale is in line with that previously identified by Levenson (1974), according to dimensions adjacent to external control. In addition, the factorial configuration for the consumer locus of control in this study has supported the structural configuration found by La Rosa (1986) previously in a Mexican population. Further, congruence of the locus of control construct with the specific measurement in purchasing scenarios was identified providing evidence of the improvement in the measurement when it is adapted to the behavior or objective variable (Busseri et al., 1998; Georgiou & Bradley, 1992).

The factors identified in this scale provide an understanding of control beliefs that guide individuals' purchase behaviors. The first factor, divinity locus, refers to entities farthest from the individual that control individuals' purchases. The second factor, called social locus, refers to beliefs about groups and people close to the decision-maker who control the way of making purchases, as relatives, friends, and loved ones. In the third factor, situational locus, the elements of chance and situations are attributed as resources of control. The fourth factor, called internal locus, reflects

attributions that an individual's abilities, intelligence, performance, and actions are determinants of the results at the time of purchase. Finally, the fifth factor, affective locus, corresponds to an evocation of affections toward others to obtain desired results, whether they are better prices or products. These dimensions follow the line of findings identified in studies of locus of control in the general Mexican population (La Rosa, 1986), children (Díaz-Loving & Andrade-Palos, 1984), and even in measurements in specific scenarios, as the choice of a partner (Padilla-Bautista et al., 2018). Specifically, cultural patterns can be seen in the consumer locus of control construct composition with the affective locus of control, an idiosyncratic dimension found in the locus of control assessment in Mexican children (Díaz-Loving & Andrade-Palos, 1984), and not previously found when exploring the construct in another contexts. The affective dimension seems to be explained and formed by sociocultural elements of the population, which in this case are collectivistic cultures like Mexico, where harmonious and affective goals are prioritized (Soler-Anguiano & Díaz-Loving, 2017).

Although the previously developed measurement of consumer locus of control has been shown to have adequate psychometric properties (see Busseri et al., 1998), its stability and psychometric properties are distorted when it is translated for Spanish-speaking regions (see Mansilla Chiguay et al., 2016). These results seem to suggest that cultural aspects can be involved in understanding the construct and shaping behaviors in certain regions. The Consumer Locus of Control Scale developed in the present study provides evidence that the cross-cultural adequation of the construct is more useful for identifying elements belonging to the construct.

Even though assessments of locus of control have shown different structures across time, multidimensionality appears to be consistent in recent studies (e.g., Paquet et al., 2016; Velasco Matus et al., 2015). In the present study, the CFA showed a particularly better fit of the five-factor structure over the two-factor and unidimensional structures previously proposed. These results are in line with a multidimensional perspective when measuring constructs (see La Rosa, 1986; Levenson, 1974). The Consumer Locus of Control Scale showed minor concerns when displaying convergent validity evidence. The AVE for the social, situational, and intern dimensions did not meet the strict criterion of convergent validity evidence, but previous literature suggests relying on other indices to ensure evidence of convergent validity, as proposed by Malhotra and Dash (2011). The discriminant validity was fully satisfied.

Most of the consumer responses have been associated with people`s financial resources. Socioeconomic status is an index that can help to understand consumers' income and financial resources. Due to the variety of said resources in consumers, it is important to assess the applicability of the consumer locus of control construct with people from different socioeconomic backgrounds. The developed Consumer Locus of Control Scale has been shown to be invariant by socioeconomic status. In other words, participants from low and high socioeconomic status groups in the present study perceived the consumer locus of the control construct similarly. With this, differences in factor scores could not be attributed to differences in understanding the construct. The invariant property of the scale allowed us to compare socioeconomic status; as a result, the internal consumer locus of control showed a marginal difference between socioeconomic status groups. Participants with high socioeconomic status scored higher in the internal locus of control compared to those with low socioeconomic status, coinciding with previous research (e.g., Perry & Morris, 2005). In this way, the identified differences can be read upon the environment-dependent and learned belief of control. An environment of low socioeconomic status could be perceived as an uncontrollable event producing a generalized feeling of helplessness translating into a lack of control. This hypothesis is based on the perception of uncontrollability or

external controllability to explain inescapability or learned helplessness (Hiroto, 1974; Miller & Seligman, 1975). This perception of controllability has been identified as a key element in consumer responses, as intentions to purchase green products (Sandoval-Díaz & Neumann, 2023). In this way, noncontingent reinforcement generates a perception that events are uncontrollable or are not initiated by instrumental responses.

The results of the present study might contribute to cultural sensitivity when creating psychometric scales. It is important to prove the hypothesis that cultural factors can permeate differences while understanding and presenting the construct. With this, future studies are needed to assess consumer locus of control in different cultures to identify those idiosyncratic and universal elements that increase understanding of consumers' control beliefs.

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Exploring Implicit and Explicit Affective Responses to Graphic Health Warnings on Cigarette Packages in Colombia

Implicit and Explicit Reactions to Tobacco Warnings

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SCIENTIFIC RESEARCH ARTICLE

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Exploring Implicit and Explicit Affective Responses to Graphic Health Warnings on Cigarette Packages in Colombia

Abstract

Graphic health warnings (GHWs) on tobacco products are a critical and cost-effective strategy for conveying the risks of smoking, particularly effective in eliciting negative emotional responses. GHWs promote intentions to quit among smokers and prevent smoking initiation among nonsmokers. In three experiments, we studied how smokers and nonsmokers differ in implicit and explicit measures of emotional reactions towards GHWs. Experiment 1 used the Self-Assessment Manikin to measure explicit emotional (arousal and valence) ratings for six warnings published on tobacco products. Experiment 2 was similar to Experiment 1 but had smokers and nonsmokers rate a new set of 36 GHWs not yet published. Experiment 3 used an implicit task, the Affect Misattribution Procedure, to evaluate and compare the affective responses to GHWs between smokers and nonsmokers. Experiments 1 and 2 showed that smokers explicitly reported weaker negative emotional reactions to both familiar and unfamiliar GHWs compared to nonsmokers. Experiment 3 showed similar levels of negative implicit emotional responses among smokers and nonsmokers. Our data suggest that the decreased affective response involves higher-order cognitive elaboration and evaluations of the messages conveyed by GHWs, while early negative emotions triggered by the graphic component of the warnings similarly affect smokers and nonsmokers. We propose that implicit measures may serve as additional and inexpensive tools for dissociating explicit biased affective responses of smokers towards GHWs from automatic emotional responses. In particular, the affect misattribution procedure may help to design warnings that communicate the risks of smoking while prevent adverse outcomes such as cognitive dissonance.

Keywords: Cognitive and affective processing, emotional reactions to smoking, graphic health warnings (GHWs), implicit affective response, smoking cessation, tobacco control policy.

Explorando las Respuestas Afectivas Implícitas y Explícitas ante las Advertencias Sanitarias Gráficas en Paquetes de Cigarrillos en Colombia

Resumen

Las advertencias sanitarias gráficas (ASG) en los productos de tabaco constituyen una estrategia clave y eficaz en términos de costos para transmitir los riesgos asociados al consumo de tabaco, en particular cuando provocan reacciones emocionales adversas. Las ASG fomentan la intención de dejar de fumar entre los fumadores y previenen el inicio del hábito en los no fumadores. En tres experimentos estudiamos cómo difieren los fumadores y no fumadores en medidas implícitas y explícitas de reacciones emocionales hacia las ASG. El Experimento 1 utilizó el Maniquí de Autoevaluación (Self-Assessment Manikin) para medir las valoraciones emocionales explícitas (activación y valencia) de seis advertencias publicadas en productos de tabaco. El Experimento 2 fue similar al Experimento 1, pero los fumadores y no fumadores valoraron un nuevo conjunto de 36 ASG aún no publicadas. El Experimento 3 utilizó una tarea implícita, el Procedimiento de Atribución Errónea del Afecto, para evaluar y comparar las respuestas afectivas a las ASG proporcionadas por fumadores y no fumadores. Los Experimentos 1 y 2 mostraron que los fumadores informaron explícitamente reacciones emocionales negativas más débiles tanto ante las ASG familiares como ante las no familiares en comparación con los no fumadores. El Experimento 3 mostró niveles similares de respuestas emocionales implícitas negativas entre fumadores y no fumadores. Nuestros datos sugieren que la respuesta afectiva disminuida involucra elaboración y evaluación cognitiva compleja de los mensajes transmitidos por las ASG, mientras que las emociones negativas tempranas desencadenadas por el componente gráfico de las advertencias afectan de manera similar a fumadores y no fumadores. Proponemos que las medidas implícitas pueden servir como herramientas adicionales y económicas para disociar las respuestas afectivas explícitas sesgadas de los fumadores hacia las ASG de las respuestas emocionales automáticas. En particular, el procedimiento de atribución errónea del afecto puede ayudar a diseñar advertencias que comuniquen los riesgos del tabaquismo, previniendo al tiempo efectos adversos como la disonancia cognitiva.

Palabras clave: Advertencias sanitarias gráficas (ASG), cesación del tabaquismo, política de control del tabaco, procesamiento cognitivo y afectivo, reacciones emocionales de fumadores, respuesta afectiva implícita.

Introduction

Tobacco use remains a leading global public health concern, as reported by the World Health Organization (WHO, 2023). In this context, graphic health warnings (GHWs) are recognized as a vital tool in combating the smoking epidemic (Flor et al., 2021). Health warnings effectively help smokers and nonsmokers by increasing quit intentions and preventing smoking initiation (Partos et al., 2013; Hammond et al., 2006). Integral to tobacco control policies, GHWs not only serve as reminders of smoking's harmful effects but also engage individuals through diverse psychological pathways. Our research explores affective responses to GHWs in Colombia, where the warnings cover only 30% of cigarette packages, falling short of the WHO's recommended 50% coverage. We examine how these affective responses differ between smokers and nonsmokers, seeking to identify key gaps and opportunities to enhance the effectiveness and psychological impact of GHWs (Adams et al., 2022).

GHWs facilitate important attitudinal and behavioral outcomes through two related psychological routes. The first is a deliberative, cognitive-controlled route that promotes self-control, warning credibility, and cognitive elaboration (Andrews et al., 2014; Brennan et al., 2016). The second is an affective route, eliciting negative emotions, attracting attention, and enhancing risk perception (Loewenstein et al., 2001). These processes foster people's informed health decisions, with affect serving as a crucial signal for assessing risks, motivating behavior, and prompting careful examination (Peters et al., 2016). Specifically, our research aims to contribute to this understanding by exploring the impact of GHWs on these psychological routes.

Understanding the affective route in health communication, particularly for GHWs, is crucial. Warnings that elicit strong negative emotional reactions are better recalled and can promote long-term awareness of smoking hazards (Wang et al., 2015; Emery et al., 2014; Evans et al., 2016). Emotionally-appealing messages, more than those conveying just rational facts, effectively enhance warning credibility, risk perception, and quit intentions. For example, Noar et al. (2020) demonstrate that pictorial warnings on cigarette packs enhance cognitive elaboration and negative affect more effectively than text-only warnings. Therefore, combining emotional appeal with factual information can maximize GHWs impact (Evans et al., 2015, 2016).

Investigating affective reactions also requires considering multiple response systems, including physiological, neural, subjective, attentional, and cognitive components (Droulers et al., 2017; Green et al., 2016; Stothart et al., 2016; Wang et al., 2015; Scheffels & Lund, 2013; Munafò et al., 2011; Moors et al., 2013). This type of research is essential for understanding the mechanisms behind GHWs' effectiveness, particularly those influencing key outcome behaviors such as quitting smoking or preventing second-hand smoke exposure (Bekalu et al., 2018; Memish et al., 2016; Maynard et al., 2014; Munafò et al., 2011). In this direction, a recent systematic review of longitudinal studies highlighted the significant role of GHWs in enhancing quit intentions and perceived health risks (Pang et al., 2021). This body of evidence underscores the importance of innovative research in diversifying GHW formats and content.

Previous studies, such as the one conducted by Sillero-Rejon et al. (2022) in our lab with a Colombian sample, have also provided valuable insights into reactions to GHWs. This research, using eye-tracking and a discrete choice experiment, explored how cigarette packaging and warning label size influence visual attention and smoking preferences. We found that standardized packaging and larger warning labels significantly heighten visual attention to GHWs and reduce their smoking appeal. These findings, emerging from a local context familiar to our research, underscore the importance of GHW design elements like size and packaging in enhancing their effectiveness.

Interestingly, in line with our previous findings, smokers seem less sensitive to GHWs than nonsmokers. For example, Stothart et al. (2016) used electroencephalography (EEG) to measure the emotional reactions of smokers and nonsmokers to familiar GHWs. They found that smokers had weaker negative emotional responses to the GHWs compared to nonsmokers when measuring *late* positive potentials in the visual cortex. However, the study did not find any differences in attentional reactions between smokers and nonsmokers as measured by *early* positive potentials. This suggests that familiarity may dampen smokers' emotional reactions, a point of particular interest for our present study.

A substantial body of research contrasting text-only warnings with those including images shows that images more effectively elicit affective reactions, while text requires deeper cognitive processing to influence behavior (Borland et al., 2009; Van Dessel et al., 2018; Evans et al., 2016; Smith & De Houwer, 2015). Therefore, in our study we will focus on the immediate emotional impact of this imagery.

Building on the understanding of GHWs' psychological impact, an important area to explore is the difference in explicit and implicit negative affect towards these warnings exhibited by smokers and nonsmokers. This distinction is crucial in gauging the full spectrum of emotional and attitudinal responses. Explicit measures typically involve self-reflective representations and are influenced by conscious deliberation (see, e.g., Parra & Tamayo, 2021). In contrast, implicit measures tap into automatic processes that operate without conscious recognition, capturing spontaneous affective responses. While explicit measures often reflect the individual's self-concept, implicit measures have the unique capacity to assess unconscious affective processing (see, e.g., Greenwald et al. 2002; McClelland, 1988). Understanding the interplay between explicit and implicit responses is essential to comprehensively evaluate the affective processing of health warnings, as both contribute to the overall effectiveness of GHWs in influencing health-related behaviors.

Examining implicit measures can potentially reveal smokers' earlier emotional processing, before familiarity with GHWs has a chance to counteract negative emotions. This insight can help to explain how smokers reduce and bias their subjective emotional reactions to GHWs. Furthermore, it is crucial to study implicit emotional reactions, as implicit information is more likely to be retained longer than explicit information (Mitchell, 2006; Tamayo & Frensch, 2015), potentially leading to more lasting negative beliefs about smoking in the long term.

Previous research has shown that GHWs can increase implicit negative attitudes towards smoking (Macy et al., 2016). However, there is a gap in the literature when it comes to directly measuring implicit affective reactions towards GHWs. Our study aims to fill this gap by using an implicit task in Experiment 3 to measure implicit affective reactions, rather than just implicit attitudes towards smoking. The findings of this research shed light on the processes smokers inadvertently use to disengage from unpleasant GHWs, as illustrated by Sillero-Rejon et al. (2020). Additionally, these findings suggest new methods for designing and evaluating the effectiveness of GHWs, particularly from a tobacco control policy perspective. This opens up future research possibilities to examine how GHWs might influence implicit attitudes over a longer term.

Overview of the Experiments

We present three experiments that compare the emotional reactions of smokers and nonsmokers using explicit and implicit behavioral tasks. Experiment 1 assesses explicit affective responses to familiar health warnings currently published on tobacco products. Experiment 2 assesses explicit affective responses to novel health warnings not currently published. Experiment 3 assesses implicit affective responses to the pictorial component of unpublished health warnings without text. The

broad goal of our research is to compare the affective reactions of smokers and nonsmokers to health warnings. If smokers and nonsmokers differ in their explicit affective reactions to familiar warnings, it suggests habituation and "wear-out" as a possible explanation. However, if smokers display reduced explicit affective reactions to novel warnings, this suggests that additional cognitive processes, such as cognitive dissonance or disengagement from an unpleasant stimulus, may be involved. Implicit measures, which are less susceptible to the cognitive biases explored in Experiments 1 and 2, are used in our last experiment. Here, we examine whether the implicit component of the affective reaction to unfamiliar pictorial elements in the health warnings differs between smokers and nonsmokers.

In Experiments 1 and 2, we used the Self-Assessment Manikin (SAM; Bradley & Lang, 1994) to measure explicit affective reactions. For Experiment 3, we employed the Affect Misattribution Procedure (AMP; Payne et al., 2005) to measure implicit affective reactions. On the one hand, the SAM is a simple method to assess subjective reactions in at least two key dimensions: valence (from unpleasant to pleasant) and arousal (from calm to excited) on a 9-point Likert scale. The SAM has a wide experimental and ecological validity to measure affective responses to GHWs (Droulers et al., 2017) and texts (Warriner et al., 2013). Comparisons with other response systems indicate that the SAM congruently reflects subjective responses to affective stimuli and that it has strong correlations with autonomic and neural markers of affective responses (Balconi et al., 2015; Sequeira et al., 2009).

On the other hand, the AMP is an experimental task designed to measure implicit affective responses (Payne et al., 2005). Typically, participants first see a prime image for a few milliseconds, and then they see a target Chinese character unfamiliar to them. The participant's task is to rate the character as pleasant or unpleasant. This decision is ambiguous, as participants have little basis for their choice and must rely on spontaneous affective responses elicited by the prime. Participants are instructed not to let the prime influence their evaluation of the character. However, they often cannot avoid this influence, as emotions generated by the prime inadvertently transfer to the character (Payne et al., 2005, 2008). The AMP has internal consistencies higher than 0.80, making it an excellent tool for measuring implicit responses to GHWs. In fact, it has been successfully used to reliably assess affective responses to smoking-inducing cues among smokers and nonsmokers (Payne et al., 2007).

Experiment 1

In Experiment 1, we aimed to compare the explicit emotional responses of smokers and nonsmokers to familiar GHWs of different sizes. We hypothesized that smokers would show decreased arousal and increased valence towards GHWs in comparison to nonsmokers. However, we considered that in Colombia GHWs are typically displayed at a 30% size on tobacco packages. We hypothesized that these smaller GHWs may have a weaker effect compared to control GHWs presented at full size (100% size without package). We focused on warning size in this experiment because it is a crucial element of tobacco control policy. It has been extensively studied and is known to influence the effectiveness of health warnings. To avoid potential confounding effects from cigarette packaging and branding, we used 100% size warnings in the control condition. This approach allowed for a more accurate assessment of how warning size impacts emotional responses.

Method

Design

In our study, we employed a mixed model design. This included two within-subject variables: type of affective response (valence, arousal) and GHWs size (30%, 100%). Additionally, we had one between-subjects variable: smoking status (smoker, non-smoker).

Participants

We recruited 145 participants (70 female) between 18 and 69 years old. Younger participants were college students from the Universidad Nacional de Colombia (UNAL), and older participants were parents attending an information meeting at the University. We used all tobacco-related questions from the Alcohol, Smoking, and Substance Involvement Screening Test (Ali et al., 2002) based on the criteria proposed by the WHO, to classify the smoking status. The inclusion criterion for smokers was that they reported smoking at least 2 times in the last 3 months (n = 58, Age: M = 22.03, SD = 5.34). Nonsmokers were identified as such if they reported never smoking in their lifetimes and no smoking in the last 3 months (n = 87, age: M = 23.94, SD = 10.75).

Materials

We used an Audience Response System (ARS, SunVote S50+) for timing, presenting the stimuli, and recording responses in real time. Each GHW published from 2016-2017 on Colombian cigarette packs was displayed at the center of a PowerPoint slide. This was accompanied by either a valence or an arousal question, and the SAM, closely modeled after Lang et al. (2008). See Supplementary Materials (SM).

Procedure

We organized participants into groups ranging in size from 25 to 42. At the beginning of the session, the experimenter read the instructions aloud. The GHWs, questions and SAM were presented one at a time on a slide projected on a wide screen (4 meter wide, 3 meter high).

For arousal, the question 'how relaxed or excited does this image make you feel?' appeared at the top of the slides. For valence, the question 'how much do you like or dislike this image?' appeared at the top of the slides. Then, a GHW and the SAM appeared below each question. Participants provided ratings for four types of trials: 1) valence-question and GHW presented on a branded cigarette packet (30% size), 2) valence-question and GHW presented at full size (not on cigarette packet), 3) arousal-question and GHW presented on a branded cigarette packet (30% size), and 4) arousal-question and GHW presented at full size. For the 30% size, the warnings appeared on a cigarette packet. For the 100% size, they appeared without the context of the cigarette packet. In total, each participant provided four ratings for each of the six GHWs (see SM). To avoid fatigue or carry-over influences by repetition, the four types of trials followed a semi-random sequence: neither the same GHW nor the same question followed consecutively. After the 24 experimental trials, we collected sociodemographic data and information about tobacco consumption. The whole procedure took approximately 20 minutes.

Data Analysis

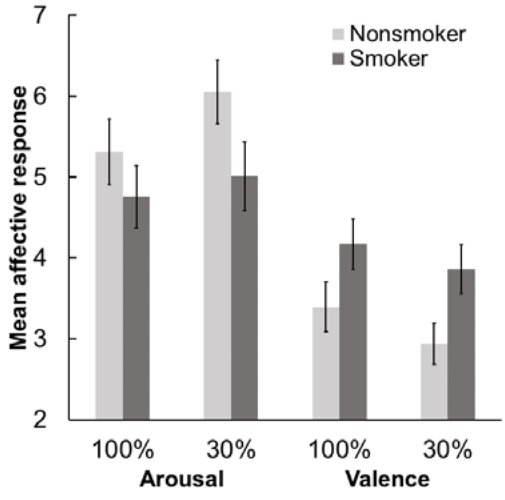
In our study, data analysis was conducted using a 2 × 2 × 2 mixed model. This model included smoking status (smoker, non-smoker) as a between-subjects factor, and GHWs size (30%, 100%) and affective response type (valence and arousal) as within-subjects factors. The chosen model allowed us to effectively isolate and examine the interactions between these variables in determining affective responses to GHWs.

Results

We conducted a mixed ANOVA to determine the effects of smoking and GHW size on explicit affective ratings (assumptions of ANOVA were met). There was a significant main effect for the type of affective response in which the arousal scores were statistically higher than valence ratings F (1, 143) = 59.696, p < .001, η^2 =0.29, but no significant main effect of size F (1, 143) = 0.788, p = .376, η^2 = 0.005. There was a statistically significant three-way interaction between affective response, size, and smoking status, F (1, 143) = 6.444, p = .012, η^2 = .05. There were significant two-way interactions between affective response and smoking status F (1, 143) = 14.267, p < .001, η^2 = 0.10, and between affective

response and size F (1, 143) = 50.950, p < .001, η^2 = 0.36, but there was no interaction between size and smoking status F (1, 143) = 1.849, p = .176, η^2 = 0.01. We ran four pairwise comparisons (Bonferroni adjusted) between smokers and nonsmokers for arousal and valence, to GHWs presented at 30% and 100% sizes. All mean differences were significantly different between smokers and nonsmokers (p_s < .001), except for the arousal responses to 30% size (p = .061). See Figure 1.

Figure 1
Mean explicit affective responses in Experiment 1 for familiar GHWs. The arousal scale ranges between 1 (very relaxed) and 9 (very excited). The valence scale ranges between 1 (very unpleasant) to 9 (very pleasant). The error bars depict ±1 Standard Error of the mean (SEM).



Discussion

Smokers and nonsmokers differed in their affective ratings for arousal and valence, particularly when the warnings were presented at full size (100%) without the context of the branded cigarette packet. Affective reactions are presumably stronger to full size warnings than to smaller warnings because participants are not distracted by the brand. These findings replicate and extend previous studies showing that the presentation of cigarette packages decreases aversion to GHWs (Sillero-Rejon, 2022).

Similarly, White et al. (2015) observed a diminishing impact of graphic health warnings among adolescents over time. Their study revealed that cognitive processing of these warnings returns to baseline levels after five years. This finding underscores the need for regular refreshment of warning messages to sustain their effectiveness. In our study, smokers showed less arousal and greater valence compared to nonsmokers. In this experiment, participants judged GHWs that have already been on the market. Consequently, we assume that familiarity with these GHWs led to habituation, which in turn differentially decreased the explicit affective impact on smokers compared to nonsmokers. This concept of habituation aligns with the findings of Woelbert and d'Hombres (2019), who reported both general and specific wear-out effects of GHWs. Their research highlights the importance of regularly updating warning images to maintain their effectiveness.

Experiment 2

Experiment 2 had three different objectives. The first was to assess explicit affective responses to unfamiliar GHWs presented in full size (100%) without the context of the branded cigarette packet. Our working hypothesis posited that differences in explicit ratings of GHWs between smokers and nonsmokers would persist. This is based on previous evidence suggesting that smokers tend to display defensiveness or cognitive dissonance to familiar messages conveyed by GHWs (Bekalu et al., 2018; Harris et al., 2007; LaVoie et al., 2017; Smith & De Houwer, 2015). Second, we wanted to identify which specific warnings elicited the strongest and the weakest emotional responses. We hypothesized that high-impact GHWs, that is, portraying explicit content of real patients and body damage (e.g., respiratory and cardiovascular diseases), would activate stronger emotional responses than GHWs portraying mental health effects or generic contents (e.g., 'nicotine is addictive' and 'smoking kills'). Third, we intended to generate a higher number of images necessary to evaluate

implicit affective responses in Experiment 3, where the AMP usually requires more primes than the SAM (Payne & Lundberg, 2014).

Method

Design

In our study, we employed a 2 x 2 mixed design. This design featured affective response type (arousal, valence) as a within-subject factor and smoking status (smoker, non-smoker) as a between-subjects factor. This design allowed us to effectively examine the interaction between affective response and smoking status in shaping reactions to the health warnings.

Participants

The participants were 118 undergraduate students (50 women) from UNAL. They received course credit for their participation. Participants' average age was 20.6 years (*SD*= 2.7, range 18-30). Participants were classified as smokers (n = 50) and non-smoker (n = 68) with the same criteria as in Experiment 1.

Materials

Unless otherwise stated, we used the same settings, materials, instruments, and procedures as in Experiment 1. We designed 36 new GHWs based on a survey and focus groups. These images were sourced from international and national databases for tobacco health warnings, including Mercosur and the Colombia Ministry of Health. An expert panel reviewed the texts and images for clarity and accuracy. As a result, six new warnings were created for each of the following six topics: 1) reproductive/ sexual diseases, 2) pancreatic cancer, 3) respiratory diseases, 4) second-hand smoke, 5) cardiovascular diseases, 6) mental health and smoking.

Procedure

The experiment began with instructions and four familiarization trials. Next, the 72 experimental trials made up of 36 GHWs followed. For each GHW, both valence and arousal ratings were collected in separate trials. We instructed participants to provide an intuitive and rapid rating about their feeling toward each GHW.

Data Analyzes

Initially, we conducted a 2 x 2 mixed ANOVA. This analysis used affective response type (arousal, valence) as a within-subjects factor, and smoking status (smoker, non-smoker) as a between-subjects factor, involving the whole set of 36 GHWs.

Secondly, we calculated an impact score for each GHW. This score was computed by subtracting the mean average valence ratings of smokers from those provided by nonsmokers. We then divided this difference by the sum of the standard errors from each group. Through this method, the 36 GHWs were evenly divided into low- and high-impact subsets based on their valence scores. The purpose of the impact score was twofold: it maximized the differences between smokers and nonsmokers in their explicit responses, and it facilitated a direct comparison of the same high- and low-impact GHWs using implicit methods in Experiment 3.

Results

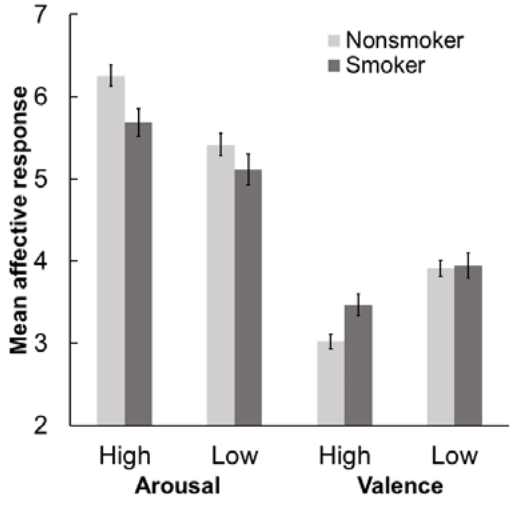
All assumptions of ANOVA were met in our study. This analysis revealed an interaction between smoking status and affective response $F(1, 116) = 4.13$, $p = .044$, $\eta^2 = 0.04$. Consequently, we conducted simple effect analyses for arousal and valence separately. There was evidence of a main effect of reduced arousal for smokers $F(1, 116) = 4.31$, $p = .040$, $\eta^2 = 0.04$ but no evidence of a main effect of smoking status for valence $F(1, 116) = 2.41$, $p = .12$, $\eta^2 = 0.02$.

Our second planned analysis showed a significant three-way interaction between affect, GHW-impact, and smoking status $F(1,116) = 3.26$, $p = .001$, $\eta^2 = 0.10$. There were significant two-way interactions between affect and smoking $F(1,116) = 4.13$, $p = .044$, $\eta^2 = 0.04$, and between affect and impact $F(1, 116) = 208.35$, $p < .001$, $\eta^2 = 0.64$, but

no interaction between smoking and impact F (1, 116) = 1.84, p = .177, η^2 = 0.02.

We ran four pairwise comparisons between smokers and nonsmokers for arousal and valence to high- and low-impact GHWs (Bonferroni adjusted). As expected, mean differences between smokers and nonsmokers were statistically significant for high impact warnings for arousal and valence (p_s < .009) but not for low impact warnings (p_s > .178). See Figure 2.

Figure 2
Mean explicit affective responses observed in Experiment 2 for unfamiliar GHWs of high- vs. low-impact. Error bars depict ±1 SEM.



Discussion

In Experiment 2, we observed that smokers showed decreased arousal compared to nonsmokers in response to unfamiliar GHWs. However, there were no significant differences in valence ratings between smokers and nonsmokers across the full set of 36 GHWs. To examine deeper, we conducted more detailed analyses. These were aimed at separating the variance caused by the increase in the number of GHWs from 6 in Experiment 1 to 36 in Experiment 2.

These further analyses revealed that not all warnings exert strong effects on explicit ratings. Factors such as smoking status, familiarity, and the warnings' impact contributed to differences in explicit arousal and valence ratings. This information is crucial for Experiment 3, where we assess the effects of low- and high-impact warnings on implicit responses separately.

Taken together, these data support the hypothesis that smokers explicitly evaluate aversive warnings in a biased way. They report feeling less aroused and they tend to rate high-impact warning as more likeable compared with nonsmokers (see Figure 2). Experiment 2 suggests that the observed effect is not solely due to familiarity, wear-out, or preexposure to the warnings, as we initially assumed in Experiment 1. These findings align with previous studies, which indicate that smokers' biased explicit responses to GHWs may be influenced by defensiveness (Harris et al., 2007), reactance (LaVoie et al., 2017), or cognitive dissonance (Glock & Kneer, 2009), each triggered by negative affect.

Experiment 3

Experiment 3 was designed to determine if emotional reactions measured using an implicit procedure differed between smokers and nonsmokers. The rationale behind this experiment is rooted in the premise that implicit reactions, being more spontaneous and less prone to bias, should better reflect automatic affective associations with emotionally laden stimuli like the visual components of GHWs.

Previous research using the AMP has demonstrated that nicotine-deprived smokers often show a higher proportion of implicit pleasant responses to rewarding smoking-images compared with nonsmokers (Haight et al., 2012; Payne et al., 2007). In light of these findings, our aim was to investigate whether a reverse pattern occurs among smokers in response to aversive smoking-images, such as those found in GHWs.

We predicted that implicit reactions should not differ between smokers and nonsmokers. This is based on the idea that defensiveness and cognitive dissonance require explicit appraisal of the anti-smoking messages, which presumably occurs at a later processing stage. Thus, this experiment

sought to shed light on the more automatic aspects of affective response, unaffected by conscious bias or rationalization processes.

Method

Participants

We recruited 83 undergraduate participants (44 women, mean age = 21.5, *SD* = 3.24). The criteria for nonsmokers were that they had smoked fewer than 100 cigarettes in their lifetime and had smoked none in the past 30 days. The inclusion criteria for smokers were that they smoked at least 2 days per week and smoked at least one cigarette per smoking day. In contrast to the previous 2 experiments, we used the same criteria to classify participants typically used in the AMP in order to replicate previous procedures. As a result, we tested 49 nonsmokers and 34 smokers (M = 5.79 cigarettes per day *SD* = 4.6).

Materials

The GHW stimuli were exactly the same 36 images used in Experiment 2 but without text or the context of the branded cigarette packet. The control stimuli were 36 matched images taken from the International Affective Picture System (IAPS), selected if they had medium valence and arousal according to previous validations in culturally similar populations (Branco et al., 2023). In addition, we presented a gray square (GS) 36 times as a nonpictorial control prime. We used the GHWs, IAPS, and GS as primes in the AMP. The participants evaluated 108 Chinese target pictographs taken from a pool of 200 randomly selected for each participant. These targets were previously validated in other AMP studies (Payne et al., 2005, 2007; Payne & Lundberg, 2014).

Design

We utilized a 3 x 2 mixed design. The design incorporated a within-subjects factor of prime type (Control, IAPS, GHW) and a between-subjects factor of smoking status (smokers, nonsmokers). This design was selected to effectively examine how different prime types influence participants' responses, depending on their smoking status.

Procedure

Participants completed the experiment in individual cubicles. For each trial, the computer presented a prime stimulus (GS, IAPS or GHW) for 75 ms, followed by a blank screen (125 ms), followed by a target kanji (100 ms). Finally, a visual mask remained on the screen until the participants provided an answer. At this point, the participants were instructed to decide if each Chinese pictograph was pleasant or unpleasant, by pressing one of two keys (E = pleasant or I = unpleasant). Participants completed 108 randomly presented experimental trials for 36 GHW, 36 IAPS images, and 36 GS. As usually modeled in the AMP, we instructed participants to avoid being influenced by the primes and to provide an honest and intuitive rapid response to the target. After the experimental trials, the participants completed questionnaires about their smoking habits and demographic data.

Data Analyzes

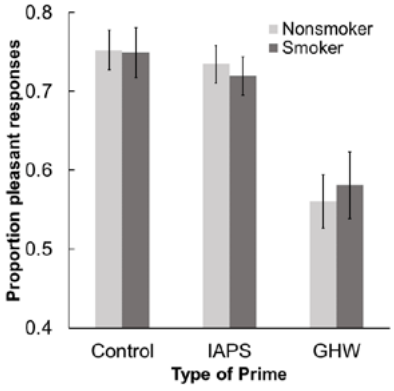
We scored responses by computing the proportion of pleasant responses to targets preceded by either 1) control GSS, 2) IAPS images, or 3) GHW images. These responses were analyzed in a 3 x 2 mixed ANOVA with a within-subjects factor of prime type (control, IAPS, GHW) and a between-subjects factor of smoking status (smokers, nonsmokers).

In a second step, we computed scores by splitting responses to high- versus low-impact GHWs previously identified as in Experiment 2.

Results

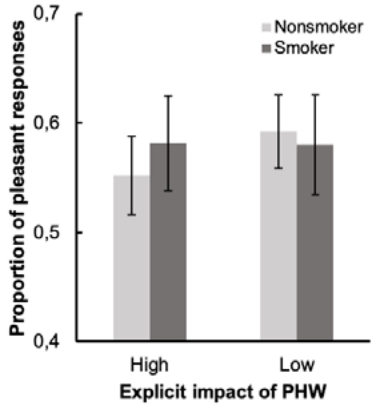
The assumptions of ANOVA were met in our analysis. The results revealed a main effect of the prime type F (2, 162) = 33.500, $p < .001$, = .414, indicating that GHWs were less frequently associated with pleasant responses. However, no interaction was found between prime type and smoking status F (2, 162) = 0.291, p =.748, = .001. For more details, see Figure 3.

Figure 3
Overall results of Experiment 3. Mean proportion of implicit pleasant responses to nonpictorial control stimulus (grey square), 36 control images from the IAPS, and to the full set of 36 GHWs. Error bars depict ±1 SEM.



Additionally, we ran a mixed ANOVA to analyze possible differences between smokers and nonsmokers for GHWs previously classified as low- or high-impact in Experiment 2. A mixed ANOVA with impact (low, high) as a factor and smoking status (smoker, non-smoker) as a factor showed no interaction F (1, 79) = .554, p = .459, = .006, and neither main effects of smoking status F (1, 79) < .001, p = .992, < .001 nor impact of prime F (1,79) = .420, p = .519, = .004. See Figure 4.

Figure 4
AMP results for Experiment 3 (y-axis). Mean proportion of implicit pleasant responses to 18 GHWs classified as high-impact vs. 18 GHWs classified as low-impact according to the results of the explicit measures of Experiment 2 (x-axis). Error bars depict ±1 SEM.



Discussion

In Experiment 3, we used an implicit task, the Affect Misattribution Procedure, to evaluate implicit affective responses to GHWs. We found that pictures that were meant to be aversive, triggered a lower proportion of positive responses compared to IAPS images and control stimuli (Figure 3). However, even when we used data from Experiment 2 to identify high impact images, there was no difference in implicit affective responses between smokers and nonsmokers (Figure 4).

The most parsimonious explanation for this finding is that by removing text from GHWs, the warnings become simply aversive stimuli. In this way, they do not favor different effects for smokers and nonsmokers, as the images alone do not target any specific group. However, the AMP has previously demonstrated enough sensitivity to capture different affective responses to appetitive visual smoking cues without text (Payne et al., 2007). Long texts are usually excluded in the AMP. This is due to the fact that at a presentation time of 75 ms complex information cannot be fully read or appraised (Payne & Lundberg, 2014).

The present study adds to the literature showing that the interaction between images and texts in GHWs is more complex than originally thought. This is particularly true at the implicit level, as evidenced by the works of Cameron et al. (2015), Van Dessel et al. (2018), and Droulers et al. (2017). Their research suggests that the synergistic effect of images and texts in GHWs assumed in earlier studies warrants a more nuanced understanding. Experiment 3 suggests that defensiveness or cognitive dissonance, typically encountered in smokers frequently exposed to aversive GHWs, is primarily a higher order explicit cognitive process. To our knowledge, this experiment is the first objective assessment of implicit affective responses to the pictorial component alone of GHWs using the AMP. This experiment highlights the effectiveness of a straightforward experimental approach like the AMP for assessing smokers' affective reactions. Specifically, it proves useful in contexts where

distinguishing between explicit emotional evaluations and implicit affective reactions to GHWs is particularly desirable.

General Discussion

The aim of this paper was to examine how smokers and nonsmokers differ in their explicit and implicit affective reactions to GHWs. Experiment 1 focused on comparing explicit SAM ratings of valence and arousal in response to familiar GHWs. We found that, generally, smokers exhibited reduced arousal and increased valence compared to nonsmokers. This was especially notable except in the case of arousal towards smaller warnings (30% size). These results align with previous studies, such as Moodie et al. (2016), which have demonstrated that branded cigarettes can lessen the impact of GHWs for both smokers and nonsmokers. Notably, our findings indicate that smokers tend to perceive GHWs as more pleasant compared to nonsmokers, a trend that is consistent with existing literature.

Experiment 2 involved comparing explicit SAM ratings given by smokers and nonsmokers to novel warnings. The results from this experiment indicate that smokers' more positive evaluations of GHWs are not merely due to familiarity or 'wear-out' of the message, as suggested by Borland et al. (2009). Rather, it appears that higher-order cognitive processes, such as appraisal, may contribute to defensiveness or cognitive dissonance. This is particularly noticeable in responses to emotionally charged, high-impact GHWs.

Finally, in Experiment 3, we observed that implicit affective reactions to the pictorial component of novel GHWs were similar among smokers and nonsmokers. This similarity suggests that both groups may share a comparable level of initial affective aversion to the images. Interestingly, GHWs apparently induce defensiveness or cognitive dissonance among smokers at an explicit cognitive level, as indicated from the SAM responses. Conversely, at a more automatic, implicit emotional processing level, these effects were absent, demonstrating a pattern we describe as *early affective processing parity*.

Taken together our three experiments, this paper introduces a novel methodology that distinctly separates the explicit responses of smokers from their implicit affective reactions. Specifically, it addresses how smokers' explicit responses, largely influenced by cognitive appraisals, tend to favor defensiveness and dissonance. At the same time, our approach also captures the implicit affective responses that are part of the initial processing stages in emotional reactions to GHWs.

Interpreting our findings as early affective processing parity aligns well with previous research, such as that by Stothart et al. (2017). In their study, they highlight the distinction between early and late emotional responses to GHWs using EEG evidence. However, our approach, which employs a modified version of the AMP to measure implicit emotional responses and the SAM for explicit ones, offers a less expensive and less invasive alternative. More than just a cost-effective method, our paper suggests a new way to assess automatic affective reactions to GHWs, as well as to health messages targeting other substances or behaviors (Maynard, 2017; Nuño Gutierrez et al., 2018). Looking forward, our findings and methodology open avenues for future research to explore how GHWs engage these two potentially competing processes, aiming to maximize smoking prevention and enhance intentions to quit.

Our findings, however should be interpreted in light of the following limitations. Our research was not initially conceived to understand how GHWs influence long term attitudinal and behavioral outcomes. It was simply designed to develop and test a new methodology to measure implicit affective reaction to GHWs in the short term. Therefore, it remains unknown whether implicit or explicit measures of negative affect accurately predict behavioral outcomes such as quitting attempts or intentions to quit smoking. However, we provisionally suggest that implicit

emotional reactions can usefully supplement explicit measures by observing the time course of both types of responses to GHWs.

A second limitation of our research is that we compared implicit and explicit measures of valence across different experiments. Future research should focus on examining if the observed patterns hold true in within-subjects designs. In such studies, the same participants would provide both implicit and explicit ratings of their affective reactions to GHWs. This approach would further validate the consistency of responses across different methods of measurement. However, this not a straightforward experimental manipulation because despite counterbalancing, familiarity can bias responses for participants providing explicit judgements before implicit judgements.

Finally, we recognize a limitation in our participant sample composition. The convenience samples of smokers and nonsmokers used in our research may not fully capture the diversity among smokers, particularly those most at risk for smoking-related issues. This limitation highlights the importance of broader, more inclusive participant selection in future studies to enhance the representativeness and generalizability of the findings.

This study, despite its limitations, incorporates key strengths, including the inclusion of both smokers and nonsmokers in all experiments. This approach was instrumental in detecting emotion processing biases in smokers' responses to GHWs. Our research highlights the crucial role of implicit mechanisms in influencing negative emotional responses, vital for effective smoking prevention and cessation. One of the primary contributions of this study is the development of implicit emotional assessments for evaluating GHWs before they reach the public. This methodology holds considerable potential for broader application, offering other countries and jurisdictions the opportunity to enhance traditional explicit and attitudinal evaluations with these implicit assessments in the design and evaluation of health warnings and messages.

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Transparency and Altruistic Punishment in an Experimental Model of Cooperation to Corruption Through Economic Games

Transparency and punishment against corruption

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SCIENTIFIC RESEARCH ARTICLE

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Transparency and altruistic punishment in an experimental model of cooperation to corruption through economic games

Abstract

This work integrates cooperation, punishment, treasury damage, and norms transgression in three variants of a single experimental model of corruption. Participants formed words with predetermined letters, receiving a reward for each word, besides an individual reward taken from the common fund if they reached the goal. A manipulation in the letters made it impossible to reach the goal, so reporting exceeding it implied cheating for a benefit. Three studies model the effects of signaling, descriptive norms, and the possibility of punishing or investigating corruption acts (transparency). 248 participants were randomly assigned to the conditions of each study. Significatively less cheating behavior was found in reports of words and earnings in Studies 1 and 3, but not in Study 2. The experimental model reveals the potential of transparency as an alternative to diminishing corruption with less social cost than altruistic punishment. The relevance of these results for implementing public policies was discussed.

***Keywords*:** Altruistic punishment, corruption, descriptive norms, signaling, transparency.

Transparencia y Castigo Altruista en un Modelo Experimental de Cooperación a la Corrupción a Través de Juegos Económicos

Resumen

Este trabajo integra la cooperación, el castigo, el daño al erario y la transgresión de normas en tres variantes de un único modelo experimental de corrupción. Los participantes formaban palabras con letras predeterminadas, recibiendo una recompensa por cada palabra, además de una recompensa individual tomada del fondo común si alcanzaban la meta. Una manipulación en las letras hacía imposible alcanzar la meta, por lo que informar de que se superaba implicaba hacer trampas para obtener un beneficio. Tres estudios modelan los efectos de la señalización, las normas descriptivas y la posibilidad de castigar o investigar los actos de corrupción (transparencia). 248 participantes fueron asignados aleatoriamente a las condiciones de cada estudio. Se encontró un comportamiento de engaño significativamente menor en los informes de palabras y ganancias en los Estudios 1 y 3, pero no en el Estudio 2. El modelo experimental revela el potencial de la transparencia como alternativa para disminuir la corrupción con menor coste social que el castigo altruista. Se discute la relevancia de estos resultados para la implementación de políticas públicas.

Palabras clave: Castigo altruista, corrupción, normas descriptivas, señalización, transparencia.

According to Transparency International (2016), in 2015 Mexico obtained 35 out of 100 points in its corruption perception index, ranking as one of the most corrupt countries evaluated. This rating steadily worsened from that date until the 2020 measurement where it reached just 31 points, placing it below the average score for the American continent (43) and other regions as Sub-Saharan Africa (32) (Transparency International, 2021). These corruption levels affect the economy. For example, Dang et al. (2022) show that corruption increases the informal economy, and Spyromitros and Panagiotidis (2022) show that high levels of corruption, added to bureaucratic inefficiency, hinder the economic growth of countries.

Traditionally, corruption has been studied as a problem for public officials and their institutions. Treisman (2000), for example, defines corruption as the abuse of public office for personal gain. However, the levels of corruption observed in Mexico cannot be explained without the participation, or at least the consent, of a large part of the population, indicating a severe problem of respect for legality. In data from INEGI (2015), 22% of those surveyed state that they have paid bribes in procedures to establish a company, 23% for operations before the public prosecutor, and 55% for matters related to general security authorities. These high rates of citizen participation in the face of corruption may point to a normalization of corruption. For example, the Constitutional Culture Surveys in Mexico (Fierro et al., 2011) show that 41% of citizens would be willing to violate the law if they consider they are correct, while 21% declare that they agree or strongly agree with the phrase "breaking the law is not so bad, the bad thing is that they catch you" (Fierro et al., 2017).

From these antecedents, the definition of Treisman (2000), centered on public officials as sole agents of corruption, has been exceeded. Sutherland (1940) defines corruption as a violation of delegated or implicit trust from a broader perspective. From a more operational approach, Transparency International (2019) defines corruption as the abuse of entrusted power for private gain, classifying it as large (which occurs in the upper echelons of government), political (exercised by decision-making officials to modify procedures of the allocation of resources for their benefit), and less (exercised by public officials in their daily interactions with ordinary citizens). From this last category, corruption is a problem whose understanding and solution require including citizens as agents, not only as victims.

Persson et al. (2013) conceive corruption as a collective action problem, where people act according to the behavior they expect from others. Mungiu-Pippidi (2013) considers that collective action can foster an ethical universalism that allows for reaching a balance of social well-being. However, Marquette and Peiffer (2015) consider this approach to fighting corruption incomplete as it does not include the possibility of monitoring each other to cooperate for the collective good.

Cooperation, common goods, and corruption

Cooperation is a practice where an individual or group puts part of their resources (e.g., time, money, work) into a joint task with another individual or group to obtain a common benefit (Bowles & Gintis, 2011). In cooperation, a cooperator is identified as someone who pays a cost so that the parties involved obtain a benefit, and a free-rider is someone who does not pay that cost and shares the benefits anyway (Nowak, 2006).

Although evolution implies competition between individuals, where selfish behaviors are rewarded, cooperation is necessary to build new levels of organization (Nowak, 2006). These more complex levels of social organization give rise to collective goods, which differ in their capacity for exclusion due to their magnitude and nature. For example, you can deny the access easily to someone who refuse to pay a movie ticket, but its harder to exclude from living in a secure neighborhood to someone that refuse to pay its taxes as the rest of neighbors does. They also differ in their level of exploitation by use. For example, when a car is purchased,

it is no longer available to someone else, while when public transportation is used, it is still available to others (Ostrom, 2003, 2010).

For this research, the interest is in the common-pool resources, that refer to natural or human-made resources and are considerably large enough to make the exclusion of their use or benefit feasible (Ostrom, 2011), and whose consumption or exploitation reduces more notably the total of goods available to others (Ostrom, 2003), but they have evident and quantifiable decline due to their exploitation; for example, timber forests, water, and the public fund. Because of their deterioration and the difficulty of excluding free-riders, common-pool resources are vulnerable to overuse, which can deplete resources and destroy the ability of the system to restore itself. This phenomenon, known as the tragedy of the commons (Hardin, 1968; Ostrom, 2011), results when people act only according to their immediate personal benefits and make excessive use of a scarce resource until it is exhausted, finally leading all to ruin (e.g., deforestation, bankruptcy).

Weisel and Shalvi (2015) investigated corruption through a game where two players roll dice in several rounds without supervision and receive a reward in each round if both obtain the same number. The results show that, even without the possibility of communicating or agreeing previously, the players report coincidences superior to those expected by chance, pointing out the existence of cooperation between individuals as a critical element of corruption, in this case, cheating to get more profit. This is a relevant finding, but the experimental procedure does not entirely model corruption, as the resources obtained by the players come from the experimenters and not from a common fund fed by contributions from the players, as in the case of a treasury provided by the collection of taxes.

In another study, Fehr and Gächter (2000) designed a procedure where players had to decide whether to contribute part of their profits from each round to a fund that would be shared equally among all at the end or keep all their income. During some rounds, the players only decided whether they contributed to the common fund. Still, in another series of rounds, they could pay for the experimenters to punish those who had not contributed to that round, an action known as altruistic punishment since it implies a cost but not a direct and immediate benefit. This possibility of punishing free riders steadily increased cooperation, showing the power of altruistic punishment, originated by the vigilance of the players (citizenship) and not of the experimenters (authority or government) to reduce desertion significantly. However, this experimental procedure does not entirely model corruption either, since the alternatives of cooperating or not in the common fund are validated by being included in the rules of the game, while norms in society dictate that the correct thing is to contribute to the common fund and deserting is immoral and illegal, implying a clear transgression of the norm.

Furthermore, unlike the high disposition to altruistic punishment reported in the studies by Fehr and Gächter (2000, 2002), other studies show that people are very reluctant to punish those who have not directly insulted them (Pedersen et al., 2018), and this disposition is almost null in conditions outside the laboratory (Pedersen et al., 2020). The latter leads to think about alternative forms of participation, more affordable than the direct exercise of punishment, for example, anonymous reporting and the requirement of the authority to investigate and make transparent presumed acts of corruption (Bauhr et al., 2020).

Finally, the procedure of Fišar et al. (2016) includes three players, who occupy the roles of two citizens and an officer. Each participant received 100 coins at the beginning of the activities and was made aware that was playing with two other people and that each was given the same number of coins. The first citizen and the officer could keep their coins or cooperate and take 20 more coins each, which would be subtracted from the second citizen. In turn, this second citizen could just keep

their 60 coins or pay ten coins to punish the officer and the other citizen, holding only 50 coins. This procedure incorporates altruistic punishment and cooperation as essential elements of corruption but has the weakness of validating the possibility of conspiring to be corrupt into the rules. Again, as in the Fehr and Gächter (2000) procedure, corruption behaviors were incorporated into the rules, validating them as an option, as occurs, for example, in baseball, where players can steal a base without violating the rules of the game, even if it imply a higher risk.

As in the procedure by Fišar et al. (2016), acts of corruption typically require the cooperation of two or more people, for example, a citizen and an official, in the case of bribery and other forms of petty corruption. As these acts are punishable by law for both citizens and officials, the risks of cooperation are compounded by the risk that the counterpart denounces, which in some laws implies the benefits of reduction of penalties for the whistleblower (Piccolo & Immordino, 2017). Cooperation requires a coordination process, where the parties involved must successfully communicate their intentions to coincide with their shared interests (Bacharach, 2018). This is complicated for acts of corruption, considering that proposing someone else to participate in the act of corruption implies the risk of being denounced or exposed, which, in the case of Mexico at least, has given rise to many covert forms of language (Legorreta & de Mola, 2016) that facilitate coordination and cooperation in these acts with less risk for the parties involved. For these reasons, the experimental procedure proposed here includes a manipulation where the participants receive signals from a confederate, reporting more words than she has formed, covertly inviting to falsify the results to obtain more profits from the common fund, which would model cooperation in the act of corruption.

Considering the analyzed antecedents, this work integrates into a new experimental procedure the strengths of the studies that experimentally model cooperation in unsupervised dishonest acts (Weisel & Shalvi, 2015), the covert invitation to cooperate in a corruption act (Fišar et al., 2016) and the use of public goods games and altruistic punishment to reduce free-riding (Fehr & Gächter, 2000, 2002), although in this case, to better model the existence of a treasury, the initial common fund was formed by resources contributed by the players.

First, we tested the experimental procedure in two studies by manipulating two variables whose effects on cooperation and corruption are known from previous studies. The first study analyzed signaling effects on cooperation for personal over collective benefit. The second study examines the impact of descriptive social norms on cooperation for personal gain. Finally, considering the low disposition to altruistic punishment (Pedersen et al., 2018, 2020), a third study compared altruistic punishment with another condition of request for transparency, where the participants can request the investigation and transparency of possible acts of corruption from the other players.

Then, this paper aims to explain the effects of signaling, social norms, and the possibility of punishment for cooperating in corruption. The hypothesis is that cooperation with corruption will be greater when signaling and the social norm of dishonesty are present, but there will be less cooperation with corruption when there is the possibility of sanction.

Study 1: signaling effects on cooperation for personal benefit

Signaling is when two parties have access to different information, so some have more information than others (Spence, 2002). Since this asymmetric information is private, people with the information could make better decisions than people who do not have it (Connelly et al., 2011). Then a person, *the sender*, has private information (*signal*) that can be positive or negative and can be offered to *the receiver*. The latter receives and interprets the information and sends a response to the sender. For the signaling to be successful,

the sender must obtain benefits for some action that the receiver performs and that he would not have achieved without the information received (Banks & Sobel, 1987; Connelly et al., 2011). In a corruption act as bribery an official can offer a signal to a citizen, seeking to accept it, and both obtain a mutual benefit that would not be received if someone denounces (not cooperate); it is up to the citizen to get that signal and to cooperate with the official for mutual benefit.

Signaling has already been shown to have positive effects on cooperation. In a two-person strategy game, Salahshour (2019) found that, despite their apparent cost, signals evolve due to their capacity to elicit cooperation. Heinz and Schumacher (2017) examined the signs that the participants' curriculum reported on the willingness to cooperate as a team, finding that contributions in a public goods game increased following the degree of social participation indicated in the curriculum.

This study evaluates the effects of signaling on cooperation for personal gain in a situation that models petty corruption. The hypothesis is that higher cheating behavior will be found in the signaling condition compared to the control condition.

Method

Participants

The participants were 56 people from the city of León, Guanajuato, a predominantly urban region that is the seventh most populated in Mexico with 1.7 million inhabitants, whose economy is based mainly on the automotive and footwear industries. 57.14% are women, and 42.86% are men, with an average age of 20.79 (SD = 5.14). 7.15% had incomplete high school or lower studies, 39.29% completed high school, 44.64% had incomplete university studies, and 8.93% completed university studies. Participants were randomly assigned, 28 in control and 28 in the experimental condition. Of the 100 people invited, 19 people declined the invitation, 19 agreed to participate but did not continue with the communication, and only six people were excluded from the analysis for guessing at the study objectives.

Procedure

The inclusion criteria were being 18 years of age or older and being familiar with the use of instant messaging as Google Chat and Facebook Messenger, and as exclusion criteria having partial or completed university studies in psychology or economics, to avoid anticipating experimental procedures and manipulations by having a background in this type of research. Based on previous studies of corruption that show significant differences between the sexes (Rivas, 2013), it was sought to preserve the same proportion of men and women as much as possible.

Given the sanitary restrictions due to the COVID-19 pandemic, all contact with the participants and the experimental procedures were carried out by virtual means to avoid contagion risks to participants and experimenters.

Participants were invited through the research team's social networks, explaining that their participation would be voluntary, anonymous, and the data provided would be confidential, analyzed for scientific research purposes, and would be protected by the titular researcher, also informing them about the study objective, its procedures, and estimated duration. They were also told that to participate they had to contribute 5 Mexican pesos (approximately a quarter of a dollar) to form a common fund. Those who satisfied the inclusion and exclusion criteria and agreed to participate were sent a Google Forms link by email where they could read the informed consent in detail and, if they decided, express their consent by checking a box and continuing to respond to a sociodemographic data form. After answering the format, the description of the experimental procedure was presented as an online game where they had to form words together with other participants. They were reminded that they should have $5 on hand that they would contribute to creating the common fund. The informed consent

also stated that in the game, they could win, but there was also the possibility of losing their initial contribution depending on their performance in the game. This helps to bring realism and relevance to their decisions, being important that participants felt they could win or lose. The experiment was presented to them as a study to measure the ability to form words, so, moral decisions were not the focus of the procedure. Furthermore, as an ethical consideration, the players received the game's winnings but did not pay their contributions or losses at the end of the procedure.

They received an email account and password to enter the Hangouts platform (https://hangouts.google.com), that prevented participants from knowing who they were playing with and controlling and maintaining a record of communication between them.

All participants were assigned the role of player two and the number of pair three, in each experimental session one participant and seven confederates played. Once on the Hangouts platform, a private chat with their partner and a group chat appeared with a link and instructions that directed them to the Socrative page (https://www.socrative.com). On this page, they were presented with the game instructions.

In the beginning, six supposedly random letters appeared on their screen. With these letters, both players in each pair had to form as many Spanish words as possible of at least four letters, for which they had one minute. They were asked to have a sheet at hand to write the words formed but only report the number of words, under the argument that it was easier to record what they won each round. The real reason was to generate a perception as it was easy to provide a false number of words. In each round, the letters appeared at the top of the screen, and the answer options indicated the number of words formed and the corresponding amount of money (e.g., one word = $.50 to the common fund, $0.125 per pair).

Both players earned $1 for each word they formed, which was accumulated in the common fund distributed among all at the end. For each round, a goal of 5 words was set. If the pair exceeded that goal, the players could conserve the profits of those rounds in a private fund and take $1 from the common fund. Except for the first two rounds, the letters provided were previously tested to limit the possible words to 5 (the letters used and the words formed with these can be seen in the Appendix A). This manipulation made it possible to know if the players reported more words than they could form.

In the experimental condition, in rounds six and nine, player one (confederate) proposed to player two (participant) to report more words to overcome the goal and obtain higher profits (signaling manipulation). In the control condition, the participants did not receive messages at all.

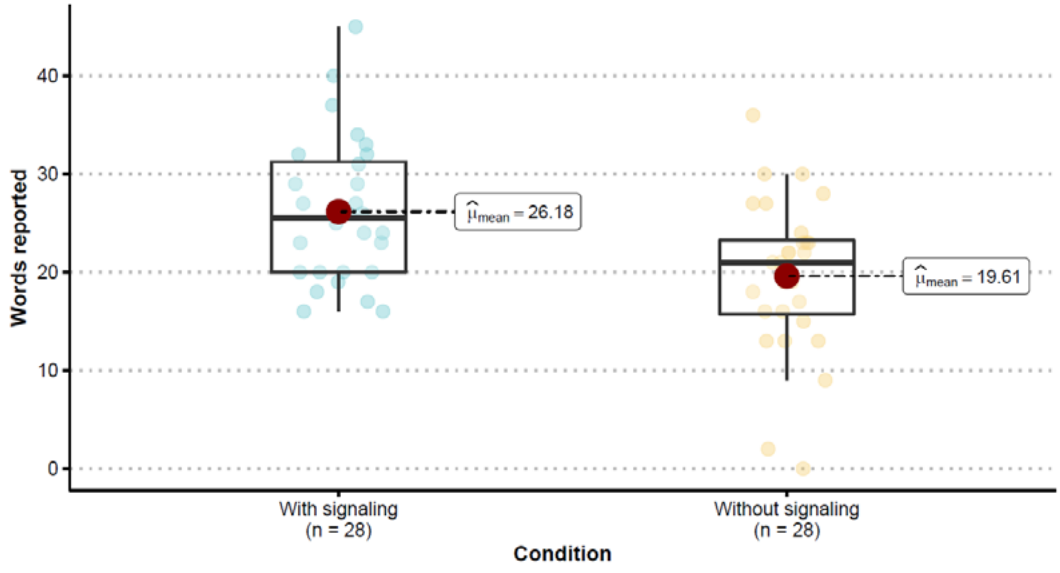
At the end of the ten rounds, the participants were informed that the session had concluded. The post-experimental interview was carried out to verify that they fully understood their decisions in the game and were not suspicious of the experimental manipulations. At that time, the common fund was distributed among all the participants, and was agreed on how to send them their corresponding earnings, indicating that they could also keep their initial contribution. Finally, they were informed about the experimental manipulations of the procedure, and about the real objectives, reiterating that their decisions would be confidential and would have no repercussions of any kind, and the contact details with the research team were reiterated for communication with doubts or any additional information. There were no complaints or comments of discomfort with the procedure. The procedure was reviewed and accepted by the Institutional Committee of Bioethics in Research of the Guanajuato University (CIBIUG-P16-2021).

Results

The analysis was carried out in the R software (R Core Team, 2021), the effect sizes were calculated with the *effectsize* package (Ben-Shachar et al., 2020), and the graphs in the *ggstatsplot* package (Patil, 2021).

Only 17.86% of the participants reported having exceeded the goal in the condition without signaling, while 50% did so in the condition with signaling, a difference statistically significant with medium effect size according to the chi-square test with Yates's adjustment $\chi^2(1) = 5.09$, $p = .023$, 1-β = .52, V = .31, 95% CI [0, 1]. In addition, using the Student's t-test it was found that the averages of the reported words were also higher in the condition with signaling (26.18, $SD = 7.38$) compared to the condition without signaling (19.61, $SD = 8.02$), statistically significant differences with large effect size, $t(54) = 3.19$, $p = .002$, 1-β = .50, $d = 0.85$, 95% CI [0.27, 1.41], as seen in Figure 1.

Figure 1
Words reported by participants according to the condition in which they played (Study 1)

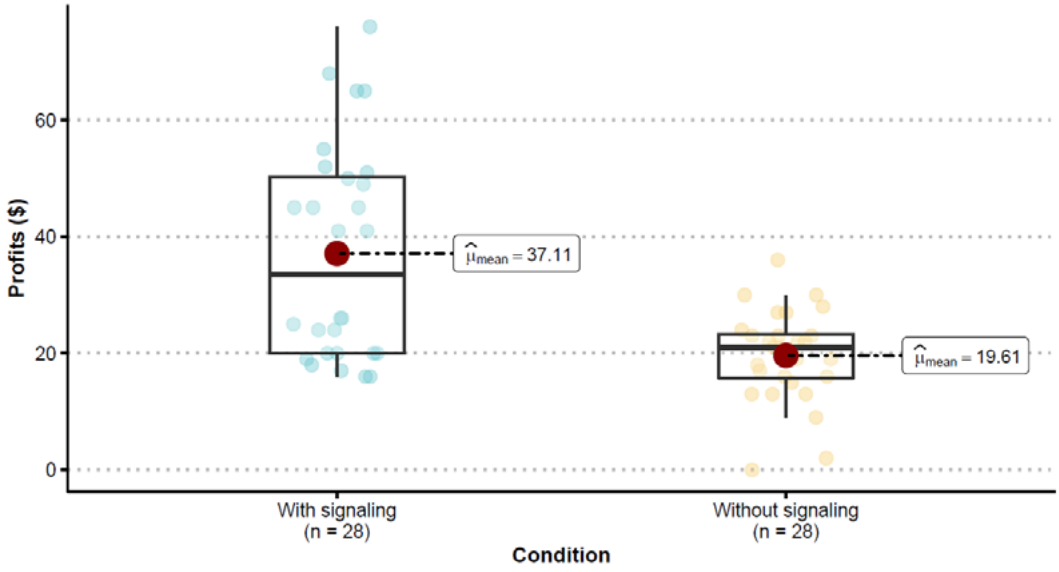


Note. Average of words reported, quartiles, and outliers in each condition

Additionally, the differences in profits in both conditions were analyzed. As indicated in the method, in rounds six and nine a confederate suggested that participants report more than six words and exceed the goal for higher profits. This is because, by reporting six or more words, the profits went to a private account that was not divided with the other pairs in the game, but only when both team members exceeded the goal. Therefore, the participants' reports of six words or more in rounds six and nine were multiplied by four, since those profits were not shared with the other three game pairs.

Through the Mann-Whitney-Wilcoxon test, significant differences with large effect size were found in the profits according to the condition in which they played, $W = 601$, $p < .001$, 1-β = .53, $r_b = 0.53$, 95% CI [.28, .72], being higher in the condition with signaling ($M = 37.11$, $SD = 18.44$), than in the condition without signaling ($M = 19.61$, $SD = 8.01$), as can be seen in Figure 2.

Figure 2
Average profits of participants according to the condition in which they played (Study 1)



Note. Average profits, quartiles, and outliers in each condition

Discussion

As expected in the hypothesis, the participants in the signaling condition reported exceeding the limit in more rounds than in the without-signaling condition; that is, they lied more to obtain benefits following the requests of the confederates (Persson et al., 2013; Salahshour, 2019). The right thing was done when the confederate did it (to report the actual words), but when proposed cheating, the participant also did it (Rothstein, 2000). Remembering that the profits obtained were merged with the money contributed by each participant, in a hypothetical situation, there was the possibility that the common fund would disappear if all the pairs cheated and reported more words in all the rounds, thus fulfilling the called tragedy of the commons (Hardin, 1968).

The proposed experimental model could be used to analyze other variables. In this sense, social norms were analyzed in the second study.

Study 2: effects of descriptive norms on cooperation

This study extends the results of Study 1 by manipulating descriptive norms, a variable whose effects on cooperation and corruption are known.

Miller and Prentice (2016) define social norms as the tendency to behave as most people do; Young (2015) defines it as "unwritten codes and informal understandings that define what we expect of other people and what they expect of us" (p. 360). Cialdini et al. (1990) show that a person's behavior can be influenced by *descriptive norms*, which are observed behaviors that people commonly perform. These norms provide a quick response guide; thus, people can act as other people do in the same situation (Cialdini et al., 1991).

Thus, chaotic environments are perceived as clues of an implicit tendency to transgress the rules of order without receiving sanctions since other people have done it before (Keizer et al., 2008). However, the descriptive norm can only

influence other people's behavior if it is seen as a focus of attention for others (Cialdini et al., 1991).

Fehr and Fischbacher (2004) point out that social norms determine cooperation between individuals; there will be cooperation if the other individuals cooperate. Hallsworth et al. (2017) noted that the payment of taxes increases when messages that relate to social norms are presented (e.g., "paying taxes means that we all gain from vital public services like the National Health Service, roads and schools").

Köbis et al. (2019) found in a field experiment that there was a lower bribery descriptive norm and fewer bribes in a game where participants were exposed to posters with anti-bribery messages. Similarly, Abbink et al. (2018) showed that participants offered twice as many bribes in a game when they knew they were interacting with a person whose companions were mostly corrupt, contrary to when they knew that most were honest.

The present study aims to evaluate the effects of the descriptive dishonesty norm in cooperation for personal gain. The guiding question in this study is, to what extent can a common standard of dishonesty increase cooperation for corruption? It is hypothesized that higher corruption behavior will be observed in the descriptive dishonesty norm than in the control condition.

Method

Participants

72 people participated, 56.9% women and 40.28% men, with a mean age of 21.95 (SD = 7.64). 8.57% had incomplete high school or lower studies, 50% completed high school, 25.71% had incomplete university studies, and 15.71% completed university studies. Participants were randomized; there were 36 participants in the control condition and 36 in the experimental condition. Of the 96 people invited, nine people declined the invitation, 11 agreed to participate but did not continue with the communication, and four people were excluded from the analysis for guessing at the study objectives.

Procedure

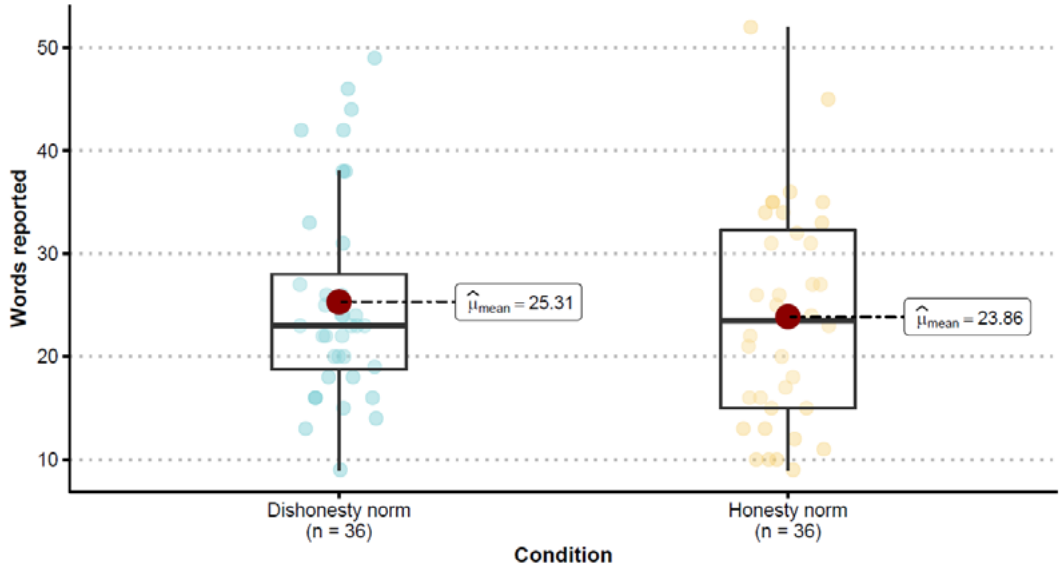
Adjustments were made to the experimental conditions of Study 1. There was only one group chat on the Hangouts platform in this study with two participants and six confederates. After each round, they were asked to report in the group chat how many words formed. In the control condition, six confederates, who supposedly played as three pairs, reported the words they had formed without exceeding the goal of five words. In the experimental condition (dishonesty norm), the six confederates reported forming more words than they did, exceeding the goal in two rounds. They reported on the public chat that they did it to earn more money and recover from the losses of the previous rounds. Thus, the participants were exposed to a descriptive norm of violating the honesty norm.

Two participants played as a pair in each experimental session in this case. They had the dilemma of whether to follow the other teams and report that they had exceeded the goal or to report the number of words they really formed. Everything else was done in the same way as in the procedure described in Study 1.

Results

In this study, 25% of the participants reported exceeding the limit in the condition with the honesty norm compared to 27.8% who exceeded it in the condition with the dishonesty norm, although the difference is not statistically significant and the effect size is very small, $\chi^2(1) = 0$, $p = 1$, 1-β = .79, V = .0, 95% CI [0, 1]. The average reported words were 25.31 (SD = 10.02) in the dishonesty condition and 23.86 (SD = 10.65) in the honesty condition (Figure 3), being this difference not statistically significant, $W = 694$, $p =$. 608, 1-β = .61, $r_b = 0.07$, 95% CI [-.19, .33].

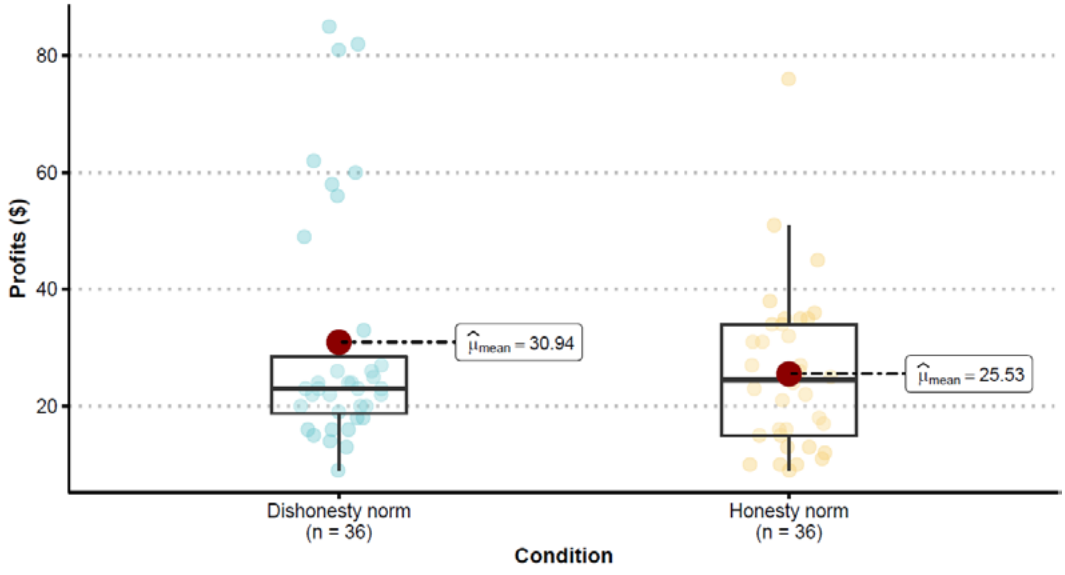
Figure 3
Words reported by participants according to the condition in which they played (Study 2)



Note. Average of words reported, quartiles, and outliers in each condition

Neither were significant the differences found in the average profits for the conditions of dishonesty ($30.94, *SD* = 25.79) and honesty ($25.53, *SD* = 13.77), $W = 694$, $p = .608$, $1\text{-}\beta = .51$, $r_b = .07$, 95% CI [-.19, .33], as seen in Figure 4.

Figure 4
Average profits of participants according to the condition in which they played (Study 2)



Note. Average profits, quartiles, and outliers in each condition

Discussion

This study found no significant differences in the reports of exceeding the goal, the average number of words reported, or the profits received in both conditions, rejecting the hypothesis.

A first explanation of what happened is that, for a norm to affect the behavior of group members, it must be seen as a focus of attention (Cialdini et al., 1991). The participants had to focus on the other pairs reporting word counts that exceeded the limit. In the results of Cialdini et al. (1991), it is observed that those who were exposed to a model that threw garbage in a dirty environment threw more trash out of the dumpster. Still, those who saw the same model in a space where no one else had thrown garbage before followed the example of the others and not the model, not littering. It is possible that the environment generated by the experimental procedure, being a university project dedicated to science, gave the impression of a *clean environment*, where most people had to follow the rules, and only some transgressed them, but not for that, they represented a good role model.

A descriptive norm (frequency of behaviors) was used in this work. Still, an injunctive norm was not used, which is defined as those behaviors that are approved or disapproved by people explicitly (Cialdini et al., 1990). It is likely that the participants just disagreed with cheating because they did not want to transgress the honesty norm, they did not want to cause harm to third parties, or they feared some punishment for cheating. Brauer and Chaurand (2009) already indicated that injunctive norms were strongly related to social control, which could have happened in this study. Through various studies, Eriksson et al. (2015) point out that injunctive norms of disapproval can arise when conduct is considered unusual (descriptive norm). It may have been unusual to observe six confederates cheating so openly rather than privately, as usual in corrupt acts.

Study 3: social sanctions on cooperation for corruption

Fehr and Gächter (2000) found that cooperators punished non-cooperators (free riders) even though this implied a cost and did not reflect immediate gains for them. *Altruistic punishment* is the act in which people punish free riders even if this results in a cost for them and does not produce immediate material gains (Fehr & Gächter, 2002). Egas and Riedl (2008) found that cooperation is only maintained if there are optimal conditions to do the altruistic punishment, as its high impact and low cost.

Bond (2019) observed in experimental procedures of altruistic punishment that participants modify their behavior depending on the level of cooperation of others. Likewise, when the cost is low and the impact is high, the effects on the cooperation last longer and spread among more people in the network. Zhang et al. (2017) simulated free-rider punishment strategies proposing a situation where the cost of punishment is shared by cooperators, finding that there is greater cooperation when free-riders are punished and a decline in cooperation when there is no punishment.

However, other studies indicate that, although people punish people who offend them directly or people close to them, they are very unwilling to punish those who offend strangers, although they do show a certain level of anger about that situation (Pedersen et al., 2018). This willingness to punish people who offend strangers is, in fact, almost null in not experimental situations (Pedersen et al., 2020).

The research question guiding this study is: To what extent does the mechanism that allows altruistic punishment or the anonymous demand for transparency affect cooperation in corruption acts, compared to a scenario where punishment and transparency are impossible?

As a hypothesis, less cooperation to transgress the game rules for benefit increasing (corruption) is expected in the punishment and transparency conditions than in the control condition. If the

anonymous demand for transparency has a lower social cost than the altruistic punishment previously used in the studies by Fehr and Gächter (2000, 2002), a greater willingness to participate against corruption is expected in the transparency condition than in the punishment condition.

Method

Participants

There was an initial sample of 133 participants, of whom 10 abandoned the procedure. Three were discarded from the final sample for guessing at the study objectives or not adequately understanding the procedures. Finally, data from 120 participants were analyzed, 50.42% were women, and 48.74% were men; the ages were between 18-70 years (M = 24.4, SD = 7.28). Regarding the level of studies, 58.8% had incomplete professional studies, 26.9% completed professional studies, and 9.2% had high school or lower studies. All were residents of the metropolitan area of Léon, Guanajuato.

Instruments

Excel registration forms were filled out online from Google platforms to enter the game. The results of the tasks assigned in each experimental round were recorded in these formats. In addition, there was a sociodemographic section where the participants answered about their age, educational level, and sex.

Procedure

It was explained to them that they would play in teams of two people, connected online with eight more players plus the experimenter; but only one player was real, and the others were confederates. The game was played on a Google spreadsheet, which was accessed with a link shared in the group chat. On the sheet, there was a table with columns of the pair and player number, along with the instructions for the game.

Excel registration forms were filled out online from Google platforms to enter the game. The results of the tasks assigned in each experimental round were recorded in these formats. The experimental session consisted of 10 rounds in which participants had to form words with letters provided. In each round, the letters were written in a table column.

The earnings of each pair appeared at the bottom of the table, added automatically as they reported the number of words. Both players earned $1 for each word they formed, which was kept in a common fund that would be shared among all players finishing all rounds. For each round, a goal of 5 words was set. If the pair exceeded that goal, the players could keep the profits in that round in a private fund, which would not be shared with the other teams, and take $1 from the common fund. With this payment scheme, players had incentives to report more words, but if many did, they would deplete the common pool for everyone, simulating the tragedy of the commons.

Participants had a Confederate teammate, who during rounds six and 10 of the procedure reported false higher data to have more profits in the private fund (corruption). These profits only would be received if the participant also reported having exceeded the word goal, signaling cooperation. Additionally, pair two reported in rounds two, three, six, nine, and 10 that they had exceeded the word limit, registering between six and eight words for each player in that pair, so their profits were higher than the other teams. This stimulus made it possible to analyze whether the participants decided, depending on the experimental condition, to punish or request that the results of that pair be investigated (transparency).

Participants were randomly assigned to one of three conditions. In the punishment condition, participants could punish other players if they believed they were cheating, paying $1 for each punishment, and subtracting the punished team's profits in that round. Punishment was openly requested in a group chat so that everyone could see it. On the condition of transparency, the participants could pay $1 for asking in the

experimenter's private chat to investigate a team if they considered that it was cheating. Supposedly, if the reported team was found to be cheating, they were penalized with the profits from the round in which they were reported. Participants were informed that neither the amounts paid for transparency or punishment nor the profits taken from those allegedly cheating, would be returned to the common fund, making it clear that they would not have direct gains from these decisions. In the control condition, the participants could not request punishment or transparency as in the other conditions.

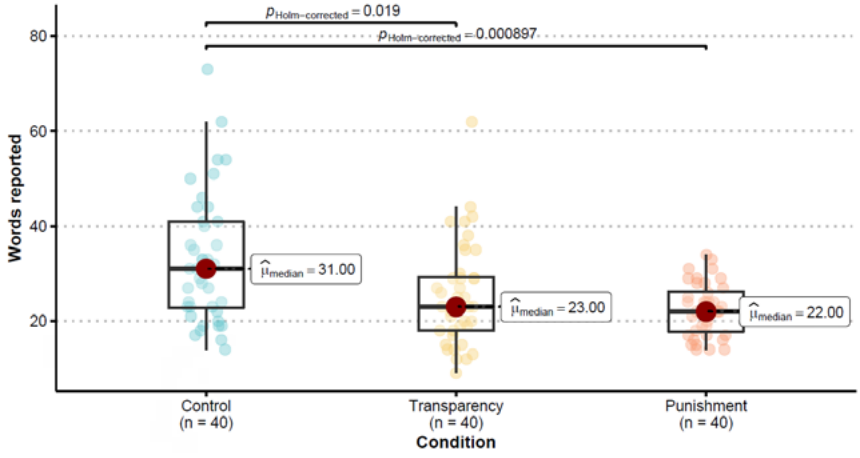
At the end of the ten rounds, the post-experimental interview was carried out. The common fund was distributed among all the participants, and ways were agreed to send them the corresponding earnings, indicating that they could also keep their initial contribution. They were informed about the experimental manipulations of the procedure, its objectives, and the contact details with the research team were reiterated.

Results

In the first analysis, the number of times it was reported to exceed the goal in each condition was compared through a contingency table. As expected, in the control condition there were a greater number of reports of exceeding the goal, with 47.5% of cases, compared to 20% in the transparency condition and only 7.5% in the punishment condition, differences that are statistically significant with medium effect size, $\chi^2(2) = 17.86$, $p < .001$, $1\text{-}\beta = .43$, $V = .36$, CI 95% [.18, 1].

In addition, Kruskal-Wallys's test was used to analyze whether there were differences in the words reported in the experimental conditions. Again, the participants in the control condition reported a higher number of words ($M = 32.83$, $SD = 13.66$, $Mdn = 31$) compared to the conditions of transparency ($M = 25.50$, $SD = 10.88$, $Mdn = 23$) and punishment ($M = 22.45$, $SD = 5.51$, $Mdn = 22$), differences that are statistically significant with medium effect size, $H(2) = 13.90$, $p < .001$, $1\text{-}\beta = .62$, $\varepsilon^2 = .12$, CI 95% [.04, 1], as seen in Figure 5. Post hoc analysis with Dunn's test indicates that differences are generated between the control condition with the transparency condition, $p = .018$, and with the punishment condition, $p < .001$, without being significant between the transparency and punishment conditions, $p = .307$. The post hoc tests were performed with the *rstatix* package (Kassambara, 2021).

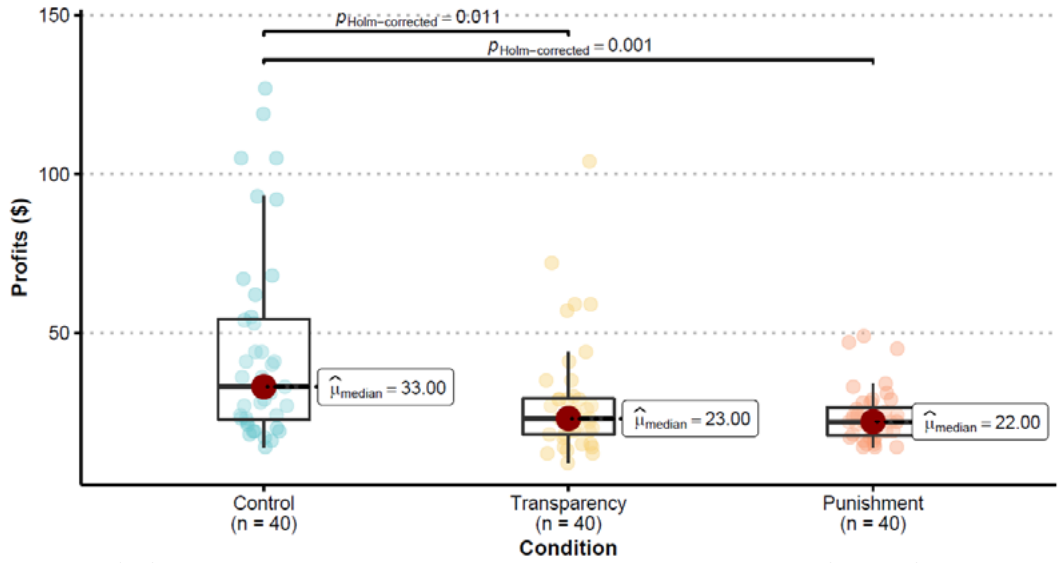
Figure 5
Words reported by participants according to the condition in which they played (Study 3)



Note. Medians of reported words, quartiles, and outliers are shown. Pairwise comparisons were made with Dunn's test with Holm's fit; only significant comparisons are shown

Once again, in the control condition the profits were higher (M = 52.4, SD = 43.50, Mdn = 33) compared to the transparency condition (M = 30.3, SD = 20.69, Mdn = 23) and the punishment condition (M = 23.8, SD = 8.46, Mdn = 22), resulting in significant differences with medium effect size, $H(2) = 14.01$, $p < .001$, 1- β = .69, $\varepsilon^2 = .12$, CI 95% [.04, 1] as shown in Figure 6. Post hoc analyses with Dunn's test indicate that the differences are generated between the control condition with the transparency condition, p = .011, and with the punishment condition, p = .001, without being significant between the transparency and punishment conditions, p = .433.

Figure 6
Profits of participants according to the condition in which they played (Study 3)



Note. Medians of profits, quartiles, and outliers are shown. Pairwise comparisons were made with Dunn's test with Holm's fit; only significant comparisons are shown

Regarding requests for punishment or transparency, only 4 (10%) participants in the transparency condition requested a total of 14 reports. In the punishment condition, 6 (15%) participants requested a total of 20 punishments from other couples. The percentages of those who requested reports or punishments in each condition do not differ significantly from each other, $\chi^2(1) = 0.11$, p = .735, 1-β = .73, v = .0, CI 95% [.0, 1].

Discussion

As in the studies by Fehr and Gächter (2000, 2002), implementing the possibility of punishing others turned out to be an effective measure to keep the transgression of norms to the detriment of the majority. Previous computational simulations show that sanctions against the violation of norms are more effective when they are performed by the majority than when they are concentrated on a few agents (Chen et al., 2014), although the success of these measures to preserve cooperative ties in a social system largely depend on whether sanctions are sufficiently costly (Zhang et al., 2017).

Therefore, for altruistic punishment to reduce the transgression of norms, a significant proportion of the population must forcefully punish the transgressors. However, studies show little willingness in natural conditions to punish others who have not directly affected us (Pedersen et al., 2020). Even in laboratory conditions, people prefer to

avoid the responsibility of sanctioning others when they are offered the opportunity, even if they had committed to doing so (Kriss et al., 2016). This low willingness to punish others for their acts of corruption can be especially low in countries with chronic corruption problems, where even beliefs that justify corruption are established in the culture (Cruz et al., 2020). Furthermore, even with the potential for altruistic punishment to contain rule transgression, the solution cannot simply be to promote or support altruistic punishment without considering the possible consequences for the punishers. For example, Front Line Defenders (2021) reports that in 2020 at least 331 people were killed in the world for their work as human rights defenders, besides those who are threatened or persecuted even by the governments of their own countries.

Bauhr et al. (2020) review shows that transparency mechanisms effectively combat corruption. Even the governments of highly corrupt countries tend to adopt transparency and anti-corruption policies, especially in legitimacy crises, corruption scandals, and high political competition. They often adopt these policies to signal change or honesty, hoping to be in control of their implementation to maintain their impunity. But this is usually a wrong calculation. The pressures of the electorate and other internal or external political forces can promote the effective implementation of transparency and the fight against corruption (Schnell, 2018).

This study shows that a system that makes it possible to request access to transparency easily can be as dissuasive to corruption as altruistic punishment, also involving fewer risks for citizens. To delimit the actual scope of these tools, it would be necessary to assess aspects as the regulatory burden associated with requests for transparency in different nations and the willingness and capacities of citizens to make these requests.

We consider that the experimental procedure presented is a contribution that can be easily adapted in future studies to other nearby topics, for example, for the analysis of strong reciprocity (Gintis et al., 2008), where, in addition to sanctioning free-riders (strong negative reciprocity), cooperation with those who respect the rules would be privileged, even though cooperating with corrupt people could bring higher personal benefits (strong positive reciprocity).

General conclusions

We consider that the experimental model successfully represents cooperation, the formation of a common fund, the transgression of the rule of honesty, and damage to third parties in corruption, in a relatively inexpensive procedure without problems of experimental death due to abandonment or poor understanding of the rules.

Results show evidence of how public or private sanctions can be a viable strategy to maintain cooperation to prevent corruption. However, for these strategies to work, sanctions must be applied effectively, where people have the certainty that their complaints will be dealt with effectivity, without allowing impunity.

Among the limitations of this work, it is possible, as in any experimental design, that the results are due to the controlled and artificial situation, and that in real scenarios they become complicated to achieve, as some authors already mentioned regarding the effectiveness of punishment (Pedersen et. al, 2020). As Julián and Bonavia (2017) identify in their theoretical review, much of the research on corruption is done through experimental methods that can present artificial situations, but at the same time constitute a valuable tool to model possible modifications to the rules or sanctions as are presented in this study. However, the results are consistent with those found previously, favoring the idea of the possibility of generalizing them and applying them to public policies (Belaus et al. 2016).

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Appendix A

Provided letters and possible words in each game round

Round	Letters	Possible words							
Test 1	Q A C B O A	ABACO	CAOBA	ABOCA	ACABO	BACA	BOCA	CABO	COBA
Test 2	O P S A	SOPA	SAPO	POSA	PASO	PASÓ	ASPO	ASPÓ	OPAS
1	E H A V T G	VEGA	GETA	VAHE	VETA	VATE			
2	V G A A P H	PAVA	HAGA	PAGA	VAGA	VAHA			
3	Q O T O R	ROTÓ	ROTO	TORO	OTRO	ORTO			
4	P H E Q T A	PATÉ	PATE	PETA	TAPE	TAPÉ			
5	A X A M S A	AMAS	ASMA	SAMA	MASA	AMASA			
6	X T H A J E	JATE	TEJA	TAJÉ	TAJE	JETA			
7	T T Q O R U	TUTOR	TOUR	TUTO	RUTO	RUTÓ			
8	L I Q E F C	FIEL	FICE	FICÉ	FILE	FILÉ			
9	S O Q L W O	SOLO	OSLO	LOSO	LOSÓ	SÓLO			
10	O A P Q L A	APOLA	LAPO	PALO	PALA	LAPA			

Note: The possible words were obtained in a word generator considering the instructions of the game, that is, words of at least four letters in spanish. The resulting words were verified in the dictionary of the Royal Spanish Academy.

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Social-Cognitive Mechanisms of Moral Disengagement, Gender Differences and Psychological Predictors in Young Populations

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SCIENTIFIC RESEARCH ARTICLE

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Social-Cognitive Mechanisms of Moral Disengagement, Gender Differences and Psychological Predictors in Young Populations

Abstract

The theory of moral disengagement has been useful in explaining disruptive social behavior in young people, showing differences between men and women. However, there are no studies regarding the association of psychological factors, as impulsivity, self-esteem, anxiety, and moral disengagement. Therefore, we analyzed gender differences and psychological predictors of moral disengagement mechanisms in young people. This was a quantitative, cross-sectional, comparative, and correlational study. Participants were 1,419 young people aged 16 to 30 years (M = 20.6, SD = 3.32) who answered the Mechanisms of Moral Disengagement Scale (MMDS), the Barratt Impulsivity scale (BIS-11), the Rosenberg Self-Esteem Scale (RSES) and the Beck Anxiety Inventory (BAI). A Student's t-test showed that men had higher scores on moral disengagement mechanisms and self-esteem, and women had higher scores on anxiety. Moral disengagement mechanisms were found to be inversely correlated with self-esteem, but directly correlated with impulsivity and anxiety. Multiple linear regression analysis showed that self-contempt, impulsivity, anxiety, and gender had the strongest effects on predicting moral disengagement and mechanisms. These effects were similar for men and women. This study provides important information about the influence of psychological factors not explored in previous studies on the understanding of moral agency in young people.

Keywords: Anxiety, impulsivity, moral cognition, moral disengagement, self-esteem.

Mecanismos Socio-Cognitivos de Desconexión Moral, Diferencias de Sexo y Predictores Psicológicos en Jóvenes

Resumen

La teoría de la desconexión moral ha sido útil para explicar el comportamiento social disruptivo en jóvenes, mostrando diferencias entre hombres y mujeres. Sin embargo, no existen estudios sobre la asociación de factores psicológicos, como la impulsividad, la autoestima, la ansiedad y la desconexión moral. Por lo tanto, se analizaron las diferencias de sexo y los predictores psicológicos de los mecanismos de desconexión moral en jóvenes. Se trató de un estudio cuantitativo, transversal, comparativo y correlacional. Los participantes fueron 1.419 jóvenes de entre 16 y 30 años (M = 20,6, DE = 3,32) que respondieron las escalas de Mecanismos de Desconexión Moral (MMDS), Impulsividad de Barratt (BIS-11), Autoestima de Rosenberg (RSES) y el Inventario de Ansiedad de Beck (BAI). Una prueba t de Student mostró que los hombres tenían puntuaciones más altas en los mecanismos de desconexión moral y autoestima, y las mujeres tenían puntuaciones más altas en ansiedad. Los mecanismos de desconexión moral estaban inversamente correlacionados con la autoestima, pero directamente correlacionados con la impulsividad y la ansiedad. El análisis de regresión lineal múltiple mostró que el autodesprecio, la impulsividad, la ansiedad y el sexo tenían los efectos más fuertes en la predicción de la desconexión moral. Estos efectos fueron similares para hombres y mujeres. Este estudio proporciona información importante sobre la influencia de factores psicológicos no explorados en estudios anteriores sobre la comprensión de la agencia moral en los jóvenes.

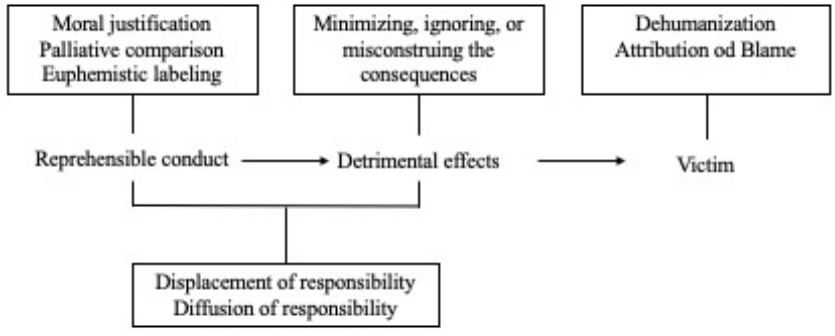
Palabras clave: Ansiedad, impulsividad, cognición moral, desconexión moral, autoestima.

Introduction

The study of moral cognition has been useful for understanding people's social behavior precisely because individual and collective moral-ethical standards are a valuable reference for analyzing and predicting social behavior (Bandura, 1991; Gómez & Durán, 2021a). Bandura (1999, 2002, 2016) points out that an individual`s social behavior is fundamentally dependent on social-cognitive mechanisms. These mechanisms self-regulate human behavior according to moral standards and ease the understanding of what is right from what is wrong. Likewise, this self-regulation is related to the negative assessment of group norm violations and therefore self-sanctioning and self-censorship is activated (guilt, shame, self-condemning) (Bandura et al., 1996, 2001; Moore, 2015).

However, self-sanctioning can be avoided by convincing oneself that ethical standards do not apply to oneself in a particular context. It involves a process of cognitive restructuring or reframing of destructive behavior as being morally acceptable without changing the behavior or the moral standards (Bandura, 1990, 2002; Giulio et al., 2018; Petruccelli et al., 2017). Individuals refrain from behaving in ways that violate their moral standards to avoid self-condemnation. Therefore, self-sanctions play a significant role in keeping conduct in line with these internal moral standards and hence in regulating inhumane conduct (Bandura et al., 1975; Gómez & Narváez, 2019). This cognitive restructuring process is known as moral disengagement. Bandura (1991, 1999, 2002, 2016) introduced eight moral disengagement mechanisms that explain how self-sanctioning is deactivated and disconnected from harmful behaviors.

Figure 1
Mechanisms and domains of Moral disengagement



Source: Bandura (1991,1999).

Empirical evidence from the last thirty years have found that both moral disengagement and social cognitive mechanisms are highly associated with the onset of not only antisocial and criminal behavior, but also bullying, cyber bullying and physical and verbal aggression in young samples (Bandura et al., 1996; Bakioğlu & Çapan, 2019; Caprara et al., 2014; Gini et al., 2014, 2015; Hyde et al., 2010; Hardy et al., 2015; Paciello et al., 2008; Runions et al., 2019). It has also been reported

that moral disengagement predicts antisocial and criminal behaviors in young offenders (Giulio et al., 2018; Petruccelli et al., 2017; Shulman et al., 2011). Recent studies in young individuals have found a negative association between moral disengagement, empathy, emotional self-efficacy and prosocial tendencies and a positive association with callous-unemotional traits (Bandura et al., 1996; Gómez et al., 2019; Gómez & Narváez, 2019; Muratori et al., 2017; Walters, 2017). These findings suggest that higher levels of moral disengagement led to an increased likelihood of aggressive behaviors and externalizing disorders, therefore, the chances to display prosocial behaviors towards the victim decrease.

Gender differences have also been described in young samples. Males have scored higher than women in moral disengagement tests (De Caroli et al., 2011; Bjärehed et al., 2019; Gómez y Narváez, 2019; Gómez & Duran, 2021b). These differences contributed to the differential effects when predicting externalizing behaviors in men (impulsive behavior, aggression, intimidation) (Cabrera et al., 2020; Charalampous et al., 2021; Espejo-Siles et al., 2020). Men scored higher than women on psychopathic traits (callous-unemotional and grandiose-manipulative) and reactive aggressive behavior (Orue et al., 2016). This trend could explain how some moral disengagement mechanisms operate and affect disruptive behaviors (Espejo-Siles et al., 2020).

Conversely, women scored higher than men in internalizing behaviors (anxiety, low self-esteem) – (Campos et al., 2019; Rescorla et al., 2018), impulsive–irresponsible traits (Orue et al., 2016), and higher levels of prosocial behavior and affective empathy toward others (Gómez & Duran, 2020; Longobardi et al., 2019; Mestre et al., 2009; Van der Graaff et al., 2014, 2018).

The tendency of men to show externalizing behaviors and of women to show internalizing behaviors, as well as differences in the use of moral disengagement, have been studied independently. However, the relationship between the effect of psychological factors on moral disengagement strategies based on gender differences is not yet clear. It could be an interesting and enriching field of study.

Currently, there is a lack of studies that focus on the relationship between trait impulsivity and moral disengagement in men, as interest has focused on aggressive and antisocial behavior, leaving aside the analysis of impulsivity as a potentially precipitating factor. The relationship between some internalizing traits in women, as self-esteem and anxiety, and their possible association with moral disengagement has also not been examined.

On one hand, most research is focused on the direct effect and mediating role of moral disengagement in predicting disruptive behavior in young populations. On the other hand, there is a lack of works related to the effects of psychological variables- anxiety, self-esteem and impulsivity- on social cognitive mechanisms of moral disengagement. Thus, more research is needed to analyze whether moral disengagement depends on these psychological variables in young samples. In addition, it is important to determine whether differences between males and females in variables as anxiety, self-esteem, and impulsivity have a differential effect on the mechanisms of moral disengagement.

Empirical evidence supporting this hypothesis is scarce and scattered. However, some authors have suggested that self-sanctioning disengagement, a product of the use of moral disengagement, allows people to maintain high positive evaluations of themselves even after committing immoral or cruel acts (Zhao et al., 2017; Liang et al., 2018). Moral self-image is related to the view of our own actions and is flexible to the cognitive assessment of social and moral behavior (Jordan et al., 2015). Thus, it is plausible that self-esteem, understood as how one evaluates and responds emotionally to oneself, is associated with moral disengagement.

In addition, impulsive people cannot postpone rewards, regulate emotions, make assertive decisions or acting without thinking (Georgiou et

al., 2019). These factors are considered to predict aggressive, violent, and antisocial behavior in young populations (Carlotta et al., 2011; DeShong, & Kurtz, 2013; Dodaj et al., 2020). Thus, it is plausible that young people who tend to behave impulsively would resort more frequently to the different mechanisms of moral disengagement to change the valuational perception of their behaviors.

Furthermore, anxiety implies subjective feelings of intense fear and concern about daily situations and can increase when coping with psychological stress and lead to the development of maladaptive beliefs, psychological breakdowns, feelings of self-censorship, and social isolation. Anxiety is usually related to an individual´s behavior and even to external situations that cause discomfort. Hypothetically, anxiety may be positively associated with moral disengagement as a way of avoiding emotional distress, justifying maladaptive actions and beliefs associated with anxiety symptoms.

A recent study analyzed the effects of Machiavellianism and ethical values on the anxiety of 115 young Chinese university students (Tang & Li, 2021). The results showed that both Machiavellianism —personality trait that denotes cunningness, the ability to be manipulative, and a drive to use whatever means necessary to gain power— and ethical values significantly influence anxiety. Specifically, in the sample of youth with strong ethical values, anxiety levels increased significantly as Machiavellianism levels increased. Those with high levels of Machiavellianism and strong ethical values showed higher levels of anxiety compared to those with low levels of Machiavellianism but similar ethical values. In contrast, among youth with weak ethical values, there was no significant difference in anxiety levels between those with high and low levels of Machiavellianism.

This study suggests that the conflict between Machiavellian beliefs and ethical values oriented towards benevolence and universalism generates anxiety and psychological distress. In this sense, in situations of dissonance between moral cognitions and actions —for example, believing that violence is immoral and engaging in violent behavior— a moral conflict is generated that leads to psychological stress and anxiety. To reduce these anxiety states, moral disengagement and its various mechanisms, which function as routes of cognitive reconstruction of immoral behavior, are resorted to. However, this relationship between anxiety and moral disengagement has not been explored in previous studies.

The association between self-esteem, impulsiveness, anxiety, and social cognitive mechanisms of moral disengagement in young samples based on gender is a rich field line that might explain how psychological factors impact moral agency. Besides, these associations are not clear in previous studies.

This study aimed at analyzing gender differences and the effect of self-esteem, impulsivity, and anxiety on social cognitive mechanisms of moral disengagement in young populations. This study also hypothesized:

H1: Men will score significantly higher than women on all moral disengagement mechanisms.

H2: Positive self-esteem (Self-Respect) has negative correlations and predictive effects, and negative self-esteem (Self-Deprecation) has positive correlations and effects on total moral disengagement mechanisms.

H3: Anxiety and impulsivity are positively correlated and predict moral disengagement.

H4: Impulsivity is a strong predictor of moral disengagement in males, whereas anxiety and self-esteem (positive and negative) are stronger predictors in females.

Method

This was a quantitative, observational, prospective, cross-sectional study. The scope of the study was associative.

Participants

A simple probability sample was taken from the total enrollment in higher education in Colombia (n = 2,355,603). The proportion of the

university population is mostly female and between 16 and 20 years of age. Participants were 1419 young college students in two Colombian cities, Manizales (54.2%) and Medellin (45.8%). By gender, 971 participants were female (68.4%), 448 were males (31.6%). The mean age was 20.6 years old (*SD* = 3.32). Participants were between 16 and 30 years old (from 16-20 years old (*n* = 861, 60.7%), 21-25 years old (n = 412, 29%) and 26-30 years old (*n* = 146, 10.3%)).

Based on marital status, 61.2% of the sample were single, and 38.8% had some type of relationship: couples (32.3%), married (2.2%), common-law partners (3.7%), divorced/separated (0.6%). Likewise, 23.5% of the sample belong to low socioeconomic status (1-2), middle class (3-4) (66.7%), and high socioeconomic status (5-6) (9.8%).

Measures

Sociodemographic data.

Participants were required to fill a sociodemographic questionnaire that included age, sex, socioeconomic status and marital status.

Mechanisms of Moral Disengagement Scale-MMD

(Bandura et al., 1996). The scale was developed to assess the construct of moral disengagement and how it directly or indirectly influences transgressive behavior. The instrument was adapted and validated in Spanish with adolescent population in Spain (Rubio-Garay et al., 2017) and university population in Colombia (Gómez et al., 2023). The Spanish version consists of 32 items with a 5-point Likert scale (1 = Totally disagree) (5 = Totally agree). The instrument consists of four-item subscales, each corresponding to eight moral disengagement mechanisms. Moral justification, euphemistic labeling, palliative comparison, displacement of responsibility, diffusion of responsibility, distortion of consequences, attribution of blame, and dehumanization.

The psychometric properties of the Spanish validated test showed good fit index for the scale according to the eight moral disengagement mechanisms and for the general construct (Gómez et al., 2023; Rubio-Garay et al., 2017). This questionnaire has been used in young samples and showed a Cronbach´ s alpha between .82 and .93 (Bandura et al., 1996; Bandura et al., 2001; Gini et al., 2014; Gómez & Narváez, 2019; Hardy et al., 2015; Paciello et al., 2008).

Barratt Impulsiveness Scale, v.11, BIS-11

(Patton et al., 1995). The BIS-11 is composed of 30 items with Likert-type questions in which participants report the frequency of different impulsive behaviors (from 1 rarely or never to 4 often or always). It measures global impulsivity and three main factors have been identified: Cognitive, motor, and non-planned impulsiveness. A previous systematic review suggested a cutoff score over 74 (global impulsiveness) in psychological studies (Stanford et al., 2009). Cronbach's alpha value in this study was .78 in the global score and .70 for subscales. The global impulsivity score was used in this study. Internal consistency for this study was assessed using McDonald's Omega (ω) coefficient, and the results are shown in Table 1.

The Rosenberg Self-Esteem Scale-RSES

(Rosenberg, 1965). Is a widely accepted 10-item questionnaire used to assess global self-esteem. It assesses both positive and negative self-perceptions. The scale is generally considered to be unidimensional. Participants respond to each statement on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree. Responses indicating low self-esteem are "disagree" or "strongly disagree" for items 1, 3, 4, 7, and 10, and "strongly agree" or "agree" for items 2, 5, 6, 8, and 9. Each item contributes to the overall self-esteem score. Validation studies have confirmed the excellent internal consistency of the scale and have identified both bifactorial (Cogollo et al., 2015; Gómez-Lugo et al., 2016; Hyland et al., 2014) and unifactorial

(Martín-Albo et al., 2007) structures in different research contexts, allowing its use to assess global self-esteem, as negative (Self-Deprecation) and positive self-esteem (Self-Respect) factors. The internal consistency of the instrument for this study was assessed using McDonald's Omega Coefficient (ω) and the results are shown in Table 1.

Beck Anxiety Inventory, BAI

(Beck et al., 1988). It consists of 21 items with a Likert scale ranging from 0 to 3 and raw scores ranging from 0 to 63. It measures the severity of an anxiety disorder in adults and adolescents. Because the items in the BAI describe the emotional, physiological, and cognitive symptoms of anxiety but not depression, it can discriminate anxiety from depression. The BAI scores are classified as minimal anxiety (0 to 7), mild anxiety (8 to 15), moderate anxiety (16 to 25), and severe anxiety (30 to 63). It has been validated in Spanish in clinical and non-clinical contexts, with a reported Cronbach's alpha value of .93 and statistically significant correlations with the Beck Depression Index (BDI) ($r = .63$) (Magán et al., 2008). The internal consistency of the instrument for this study was assessed using McDonald's Omega Coefficient (ω) which results are shown in Table 1.

Procedure

The instruments were administered in university settings in both cities in Colombia. The procedure for administering the instruments was face-to-face in classrooms in groups of approximately 20 to 40 people. Participants completed the informed consent form and then completed the instruments with pencil and paper. Administration of the instruments took between 45 and 60 minutes per group, and data collection was completed over a three-month period. Ethical guidelines for studies considered to involve minimal risk to human subjects (Resolution 008430/1993) were followed. The study was funded and supported by the Universidad Católica Luis Amigó, Colombia (0502029977). In accordance with Law 1090/2006 and Resolution 008430/1993, this study complies with the principles and procedures of ethical research (respect for the dignity and confidentiality of persons).

Data Analysis

The analyses were conducted on IBM SPSS Statistics 25 (IBM Corporation 2017). Missing data or incorrect answers were checked according to the instrument options and the distribution of the data was determined. McDonald's omega (ω) is based on factor loadings (Gerbing & Anderson, 1988), which allows for greater stability in calculations for multidimensional scales (McDonald, 1999). Unlike Cronbach's alpha, that can be affected by the number of items in a scale, the reliability estimate of omega is not as dependent on the number of items.

Then, descriptive analysis was performed to get mean values and standard deviations of the research variables. A comparative analysis of each disengagement mechanism, self-esteem, and anxiety was conducted controlling gender through Student´s t for independent samples. The p-values of statistical significance and the effect size (Cohen's d) of the statistical difference were reported. Cohen's (1988) procedure and interpretation was used: small effect ($d = 0.2$), medium effect ($d = 0.5$), large effect ($d = 0.8$).

A correlation analysis was then performed using Pearson's r coefficient between the variables of self-esteem (global, positive, and negative), impulsivity, anxiety, and the mechanisms of moral disengagement. Finally, a multiple linear regression model was performed, and every moral disengagement mechanism was the response variable. A regression model was also calculated for males and females to be able to analyze the effects of the predictor variables according to gender. The input method was used for the regression analyses. The assumptions of non-collinearity, homoscedasticity, and independence of the residuals were examined. A collinearity diagnostic was performed, the dispersion of the standardized residuals was analyzed, and the Durbin-Watson statistic was used to assess the independence of the residuals.

Results

The descriptive analysis with measures of central tendency and dispersion and the analysis of internal consistency using McDonald's Omega are presented in Table 1.

Table 1
Reliability and descriptive analysis for moral disengagement, self-esteem, impulsiveness, and anxiety

Variables	**ω**	*M (SD)*	*Min*	*Max*
Moral disengagement	.91	1.67 (.45)	1.0	4.1
Moral Justification	.84	1.74 (.73)	1.0	5.0
Euphemistic Labeling	.73	1.91 (.59)	1.0	4.8
Palliative Comparison	.76	1.29 (.46)	1.0	4.8
Displacement of responsibility	.76	1.71 (.61)	1.0	4.8
Diffusion of responsibility	.72	1.91 (.75)	1.0	5.0
Distortion of consequences	.81	1.90 (.70)	1.0	5.0
Attribution of blame	.76	1.45 (.53)	1.0	5.0
Dehumanization	.86	1.45 (.67)	1.0	5.0
Positive Self-esteem (Self-Respect)	.88	3.43 (.52)	1.0	4.0
Negative Self-esteem (Self-Deprecation)	.82	2.12 (.69)	1.0	6.6
Self-esteem (global)	.88	3.16 (.53)	1.0	4.4
Impulsiveness	.78	1.68 (.45)	0.4	3.0
Anxiety	.93	15.01 (11.74)	.00	71

Note. McDonald's omega coefficient, M= Mean; SD: standard Deviation; Min= Minimum score; Max= Maximum score.

Table 2 shows comparisons based on gender. Results indicate that males scored significantly higher than females on moral disengagement, and the effect size was medium. Males also scored significantly higher on each specific mechanism of moral disengagement except diffusion of responsibility ($p<.01$). On the other hand, moral justification, euphemistic labeling, and dehumanization showed medium and large effect sizes ($d \geq .5$) (Cohen, 1988). Self-esteem (global), positive self-esteem (self-respect), and impulsivity also showed higher scores for males ($p<.05$), with small size effects ($d \leq .4$). Conversely, females scored significantly higher on anxiety ($p=.001$), and the effect size was small ($d \leq .4$).

Table 2 *Gender-based comparative analysis between moral disengagement, impulsivity, and anxiety*

Variables	**Females**	**Males**	**Statistical Test**		
	(N = *971)*	**(N =** *448)*			
	M (DE)	***M(DE)***	***t***	***p***	***d***
Moral disengagement	1.59(.39)	1.84(.51)	-10.305	<.001	.59
Moral Justification	1.57(.61)	2.10(.83)	-13.551	<.001	.77
Euphemistic Labeling	1.81(.52)	2.12(.67)	-9.417	<.001	.54
Palliative Comparison	1.23(.41)	1.40(.54)	-6.340	<.001	.37
Displacement of responsibility	1.66(.58)	1.81(.66)	-4.161	<.001	.25
Diffusion of responsibility	1.89(.73)	1.97(.80)	-1.768	.077	.11
Distortion of consequences	1.81(.65)	2.10(.77)	-7.337	<.001	.42

Variables	Females (N = *971)*	Males (N = *448)*	Statistical Test		
	M (DE)	*M(DE)*	*t*	*p*	*d*
Attribution of blame	1.38(.47)	1.59(.62)	-7.144	<.001	.40
Dehumanization	1.36(.58)	1.66(.79)	-8.105	<.001	.46
Positive Self-esteem (Self-Respect)	3.40(.53)	3.51(.48)	-3.776	<.001	.21
Negative Self-esteem (Self-Deprecation)	2.12(.69)	2.10(.68)	.584	.560	.03
Self-esteem (global)	3.14(.55)	3.21(.50)	-2.491	.013	.13
Impulsiveness	1.67(.46)	1.69 (.43)	-.924	.356	.04
Anxiety	15.73(11.33)	13.45(11.33)	3.418	.001	.20

Note. *M*= Mean; SD: standard Deviation; t= Student´s t test for independent samples; *p*= significance; *d*= Cohen´s *d*

Table 3 shows the correlations between moral disengagement, self-esteem, impulsivity, and anxiety in males and females. Moral disengagement was negatively associated with self-esteem (global) and positive self-esteem (self-respect), but positively associated with negative self-esteem (self-deprecation), impulsivity, and anxiety. These correlations were significant for both males and females (p<.01).

Table 3
Pearson correlation coefficient (r) between moral disengagement, self-esteem, impulsiveness and anxiety in males and females.

Correlations	1	2	3	4	5	6
1. Moral Disengagement	1	-.215***	-.163***	.216***	.287***	.253***
2. Self-esteem (global)	-.253***	1	.865***	-.921***	-.414***	-.347***
3. Positive Self-esteem	-.125**	.822***	1	-.601***	-.315***	-.275***
4. Negative Self-esteem	.267***	-.832***	-.557***	1	.415***	.339***
5. Impulsiveness	.298***	-.380***	-.276***	.426***	1	.341**
6. Anxiety	.263***	-.363***	-.320***	.383***	.347***	1

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

Note: Correlations from the upper matrix correspond to females and the lower diagonal corresponds to males.

Table 4 shows correlations between social cognitive mechanisms of moral disengagement, self-esteem dimensions, impulsivity, and anxiety. Each moral disengagement mechanism correlated significantly and negatively with self-esteem (global) and positive self-esteem (self-respect), but positively with negative self-esteem (self-deprecation), impulsivity, and anxiety.

Moral Justification had the strongest correlation coefficients with negative self-esteem and Impulsivity. On the other hand, dehumanization showed the strongest correlations with self-esteem (global) and positive self-esteem (self-respect). Palliative comparison showed the strongest correlations with anxiety.

Table 4
Pearson correlation coefficient (r) between moral disengagement (specific mechanisms), self-esteem, impulsiveness, and anxiety

Correlations	Self-esteem (global)	Positive Sef-esteem	Negative Sef-esteem	Impulsiveness	Anxiety
Moral Disengagement	-.170***	-.080**	.202***	.275***	.161***
Euphemistic labeling	-.145***	-.091***	.162***	.267***	.178***
Palliative Comparison	-.118***	-.072**	.125***	.183***	.182***
Displacement of responsibility	-.142***	-.088***	.155***	.144***	.152***
Diffusion of responsibility	-.125***	-.068*	.137***	.151***	.131***
Distortion of consequences	-.141***	-.093***	.151***	.232***	.123***
Attribution of blame	-.087***	-.022	.112***	.118***	.165***
Dehumanization	-.181***	-.127***	.187***	.213***	.169***

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

Table 5 shows the multiple regression analysis that facilitated the factors with the highest predictive effect on moral disengagement. Positive self-esteem (self-respect), negative self-esteem (self-deprecation), impulsivity, anxiety, and gender were the predictor variables and moral disengagement, and the eight mechanisms were the dependent variables. Results indicated that self-deprecation (β = 1.07, p = .001), impulsivity (β = .189, p<.001), anxiety (β = .149, p<.001) and gender (β = .274, p<.001) contributed a significant effect (p<.05) that explained 18% of the variance in moral disengagement (global) (R^2 = .177, F (5,1412) = 62.106, p<.001). Self-respect did not show a significant effect (p<.05).

Regarding the specific mechanisms of moral disengagement, results suggest that self-deprecation, impulsiveness, anxiety, and gender showed a significant effect (p<.05) at predicting: moral justification (R^2 = .203, F (5,1412) = 73.378, p<.001), displacement of responsibility (R^2 = .051, F (5,1412) = 16.127, p<.001), diffusion of responsibility (R^2 = .034, F (5,1412) = 11.004, p<.001), and dehumanization (R^2 = .109, F (5,1412) = 35.492, p<.001).

Impulsiveness, anxiety, and gender contributed a significant effect (p<.05) at predicting euphemistic labeling (R^2 = .140, F (5,1412) = 47.223, p<.001), palliative comparison (R^2 = .078, F (5,1412) = 25.114, p<.001), distortion of consequences (R^2 = .093; F (5,1412) = 30,163, p<.001).

Finally, blame attribution (R^2 = .072, F (5,1412) = 22.875, p<.001) is significantly predicted by self-respect (β = .065, p = .043), self-deprecation (β = .078, p = .021), anxiety (β = .158, p<.001), and gender (β = .194, p<.001).

According to the standardized beta coefficient (***β),*** gender was the sociodemographic variable that contributed the strongest effects to the mechanisms of moral disengagement. On the other hand, impulsivity better explained the effects on moral disengagement (global), moral justification, euphemistic labeling, diffusion of responsibility, distortion of consequences and dehumanization. However, anxiety had the strongest effects on palliative comparison, diffusion of responsibility, and blame attribution.

Table 5
Effect of predictor variables on the mechanisms of moral disengagement

Dependent	Predictor	*B*	*EE*	β	t	p	CI 95% for B	
							Lower	Upper
Moral disengagement	Self-Respect	.019	.026	.022	.725	.469	-.032	.070
	Self-Deprecation	.070	.021	.107	3.364	.001	.029	.110
	Impulsiveness	.188	.027	.189	6.936	<.001	.135	.242
	Anxiety	.006	.001	.149	5.586	<.001	.004	.008
	Gender	.263	.023	.274	11.234	<.001	.217	.309
R^2 = .177, F (5,1412) = 62.106, p<.001								
Moral Justification	Self-Respect	.061	.042	.044	1.468	.142	-.021	.143
	Self-Deprecation	.124	0033	.116	3.724	<.001	.059	.189
	Impulsiveness	.323	.044	.199	7.412	<.001	.238	.409
	Anxiety	.006	.002	.097	3.680	<.001	.003	.009
	Gender	.535	.038	.341	14.220	<.001	.462	.609
R^2 = .203, F (5,1412) = 73.378, p<.001								
Euphemistic Labeling	Self-Respect	.006	.035	.006	.186	.853	-.062	.075
	Self-Deprecation	.036	.028	.042	1.288	.198	-.019	.091
	Impulsiveness	.270	.037	.206	7.392	<.001	.198	.342
	Anxiety	.006	.001	.118	4.315	<.001	.003	.009
	Gender	.316	.032	.250	10.018	<.001	.254	.378
R^2 = .140, F (5,1412) = 47.223, p<.001								
Palliative Comparison	Self-Respect	.007	.029	.008	.250	.803	-.049	.063
	Self-Deprecation	.021	.023	.030	.904	.366	-.024	.065
	Impulsiveness	.122	.030	.119	4.100	<.001	.064	.181
	Anxiety	.006	.001	.149	5.285	<.001	.004	.008
	Gender	.177	.026	.177	6.875	<.001	.126	.227
R^2 = .078, F (5,1412) = 25.114, p<.001								
Displacement of Responsibility	Self-Respect	.012	.038	.011	.326	.745	-.062	.087
	Self-Deprecation	.086	.030	.097	2.845	.005	.027	.146
	Impulsiveness	.093	.040	.068	2.330	.020	.015	.171
	Anxiety	.006	.001	.109	3.795	<.001	.003	.009
	Gender	.157	.034	.120	4.583	<.001	.090	.225
R^2 = .051, F (5,1412) = 16.127, p<.001								
Diffusion of Responsibility	Self-Respect	.047	.047	.032	.986	.324	-.046	.140
	Self-Deprecation	.096	.038	.088	2.552	.011	.022	.170
	Impulsiveness	.161	.050	.096	3.253	.001	.064	.258
	Anxiety	.005	.002	.081	2.804	.005	.002	.009
	Gender	.083	.043	.051	1.938	.050	-.001	.167
R^2 = .034, F (5,1412) = 11.004, p<.001								

Dependent	Predictor	*B*	*EE*	β	t	p	CI 95% for B	
							Lower	Upper
Distortion of consequences	Self-Respect	-.011	.043	-.008	-.254	.800	-.095	.073
	Self-Deprecation	.054	.034	.053	1.576	.115	-.013	.121
	Impulsiveness	.290	.045	.185	6.452	<.001	.202	.378
	Anxiety	.003	.002	.057	2.054	.040	.000	.007
	Gender	.296	.039	.195	7,622	<.001	.220	.372
R^2 = .093; F (5,1412) = 30,163, p<.001								
Atributtion of blame	Self-Respect	.067	.033	.065	2.022	.043	.002	.131
	Self-Deprecation	.061	.026	.078	2.306	.021	.009	.112
	Impulsiveness	.055	.034	.047	1.613	.107	-.012	.123
	Anxiety	.007	.001	.158	5.579	<.001	.005	.010
	Gender	.223	.030	.194	7.498	<.001	.165	.281
R^2 = .072; F (5,1412) = 22.875, p<.001								
Dehumanization	Self-Respect	-.039	.041	-.030	-.962	.336	-.118	.040
	Self-Deprecation	.080	.032	.082	2.471	.014	.016	.143
	Impulsiveness	.192	.042	.129	4.537	<.001	.109	.275
	Anxiety	.006	.002	.107	3.869	<.001	.003	.009
	Gender	.320	.037	.222	8.751	<.001	.248	.391
R^2 = .109; F (5,1412) = 35.492, p<.001								

Note: Self-Respect = Positive Self-esteem; Self-Deprecation = Negative Self-esteem.

Table 4 displays the effects of the independent variables based on gender for the mechanisms of moral disengagement. For females, impulsivity (β = .119, p<.001) and anxiety (β = .157, p<.001) were found to have a significant effect, explaining 11% of the variance in total moral disengagement (R^2 = .111; F ($_{4,966}$) = 31.226; p<.001). For males, self-deprecation (β = .168, p<.01), impulsivity (β = .198, p<.001), and anxiety (β = .154, p<.01) contributed with a significant effect, explaining 13% of the variance in moral disengagement (R^2 = .128; F $_{(4,442)}$ = 17.392, p<.001).

In both males and females, impulsivity and anxiety contributed significant effects predicting the mechanisms of euphemistic labeling, palliative comparison, and moral justification. Self-deprecation predicted moral justification only in females.

Differential effects by gender were also found. For women, anxiety contributed a significant effect in females at predicting attribution of blame. Self-Deprecation and anxiety contributed significant effects on displacement of responsibility. Impulsiveness and anxiety contributed significant effects at predicting diffusion of responsibility, distortion of consequences and dehumanization.

For men, displacement of responsibility is explained by the significant effect of impulsiveness and anxiety. On the other hand, diffusion of responsibility is explained by the effect of self-deprecation. Distortion of consequences was explained by self-deprecation and impulsiveness. Attribution of blame was explained by self-confidence, self-deprecation, and anxiety. Finally, dehumanization was explained by the significant effect of self-deprecation.

Table 6
Impact of predictor variables on mechanisms of moral disengagement in men and women

Dependent	Women (Model)			Men (Model)		
	Predictors	***β***	***t***	**Predictors**	***β***	**t**
Moral disengagement	Self-Respect	-.014	-.368	Self-Respect	.075	1.396
	Self-Deprecation	.072	1.790	Self-Deprecation	.168	2.915**
	Impulsiveness	.199	5.793***	Impulsiveness	.198	3.948***
	Anxiety	.157	4.731***	Anxiety	.154	3.111**
	R^2 = .111; F $_{(4,966)}$ = 31.226, p<.001			R^2 = .128; F $_{(4,442)}$ = 17.392, p<.001		
Moral Justification	Self-Respect	.019	.501	Self-Respect	.094	1.714
	Self-Deprecation	.141	3.492***	Self-Deprecation	.093	1.589
	Impulsiveness	.214	6.233***	Impulsiveness	.215	4.209***
	Anxiety	.081	2.431**	Anxiety	.148	2.933**
	R^2 = .107; F $_{(4,966)}$ = 29.994, p<.001			R^2 = .097; F ($_{4,442}$) = 12.961, p<.001		
Euphemistic Labeling	Self-Respect	-.029	-.755	Self-Respect	.056	1.027
	Self-Deprecation	.000	-.005	Self-Deprecation	.108	1.847
	Impulsiveness	.212	6.085***	Impulsiveness	.219	4.293***
	Anxiety	.127	3.760***	Anxiety	.114	2.255*
	R^2 = .082; F ($_{4,966}$) = 22.758, p<.001			R^2 = ,097; F ($_{4,442}$) = 12,934, p<.001		
Palliative Comparison	Self-Respect	-.013	-.334	Self-Respect	.041	0.740
	Self-Deprecation	.028	.678	Self-Deprecation	.027	0.451
	Impulsiveness	.104	2.917**	Impulsiveness	.153	2.952**
	Anxiety	.137	3.971***	Anxiety	.183	3.574***
	R^2 = .044; F ($_{4,966}$) = 12.031, p<.001			R^2 = .068; F ($_{4,442}$) = 9.133, p<.001		
Displacement of Responsibility	Self-Respect	-.001	-.017	Self-Respect	.024	.422
	Self-Deprecation	.089	2.110*	Self-Deprecation	.107	1.785
	Impulsiveness	.040	1.105	Impulsiveness	.129	2.467*
	Anxiety	.108	3.109**	Anxiety	.112	2.181*
	R^2 = .029; F ($_{4,966}$) = 8.359, p<.001			R^2 = .057; F ($_{4,442}$) = 7.780, p<.001		
Diffusion of Responsibility	Self-Respect	.028	.692	Self-Respect	.035	.625
	Self-Deprecation	.061	1.460	Self-Deprecation	.139	2.287*
	Impulsiveness	.113	3.143**	Impulsiveness	.063	1.194
	Anxiety	.081	2.346*	Anxiety	.078	1.502
	R^2 = .030; F ($_{4,966}$) = 8.484, p<.001			R^2 = .033; F ($_{4,442}$) = 4.755, p = .001		
Distortion of consequences	Self-Respect	-.043	-1.096	Self-Respect	.038	0.690
	Self-Deprecation	-.015	-.350	Self-Deprecation	.169	2.869**
	Impulsiveness	.176	4.951***	Impulsiveness	.215	4.209***
	Anxiety	.077	2.251*	Anxiety	.019	.375
	R^2 = .047; F ($_{4,966}$) = 13.042, p<.001			R^2 = .092; F ($_{4,442}$) = 12.343, p<.001		
Attribution of blame	Self-Respect	.023	.586	Self-Respect	.135	2.409*
	Self-Deprecation	.050	1.203	Self-Deprecation	.120	1.997*
	Impulsiveness	.037	1.029	Impulsiveness	.066	1.261
	Anxiety	.155	4.464***	Anxiety	.180	3.483***
	R^2 = .031; F ($_{4,966}$) = 8.797, p<.001			R^2 = .053; F ($_{4,442}$) = 7.302, p<.001		

Dependent	Women (Model)			Men (Model)		
	Predictors	β	t	Predictors	β	t
Dehumanization	Self-Respect	-.064	-1.662	Self-Respect	.014	.247
	Self-Deprecation	.029	.713	Self-Deprecation	.168	2.807**
	Impulsiveness	.171	4.896***	Impulsiveness	.072	1.378
	Anxiety	.127	3.752***	Anxiety	.084	1.624
	R^2 = .081; F ($_{4,966}$) = 22.488, p<.001			R^2 = .054; F ($_{4,442}$) = 7.317, p<.001		

* p<.05; ** p<.01, *** p<.001.

Note: Self-Respect = Positive Self-esteem; Self-Deprecation = Negative Self-esteem

Discussion

The purpose of this study was to analyze gender differences and the effects of self-esteem, impulsivity, and anxiety on the social cognitive mechanisms of moral disengagement in young students. Results indicate that males scored significantly higher than females in every mechanism of moral disengagement, except diffusion of responsibility. Therefore, the first hypothesis (H1) was supported. These findings are consistent with previous research that showed that males are more prone to moral disengagement than females (De Caroli et al., 2011; Bjärehed et al., 2019; Gómez & Narváez, 2019; Gómez & Duran, 2021b).

These differences in young samples may have several explanations. First, the fact that males are more likely to engage in externalizing behaviors may increase the tendency to engage in moral disengagement to justify harmful behaviors toward others and to avoid self-blame. Conversely, adolescent females have scored higher than males on empathy and prosocial behaviors, which reduces moral disengagement to justify aggressive behavior. These differences between males and females have been previously published by other studies (Caprara et al., 2008; Gómez & Durán, 2020; Redondo et al., 2015; Mestre et al., 2009; Van der Graaff et al., 2014; Valois et al., 2017).

According to the gender schema theory (Martin & Halverson, 1981) and the social cognitive theory (Bandura, 1986; Bussey & Bandura, 1999) these differences in moral disengagement could be due to the effects of socialization, gender stereotypes, cognitive schemas related to several behaviors and moral values that were built around gender norms. However, biological perspectives cannot be ignored in explaining the differences between males and females in social behavior and moral agency (Dugatkin, 2007).

The second hypothesis (H2) was partially supported. Results suggest that the mechanisms of moral disengagement are positively correlated with self-deprecation (negative self-esteem), and negatively correlated with self-respect (positive self-esteem). Regression analysis showed that self-deprecation significantly predicted moral disengagement and the mechanisms of moral justification, displacement and diffusion of responsibility, attribution of blame and dehumanization, while self-respect only predicted attribution of blame. These findings suggest that positive self-esteem and its negative dimension play a crucial role in the use of social cognitive strategies of moral disengagement in young samples.

Self-esteem is a psychological construct that is composed of beliefs, emotions, and moral judgements about oneself and could potentially lead to self-deprecation and self-respect (Gómez-Lugo et al., 2016; Martín-Albo et al., 2007). Self-esteem is also about emotional responses and positive-negative assessments about oneself and the social world (Jordan et al., 2015; Liang et al., 2018). Other authors argue that self-esteem is a psychological trait that is present throughout the life course and consists of specific positive and negative self-evaluations, as self-respect and self-deprecation

(Jordan et al., 2015; Rosenberg, 1986, 1989). These self-evaluations influence the psychological development of self-esteem, interpersonal relationships, and sociomoral behavior (Rosenberg, 1986, 1989).

According to the stated hypothesis, self-deprecation acts as a psychological factor that promotes the activation of moral disengagement to avoid the cognitive dissonance between the idea an individual may have about oneself —values and beliefs— and immoral behavior (Jordan et al., 2015). This psychological process and activation of moral disengagement has a regulatory function, which is to maintain a positive evaluation of the self. Even Bandura (2002) has stated that "Self-exonerations are used to neutralize self-censure and to preserve self-esteem" (p. 114).

Both social cognitive theory and empirical findings have found that moral disengagement contributes to cognitive restructuring strategies of immoral behavior, consequences, and victim roles so that people can avoid self-censorship, reduce psychological distress, and keep a positive self-image (Bandura, 2002, 2016; Jordan et al., 2015; Moore, 2015; Liang et al., 2018; Zhao et al., 2017).

Other studies have found that self-esteem and a positive view about oneself has a positive predictive effect on prosocial moral reasoning and prosocial behavior in young samples (Laible, Carlo & Roesch, 2004; Padilla-Walker & Carlo, 2014). This is consistent with the idea that low self-esteem may act as a psychological risk factor for moral disengagement. Future studies should examine whether self-esteem, self-deprecation, and self-respect act as mediating factors between moral disengagement and immoral or harmful behaviors in young samples.

On the other hand, the third hypothesis (H3) was fully supported, and the fourth hypothesis (H4) was partially accepted. Correlation and regression analysis showed that gender, anxiety, and impulsiveness have significant predicting effects on moral disengagement and its mechanisms. However, gender-based regression analysis showed that impulsivity and anxiety had similar effects in predicting moral disengagement, but no significant differences between men and women.

Bandura´s theory (1999,2002,2016) poses that guilt and remorse feelings weaken as a consequence of moral disengagement, and these feelings are generated from the cognitive conflict between moral norms and principles and immoral or harmful behaviors. However, our findings suggest that anxiety influences the deactivation of regulatory processes that characterize moral disengagement and may help to reduce moral feelings of shame, guilt, and self-censorship. Thus, the data suggest that the higher the anxiety the higher the odds of implementing social cognitive strategies of moral disengagement to reduce emotional distress.

Recent works have shown that antisocial behavior and aggression are positively associated with anxiety in young samples (Hale et al., 2004; Shulman et al., 2021). Anxiety can even act as a mediating variable between psychopathy and aggression (Thomson et al., 2021). Regarding this matter, a meta-analysis (Derefinko, 2015) showed that although psychopathic traits and aggressive behavior are related to disinhibition, there is a partial lack of negative affect like anxiety.

These studies have found that anxiety is common in antisocial behaviors that may lead to moral disengagement to diminish negative affect (fear, guilt, anxiety). Others have shown that moral disengagement might reduce negative affect in young samples with aggressive behaviors and there are not evident signs of psychopathy (Bakioğlu et al., 2019; Gini et al., 2014; Runions et al., 2019). This supports the initial claim about how anxiety influences the conflict between moral beliefs and moral actions. Our results suggest that anxiety contributes to the use of cognitive strategies of moral disengagement to reduce negative affect and cognitive dissonance.

Returning to hypothesis four (H4), impulsive-irresponsible behavior and gender have also been found to predict moral disengagement in young samples (Georgiou et al., 2019; Gini et al., 2015). Impulsivity in young people has many facets, as

making rash decisions, acting without considering consequences, seeking novelty, and having difficulty delaying gratification (Georgiou et al., 2019). It also includes a lack of planning skills to sustain attention and engagement in risky behaviors (Armstrong et al., 2015).

In this sense, the relationship between impulsivity and moral disengagement mechanisms suggests that young people who tend to act and think impulsively make greater use of moral disengagement and its respective mechanisms to justify their thoughtless actions. The data suggest that this relationship between impulsivity and moral disengagement is significant for both males and females.

Although there are no reasons to justify that the sample of this research showed aggressive behaviors, it has been demonstrated that impulsivity has a significant effect on moral disengagement. Therefore, it is reasonable to suggest that impulsivity is related to cognitive mechanisms that lead to justifying aggression in the future. Thus, both impulsivity and moral disengagement are considered psychological factors that may be related to an increased likelihood of aggression (Ball et al., 2018; Georgiou et al., 2019; Gini et al., 2015).

Psychological studies suggest that the effect of impulsivity on moral disengagement is greater in men than in women, because they exhibit a greater tendency toward sensation seeking and less sensitivity to punishment, both of which are associated with impulsivity (Page & Pina, 2018; Cross et al., 2011). In addition, men with moral disengagement attitudes are more likely to engage in nonviolent antisocial behaviors (Risser & Eckert, 2016).

However, the psychological and social factors associated with gender differences in the relationship between impulsivity and moral disengagement are less clear, warranting further research to identify differential psychosocial factors linking impulsivity and moral disengagement in men and women.

Anxiety was expected to have a stronger predictive effect on moral disengagement for women and impulsivity for men. Our results suggest that anxiety and impulsivity influence moral agency without a clear distinction between men and women. Moral disengagement may differ by gender due to the prevalence of different social behaviors. Recent studies on gender differences in aggressive and prosocial behaviors have found that females are more likely to engage in prosocial and empathetic behaviors, while males are more likely to engage in aggressive behaviors (Correa, 2017; Van der Graaff et al., 2014; Van der Graaff, Carlo, Crocetti et al., 2018). However, our findings suggest that the effects of impulsivity and anxiety on moral disengagement are not very different for men and women.

The social cognitive theory (Bandura, 1986; Bussey & Bandura, 1999) might have an explanation which states that socioemotional and moral development is influenced by social modelling (vicarious learning) along the life cycle and that might differ according to the gender stereotypes of a society. However, these differences are not properly explained by being male or female, but by the socio-cultural and educational factors associated with gender.

Due to the lack of work analyzing gender differences about the effects of psychological variables on moral disengagement, we cannot present empirical evidence about the data interpretation and further findings. Thus, future works should approach the influence of gender stereotypes and the effects of emotional variables on moral disengagement in young samples.

Conclusions, Future Studies, and Limitations

This study offers empirical evidence on gender differences in moral disengagement and their association with previously unexamined psychological factors. The data suggest that self-esteem, anxiety, and trait impulsivity influence the propensity for moral disengagement and thus relate to adolescents' moral agency. The results also showed that the propensity for moral disengagement differs for

males and females. However, when the association with other psychological factors was examined, no gender differences were found.

This raises important questions for future studies about how gendered moral agency is constructed and whether there are different psychological mechanisms in males and females that inhibit or promote moral disengagement. We know that the differences lie not in the fact of being men or women, but in the sociocultural factors that surround the construction of gender and shape patterns of social behavior and moral agency. Therefore, a second trend for future studies is to include sociocultural factors related to gender and gender stereotypes to analyze their influence on how psychological factors (anxiety, self-esteem, impulsivity) relate to moral disengagement in young people.

In addition, it is recommended that future studies include assessment measures of antisocial and prosocial behavior to develop more comprehensive models in which moral disengagement may mediate the relationship between anxiety, self-esteem, impulsivity, and social behavior in adolescents. It is also recommended to examine whether self-esteem (positive and negative) acts as a mediating/moderating factor between moral disengagement and immoral or harmful behaviors in young samples.

This study has several limitations, and the results should be interpreted with caution because of these. This study did not assess social behaviors that could provide additional evidence of more complex patterns and mediation analyses between emotional, moral, and behavioral factors. This study also did not take into account sociocultural factors in the population that could provide additional information on gender differences in moral disengagement and their association with the psychological factors analyzed.

Due to the cross-sectional nature of the study, it was not possible to assess longitudinal changes in the effect of the independent psychological variables on the prediction of moral disengagement. Therefore, longitudinal studies should be developed. Finally, the variables were assessed using self-report measures, which undoubtedly introduces some bias. Future studies should be based on key informants (parents, friends) to contrast the results.

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Presence of Meaning in Life and Subjective Well-being as Mediators of Association Between Sense of Community and Academic Engagement

Mediators of sense of community and academic engagement

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SCIENTIFIC RESEARCH ARTICLE

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Presence of Meaning in Life and Subjective Well-being as Mediators of Association Between Sense of Community and Academic Engagement

Abstract

We examined the associations between sense of community (SoC) and multidimensional academic engagement, including whether meaning in life and subjective well-being mediate the relationships. Participants were Nigerian students who completed the Classroom Sense of Community Inventory–School Form (CSCI-SF), Meaning in Life Questionnaire's (MLQ) Presence subscale, Brief Adolescent Subjective Well-being in School Scale (BASWSS), and Utrecht Work Engagement Scale – Student Version (UWES-S-9). Data was analysed using Model 6 of Hayes' regression-based PROCESS module. Results showed that both presence of meaning and subjective well-being mediated the effects of aspects of SoC on vigour, dedication and overall academic engagement. The effects of SoC on absorption was only mediated by subjective wellbeing. Mediation pathways were not significant for the effects of learning SoC on absorption. In all cases, the strongest mediation existed in the paths linking social SoC to academic engagement through subjective wellbeing. Promotion of classroom SoC may facilitate presence of meaning in life and subjective wellbeing thereby enhancing academic engagement

Keywords: Adolescence, catholic church, education, mediation, seminary, well-being.

Presencia de significado en la vida y bienestar subjetivo como mediadores de la asociación entre sentido de comunidad y el compromiso académico

Resumen

Se examinaron las asociaciones entre el sentido de comunidad (SoC) y el compromiso académico multidimensional, incluyendo si el sentido de la vida y el bienestar subjetivo median en las relaciones. Los participantes fueron estudiantes nigerianos que completaron el Inventario de Sentido de Comunidad en el Aula-Formulario Escolar (CSCI-SF), la subescala de Presencia del Cuestionario de Sentido de Vida (MLQ), la Escala Breve de Bienestar Subjetivo del Adolescente en la Escuela (BASWSS), y la Escala de Compromiso con el Trabajo de Utrecht - Versión Estudiantil (UWES-S-9). Los datos se analizaron mediante el modelo 6 del módulo PROCESS de Hayes basado en regresión. Los resultados mostraron que tanto la presencia de significado como el bienestar subjetivo mediaron los efectos de los aspectos de la SoC sobre el vigor, la dedicación y el compromiso académico general. Los efectos de la SoC sobre la absorción sólo estaban mediados por el bienestar subjetivo. Las vías de mediación no fueron significativas para los efectos del aprendizaje de la RSC sobre la absorción. En todos los casos, la mediación más fuerte existió en las vías que vinculan la RSC social con el compromiso académico a través del bienestar subjetivo. La promoción de la RSC en el aula puede facilitar la presencia de sentido en la vida y el bienestar subjetivo, mejorando así el compromiso académico.

Palabras clave*:* Adolescencia, iglesia católica, educación, mediación, seminario, bienestar.

Introduction

Positive student outcomes in education is an important research area which has received increasing research interest as reflected in issues as academic engagement (Chukwuorji, Ituma, & Ugwu, 2018; Zhou et al., 2019; Li et al., 2023). Substantial literature has produced clear and consistent evidence, outlining the positive effect of academic engagement in educational environments in terms of satisfaction with educational experiences, performance, and other achievement related outcomes (Ben-Eliyahu et al., 2018; Casuso-Holgado et al., 2013; Smithikrai et al., 2018; Steinmayr et al., 2018; Vizoso et al., 2018; Xie et al., 2019; Xu et al., 2023). As a positive phenomenon (Seligman & Csikszentmihalyi, 2000), positive effects of academic engagement have also been obtained in non-educational contexts in terms of general self-esteem (Liem & Martin, 2011) and optimised functioning (Phan & Ngu, 2015).

Existing literature have advanced several conceptualisations of academic engagement, but Schaufeli's theorising describes the construct as reflecting high levels of energy, persistence, and positive effort in activities, high levels of involvement and challenge, and high levels of concentration during students' performance (see Schaufeli et al., 2002a). In other words, academic engagement encompasses three core facets: absorption, dedication, and vigour. Vigour is the investment of effort, high energy level, resilience, and persistence of the individual in spite of setbacks and difficulties; while dedication refers to inspiration, enthusiasm, significance, challenge, and pride in academic tasks. Absorption represents full concentration and happy involvement in one's studies, whereby time passes quickly and one has difficulties detaching oneself from studies (Schaufeli et al., 2002a, b; Phan, 2014). The relevance of Schaufeli's multi-faceted perspective is the differentiation of academic engagement into aspects that represent different motivational attributes, with demonstrated support for its construct validity, relevance and applicability to classroom learning (See Phan, 2014). Hence, it provides ample opportunity for the exploration of diverse impacts of psychosocial and situational variables in academic engagement (Chukwuorji, Ifeagwazi et al., 2018).

The question of how school sense of community influences academic engagement remains an important area that is worthy of investigation by researchers. Positive interventions at school can be more effective and purposive, when there is deeper understanding of the association between well-being and academic outcomes and their influencing factors (Grabel, 2017). The mechanism through which sense of community influences well-being may explain how and why it is beneficial for engagement in academic work. The current study is aimed at examining the roles of sense of community, meaning in life and subjective wellbeing in academic engagement among male students in the minor seminary.

Sense of community (SoC) has been described as a powerful tool for learning (Bickford & Wright, 2018) and promotion of wellbeing (Barbieri & Zani, 2015). In the educational context, SoC is theorized as a feeling of being connected to the institution in terms of personal fit with other students and the school community, and academic ability (Morrow & Ackermann, 2012; Tough, 2014). SoC in the classroom creates a culture that builds on students' strengths and heals their hurts so that learning can occur; and the opportunities and structures by which students can help and support one another (Hittie, 2000). The major characteristics that underlie SoC in learning include feelings of similarity of needs, importance of learning, recognition, friendship, connectedness, acceptance, thinking critically, safety, group identity, and absence of confusion (Rovai, 2002). A strong SoC is anchored on the student's feeling of being part of a learning community where the student contributes to a common knowledge pool and where community spirit is enabled through social interactions (Rovai et al., 2004). Thus, it is expected that students will have both sense of learning community and sense of social community (Rovai, 2002).

Evidence of the positive contributions of connectedness, relatedness, belongingness, and integration to student engagement abounds in the literature (e.g., Juvonen et al., 2012; Tovar, 2013; Wang & Eccles, 2013; Wilson et al., 2015). An insightful demonstration of the linkage of social relationships and participation in the wider educational community to academic engagement is the Duke Social Relationships Project (see Asher & Weeks, 2015). The most striking finding in the study was that sstudents who were more academically engaged reported having positive wellbeing across multiple domains. Using Latent growth modelling King (2015) demonstrated that sense of relatedness positively predicted engagement, achievement, and well-being. Chukwuorji, Ifeagwazi et al. (2018) found that SoC had a significant impact on academic engagement, but the dimensions of academic engagement were not considered by the researchers. It is the consideration of how SoC may be related to the engagement dimensions that may provide a more nuanced understanding of the nature of the process.

Meaning in life is one of the core components of a eudaimonic (functioning well) conceptualization of well-being (Ryan & Deci, 2001; Ryff, 2018) and it is crucial to understanding the subjectivity of well-being (Qi & Minami, 2020). Meaning is defined by Steger (2012) as a web of connections, understandings, and interpretations that foster the comprehension of experiences and formulation of plans directing one's energies to the achievement of a desired future. Conceptually, the meaning making process is not only concerned with making sense of past events and experiences, but also about future imaginations of the self which often occurs in relation to others (Märtsin, 2019). The experience of meaning in life is a fundamental aspect of an individual's transition into adulthood (To & Sung, 2017), which is also advanced to be an important pathway to well-being (Khumalo et al., 2014).

Steger et al. (2006) delineated two facets of meaning in life —search for meaning and presence of meaning. Presence of meaning represents an understanding of self and the world and how an individual fits in the broader scheme of affairs as well as having a grasp of one's sense of the purpose one is pursuing (Steger, 2009; 2012). Search for meaning makes "people to seek out new opportunities and challenges, fuelling their desire to understand and organise their experiences" (Steger et al., 2008, p. 200), and it is often associated with psychological distress (Schulenberg et al., 2014; Chukwuorji, Abiama et al., 2019). We focused on presence of meaning because it has been found to be most frequently associated with other well-being indicators (Ashok & Swati, 2015; García-Alandete, 2015; To & Sung, 2017; Yalcın & Malkoc, 2015; Zhou et al., 2022; Kero et al., 2023), and recent diary studies have shown that relationships between search for meaning and daily well-being were mediated by presence of meaning in life (e.g., Newman et al., 2018).

Recent research has shown that sense of purpose or meaning in life was associated with academic engagement (Smithikrai et al., 2018). Meaning in life could play a positive role in students' engagement because the cognitive, motivational goal-directed, and affective constituents of meaning in life enhance students' abilities and attitudes to invest in their academic activities and engage more fully (Garrosa et al., 2017). Specifically, meaning in life is related to feelings of self-confidence and control, thereby facilitating adjustment to life changes and is associated with fewer negative affective states (Demirbaş-Çelik, 2018; Garrosa et al., 2013; Wong, 2012; Van den Heuvel et al., 2009; Yuen & Datu, 2021). However, there is limited research in this line of work. In general, there is evidence that meaning is life is generally associated with psychological well-being outcomes, but whether meaning in life and satisfaction with life mediate the relationship between sense of community and academic engagement has been rarely examined.

Subjective wellbeing (SWB) is a broad term for how people feel and think about their lives (Diener et al., 2018; Diener et al., 2002; Ajaero & De

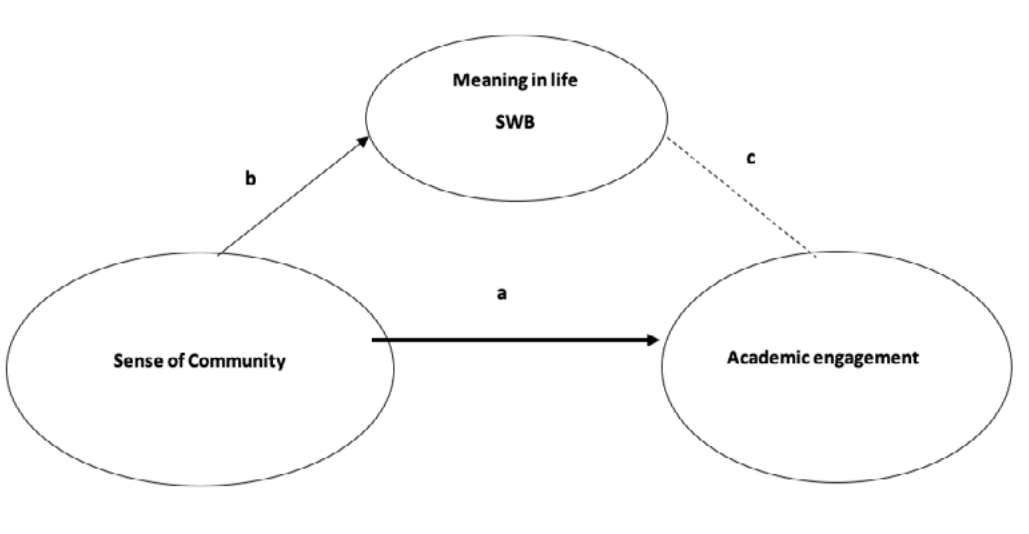
Wet, 2017) and is associated with hedonic (feeling good) and evaluative (satisfaction with quality of life) conceptualizations of well-being. Well-being at school is multifaceted and comprises different attributes, as quality of life, inner satisfaction, internal state of feelings, emotions and motivation, and enriched personal experience (Phan et al., 2016). Advancement of the theoretical phenomenon of SWB at school "may entail the situational placement of SWB within a larger system of change, and its potential associations with noncognitive and cognitive process of learning" (Phan et al., p.78). Phan et al. posits that one way forward is to consider processes and procedures that may facilitate and enhance students' well-being at school.

Students who experience a positive sense of subjective well-being may be more likely to engage proactively at school in their studies (Belfi et al., 2012; Buyse et al., 2009; Phan et al., 2016). Bowman (2010) reported that students with higher levels of SWB have an easier time in making the transition to college and, consequently, may be more likely to graduate. This finding supports research documenting an association between positive psychological functioning, personal adjustment and achievement (Ryan & Deci, 2000; Seligman, 2011). A study on mediation by Phan et al. (2016) reported that subjective well-being at school mediated the effects of academic and social self-efficacy on academic engagement of year 11 Australian boys and girls. However, the domain of conceptualisation was specific to students' engagement in mathematics learning. Their restricted view is understandable given that the self-efficacy construct needed to be domain-specific when seeking participants' responses. Similarly, fulfilment of needs was a mediator between sense of community and individual subjective well-being in a community sample of adults (Yetim & Yetim, 2014). A systematic review of 300 studies showed that students with higher levels of psychological and emotional wellbeing reported higher levels of academic achievement which may be explained as an outcome of being more engaged with their studies (Grabel, 2017).

The Present Study

Although some literature reviewed supports the association of school sense of community with academic engagement, it is necessary to elucidate the underlying mechanism of this relationship. In the current study, mediating roles of both presence of meaning in life and SWB in the link between sense of community and the dimensions of academic engagement are investigated. The previous research separately investigated the direct impacts of the variables in academic engagement. Concurrently examining the possible mediating roles of presence of meaning in life and SWB will advance the state of current knowledge on academic engagement. The inclusion of these mediators may provide information and directions regarding how these positive psychological constructs could be further harnessed and developed as psychosocial and educational interventions to promote students' academic engagement. Based on existing literature and extant theoretical postulations, we expect that: (1) The dimensions of sense of community will be positively associated with the facets of academic engagement and the overall scores of academic engagement. (2) Presence of meaning in life will be positively associated with the facets of academic engagement and the overall scores of academic engagement. (3) SWB will be positively associated with the facets of academic engagement and the overall scores of academic engagement. (4) Presence of meaning in life mediates the relationship between sense of community dimensions and the facets of academic engagement including the overall scores of academic engagement (Figure 1). (5) SWB mediates the relationship between sense of community dimensions and the facets of academic engagement including the overall scores of academic engagement (Figure 1). (6) In addition, SWB is expected to serve as the pathway through which both sense of community dimensions and meaning in life impacts on the facets of academic engagement including the overall scores of academic engagement.

Figure 1
Conceptual model of mediator effects of meaning in life and SWB on SoC and academic engagement relationship



Method

Participants and Procedure

Participants were male students at St. John Cross Seminary, Nsukka, Enugu State, Nigeria (N = 300). The sample size was found to be adequate using the online statistical software G*Power 3.1.9.2 for windows (see Faul et al., 2007). Their mean age was 14.86 years (SD = 2.51; range = 9–24 years). They were in the senior classes I (49), II (37), and III (41). Based on place of residence, there were rural dwellers (14.67%) and urban dwellers (85.33%). The study was approved by the psychology research review board of the University of Nigeria, Nsukka. The questionnaires were completed during school time, hence permission for participation of the participants were granted by the Rector of the seminary to whom the seminarians' welfare is entrusted during school time. All participants gave consent without any coercion. The duration of minor seminary formation in Nigeria is six years—three years of junior secondary education and three years of senior secondary school. The junior seminarians are taught the secular subjects as required in all secondary (high) schools in the country. Details of minor seminary education in Nigeria has been discussed elsewhere (see Chukwuorji, Ifeagwazi et al., 2018).

The minor seminary has a policy of relying on the Rector of the institution to make approval on behalf of the school and parents in these matters as students' involvement in research and other extramural activities that do not involve the students being taken outside the school premises. Nevertheless, consent was also sought from individual students. The students were approached in their classroom by the first author and three teachers who served as research assistants. They were requested to participate in a study on wellbeing at school and asked to strictly follow the instructions on each section of the questionnaire. They willingly accepted the questionnaire forms and completed them. Because of high disciplinary standards set out by the seminary rules and regulations, students were required to be in the class during the stipulated times of the day. None of the seminarians in the class at the time of the visit to their classes declined to participate in the research. The high participation rate might be because the students were told that the information to be obtained is not going to be used against them and that they were not expected to write any identifying personal

information on the form. From our experience as researchers in Nigeria, respondents who have not become too sophisticated in test taking are usually very excited to participate in surveys due to its novelty to them. They often see it as a new academic adventure from which they might gain some experience.

Measures

The Classroom Sense of Community Inventory–School Form (CSCI-SF).

The CSCI-SF (Rovai et al., 2004), is a 10-item measure of psychological SoC in the classroom. Responses are scored on a five-point Likert-style scale: 0 (Never) to 4 (Always). Negatively worded items were reverse scored. Sample items from the scale include: I feel that I matter to other students at this school (social SoC), I feel that this school does not promote a desire to learn (Learning SoC), etc. The school form of CSCI-SF was reported to be reliable and valid (Rovai et al., 2004). Chukwuorji, Ifeagwazi et al. (2018) had validated the measure among minor seminarian in Nigeria and reported a Cronbach's alpha of .82 for the total CSCI. Each respondent's score on the 10 items is summed up to obtain the total scores, and higher scores indicate higher SoC.

Meaning in Life Questionnaire - Presence of meaning (MLQ-P).

The MLQ presence of meaning subscale (Steger et al., 2006), assesses the extent to which respondents feel their lives are meaningful. The subscale is measured by five items rated on a 7-point Likert scale response format, ranging from 1 (Absolutely untrue) to 7 (Absolutely true). Sample items from the MLQ-P are: I understand my life's meaning, I have a good sense of what makes my life meaningful, etc. The scale has good reliability and validity (see Steger et al., 2006; Chukwuorji, Ifeagwazi & Eze, 2019). In the present study the Cronbach's α was .78.

Brief Adolescent Subjective Wellbeing in School Scale (BASWSS).

The 8-item BASWSS (Tian et al., 2015) assesses the cognitive and affective components of SWB in school, and it is utilised for the assessment of well-being when brevity is an important consideration. Respondents indicate how the questions apply to them by choosing the options of 1 (Very strongly disagree) to 6 (Very strongly agree). Sample items include: My school is provided with good school rules and facilities; The curriculum and homework assigned are suitable, etc. However, for the items measuring positive affect (In school, the frequency of my pleasant feelings is…), and negative affect (In school, the frequency of my unpleasant feelings is…), the response options range from 1 (Never) to 6 (Always). The Cronbach's α internal consistency reliability was .82, and it had convergent, predictive and discriminant validity, as evidence of its psychometric properties. In the present study, we obtained α of .84.

The Utrecht Work Engagement Scale–Student Version (UWES–S–9).

UWES–S–9 (Schaufeli & Bakker, 2003) is a 9-item measure of the dimensions of academic engagement: vigor, dedication, and absorption. Each of the facets is assessed with three items, on a 6-point Likert-style response format ranging from 0 (never) to 5 (all the time). Scores for the facets are calculated by the sum of the scores of each respondent on the 3 items. Higher scores indicate higher academic engagement on the particular dimension. UWES-S-9 has shown adequate reliability and validity (Schaufeli & Bakker, 2003; Ugwu et al., 2013). A previous study on this current sample by Chukwuorji, Ituma and Ugwu (2018) had confirmed the three-factor structure of UWES–S–9, with Cronbach's **α** values of .78 (absorption), .76 (dedication), .79 (absorption), and .85 (total 9- item scale). We shall use the three facets and the total scale score in this study. Overall scale score is derived by aggregating the scores on the three dimensions. Internal consistency

reliability (Cronbach's **α**) in the current study were .73 (absorption), .78 (dedication), .81 (absorption), and .79 (total 9- item scale).

A socio-demographic questionnaire was completed by the participants to provide information age, parental educational status, and class.

Data Analysis

Our data met the assumptions of normality as evidenced by estimates of -.47 to 1.63 and -1.72 to 1.68, for skewness and kurtosis, respectively. The sizes of these values were all within acceptable ranges (less than 2.0 for skewness and less than 3.0 for kurtosis) for a normal distribution (Tabachnick & Fidell, 2007). Pearson's correlation was used to ascertain the bivariate associations between age, parents' education, class, sense of community dimensions, presence of meaning in life, subjective well-being, and academic engagement dimensions. None of the demographic factors were significant correlates of academic engagement facets, and so they were not included in the main analysis for testing the hypotheses. Hayes (2013) regression-based PROCESS macro for SPSS was used to test the mediation hypotheses. Given that there are two mediators in this study, we used model 6 of the PROCESS macro which allows for the inclusion of two simultaneous mediators. The macro generates bias-corrected bootstrapped confidence intervals (*CI*) for total and specific indirect effects of sense of community dimensions (independent variable) on each of the academic engagement dimensions (dependent variable) through presence of meaning in life and subjective well-being (mediator). The advantages of bootstrapping over the traditional *p*-values in tests of hypotheses have been discussed elsewhere (see Cumming, 2014). Mediation is tested by determining whether or not the *CIs* contain zero (Fritz & MacKinnon, 2007). If zero does not occur in the *CI*, then the mediation (indirect) effect holds. Due to its superiority to Sobel's test, the PROCESS module is currently the gold standard in tests of mediation hypotheses (See Chukwuorji et al., 2019).

Results

Table 1 indicated the range of scores, mean and standard deviation for participants' age, sense of community, presence of meaning in life, well-being, and academic engagement. Correlations in Table 2 indicated that older age was associated with higher social SoC but lower learning SoC.

Table 1
Range of scores, mean and standard deviation for participants' age, sense of community, presence of meaning in life, well-being and academic engagement

Variable	Range	Mean (*M*)	*SD*
Age	9-24 years	14.86	2.51
Social SOC	0-19	9.51	3.93
Learning SOC	0-20	13.60	2.94
Presence of Meaning in Life	10-33	24.29	3.88
Well-being	6-37	27.07	5.15
Vigour	0-15	9.92	3.30
Dedication	1-15	12.46	2.84
Absorption	0-15	9.31	3.24
Academic engagement (total)	8-45	31.72	7.59

Note. SOC = Sense of community.

In Table 2, those in higher classes reported higher social SoC but lower learning SoC, lower SWB and lower vigour in academic engagement. Parent's level of education was not associated with any of the study's variables. Social SoC was positively associated with learning SoC, presence of meaning in life and well-being. Learning SoC and subjective well-being were positively related to all the study's variables. The correlations coefficient between the facets of academic engagement were all positive.

Table 2
Correlations of socio-demographic factors, sense of community, presence of meaning in life, well-being and academic engagement

	Variables	1	2	3	4	5	6	7	8	9
1	Age	-								
2	Class	.77***	-							
3	Parental Education	-.09	-.06	-						
4	Social SOC	.21***	.20***	-.02	-					
5	Learning SOC	-.17**	-.27***	.06	.23***	-				
6	Presence of MIL	.04	-.05	.05	.16**	.18**	-			
7	Well-being	-.08	-.21***	-.06	.20***	.44***	.29***	-		
8	Vigour	-.07	-.20**	.01	.07	.35***	.34***	.42***	-	
9	Dedication	-.06	-.10	.03	.09	.38**	.34***	.41***	.61***	-
10	Absorption	-.03	-.04	-.00	.08	.25***	-.12*	.21***	.41***	.44***

Note. ***p<.001; **p<.01; *p<.05; SOC = Sense of community; MIL = Meaning in life.

To control Type 1 error associated with testing whether the independent variables and the mediators predict the academic engagement and its three dimensions, we applied the Bonferroni correction method. Our comparison time (*m*) in this study was 4. Hence, the adjusted alpha for our hypotheses testing was $p<.0125$ (that is, .05/4). The direct effect of social SoC on the academic engagement dimensions as well as the academic engagement total score were not significant. The regression coefficients (*B*s) were as follows: .06 (vigour), .06 (dedication), .07 (absorption), and .19 (academic engagement total). For learning SoC the *B*s for its direct effect on the academic engagement dimensions as well as the academic engagement total score were all significant at $p = .000$. - .39 (vigour), .37 (dedication), .28 (absorption), and 1.03 (academic engagement total).

Table 3, part C, D, E, and F showed the total effects of social sense of community, presence of MIL and subjective well-being in the dimensions of academic engagement and the total scores of academic engagement. Participants with presence of meaning reported positive vigour, dedication, and academic engagement total scores, but not absorption.

Table 3
Hayes regression-based process analyses for predicting academic engagement and its facets by sense of community, presence of meaning in life and subjective wellbeing

		Social SOC				Learning SOC		
Predictors	R^2	*B*	*p*	95%*CI*	R^2	*B*	*p*	95%*CI*
(A) Predicting Presence of MIL	.02				.03			
SOC		.15	.003	[.05, .25]		.24	.006	[.07, .42]
(B) Predicting well-being	.11				.23			
Presence of MIL		.35	.000	[.17, .53]		.28	.001	[.12, .45]
SOC		.21	.004	[.07, .36]		.70	.000	[.51, .88]
(C)Predicting vigour	.23				.27			
Presence of MIL		.21	.000	[.12, .30]		.20	.000	[.11, .29]
Wellbeing		.23	.000	[.15, .27]		.17	.000	[.09, .26]
SOC		-.04	.430	[-.13, .06]		.21	.009	[.05, .36]
(D) Predicting dedication	.22				.26			
Presence of MIL		.17	.001	[.07, .28]		.16	.001	[.06, .26]
Wellbeing		.19	.000	[.11, .27]		.13	.001	[.05, .21]
SOC		-.01	.760	[-.10, .07]		.22	.005	[.07, .38]
(E)Predicting Absorption	.05				.08			
Presence of MIL		.05	.393	[-.06, .15]		.05	.392	[-.06, .15]
Wellbeing		.12	.016	[.02, .21]		.07	.203	[-.04, .17]
SOC		.03	.579	[-.07, .13]		.21	.015	[.04, .39]
(F) Predicting AE total score	.23				.28			
Presence of MIL		.43	.001	[.17, .78]		.40	.001	[.16, .65]
Wellbeing		.54	.000	[.33, .75]		.38	.001	[.15, .60]
SOC		-.02	.852	[-.25, .21]		.65	.002	[.25, 1.04]

Note. SOC = sense of community; MIL = Meaning in life, AE = academic engagement total scores.

Those with high subjective well-being also reported being academically engaged in the facets of vigour, dedication and overall academic engagement, but not absorption. In the presence of both presence of MIL and SWB, the predictive strength of the association between learning SoC and the academic engagement factors reduced, but they were still found to be significant. Based on the variances explained the model with the largest R^2 was the contribution of learning SoC, presence of MIL and subjective well-being to overall academic engagement. The weakest model by virtue of its R^2 was the prediction of absorption by social SoC, presence of MIL and well-being.

Bias corrected bootstrapped confidence intervals (*CI*) for the mediation effects are shown in Table 4. The mediation effects hold where the *CI* does not have zero. It was found that presence of MIL mediated the effect of social SoC as well as learning SoC on vigour, dedication and overall academic engagement, but such effect was not found for absorption. Subjective well-being was also a mediator of the path from both social SoC to vigour, dedication, absorption and overall academic engagement. For learning SoC, SWB mediated its effects in vigour, dedication, and overall academic engagement, but not absorption. The double mediation path from social SoC through both presence of MIL and SWB to vigour, dedication, and overall academic engagement were significant. Such double mediation effect was not found for absorption. The double mediation paths were not found to be significant with learning SoC for any of the outcome variables.

Table 4
Completely Standardised Bootstrap Tests of Mediating Effects

Variables	Vigour		Dedication		Absorption		AE Total scores	
	B	**95%** *CI*	*B*	**95%** *CI*	*B*	**95%** *CI*	*B*	**95%** *CI*
Social SOC (SSOC)								
SSOC-> MLQ-P-> UWES-S	.04	**[.01, .07]**	.04	**[.01, .08]**	.01	[-.01, .04]	.03	**[.01, .07]**
SSOC-> MLQ-P ->Well-being -> UWES-S	.02	**[.01, .04]**	.02	**[.01, .04]**	.01	[.00, .02]	.02	**[.01, .03]**
SOC-> Well-being -> UWES-S	.06	**[.02, .10]**	.06	**[.02, .10]**	.03	**[.01, .07]**	.06	**[.02, .11]**
Learning SOC (LSOC)								
LSOC-> MLQ-P-> UWES-S	.04	**[.01, .08]**	.04	**[.01, .09]**	.01	[-.03, .84]	.04	**[.01, .09]**
LSOC -> MLQ-P ->Well-being-> UWES-S	.01	[.00, .03]	.01	[.00, .03]	.00	[-.03, .25]	.01	[.00, .03]
LSOC-> Well-being -> UWES-S	.11	**[.06, .17]**	.10	**[.04, .16]**	.04	[-.00, .09]	.10	**[.05, .17]**

Note. Bold fonts are the significant mediation paths.

Discussion

The present study investigated the associations of sense of community, presence of meaning in life, and subjective well-being in academic engagement. Specifically, we extended the literature by examining presence of meaning in life and subjective well-being as concurrent mediators of the association between sense of community and the facets of academic engagement as well as its total score.

First, we hypothesised that the dimensions of SoC would be positively associated with the facets of academic engagement and the sum scores of academic engagement. This hypothesis was partly supported by the results of this study given that learning SoC was significantly associated with the outcome variables, whereas social SoC was not. These findings were important in view of a previous study which reported that although social SoC in the seminary was weak, academic excellence in the seminary environment was relatively high (Chukwuorji, Ifeagwazi et al., 2018). SoC in the learning situation have been observed to be anchored on similarity of needs, importance of learning, recognition, friendship, connectedness, acceptance, thinking critically, safety, group identity, and absence of confusion (Rovai, 2002). These attributes may be more relevant to academic-related outcomes than an exclusively socially-oriented SoC. Our study clarifies previous research (e.g., Juvonen et al., 2012; Tovar, 2013; Wang & Eccles, 2013; Wilson et al., 2015; Yılmaz et al., 2023) showing that the positive contributions of connectedness, relatedness, belongingness, and integration to student engagement are more effective when they are inclined towards the learning situation.

The second hypothesis, which stated that presence of meaning in life, would be positively associated with the facets of academic engagement and the sum scores of academic engagement was supported for vigour, dedication, and academic engagement total scores; but it was not supported for absorption. Previous research (e.g., Smithikrai et al., 2018; Yuen & Datu, 2021) which investigated meaning in life in relation to academic engagement have not explored the possible differences when the dimension of the engagement outcome is considered. Those who have understood themselves and the world may have high energy level, be more enthusiastic in meeting the challenges of pursuing academic tasks, rather than being carried away in the course of their studies.

The third prediction was that SWB would be positively associated with the facets of academic

engagement and the sum scores of academic engagement. There was support for this hypothesis for the facets of vigour, dedication, and overall academic engagement, but not absorption. Our finding is consistent with the literature which uphold that students' well-being may lead to proactive engagement in one's studies (Belfi et al., 2012; Buyse et al., 2009; Huo, 2022**;** Phan et al., 2016). For a student in the seminary to pursue intellectual accomplishments, he needs to be cognitively and affectively healthy. It is those who are mentally healthy that can effectively carryout any assigned academic task in the school.

The fourth hypothesis was that presence of meaning in life mediates the relationship between SoC dimensions and the facets of academic engagement including the sum scores of academic engagement. Some support was found for this expectation as presence of MIL mediated the effect of social SoC as well as learning SoC on vigour, dedication, and overall academic engagement, but such effect was not found for absorption. An understanding of the mediation of the SoC-academic engagement link may emanate from the contribution of SoC in making individuals to have feelings of self-confidence and control in the course of their educational activities.

Our fifth expectation was that subjective well-being would be a significant mediator of the relationship between SoC dimensions and the facets of academic engagement including the sum scores of academic engagement. This finding is consistent with findings of a similar study which reported that self-efficacy was a mechanism of influence between social self-efficacy and academic engagement (Phan et al., 2016). It is reasoned that SoC may make students increase students' striving, personal development, self-acceptance, autonomy, and positive interpersonal relationships, which in turn imbues them with sense of continued engagement in their academic work.

Lastly, we hypothesised that subjective well-being would be a pathway through which both sense of community dimensions and meaning in life impacts on the facets of academic engagement including the sum scores of academic engagement (that is, double mediation pathway). Our findings in this regard were varied. Subjective well-being was a mediator for social and presence of MIL and to vigour, dedication and overall academic engagement, but not for absorption. The double mediation was not obtained for learning SoC.

It is important to understand the study in the context of a seminary as a religious school context. In many western countries, the seminary is a graduate school where people enroll as adults to be educated in theology as they prepare for priestly vocation. In Nigeria, adolescent boys have the option of going to the minor seminary for their secondary (middle and high) school education and they are taught all the subjects that are offered in a conventional secondary school. They write the same general high stakes examinations with students in other schools in their sixth year in the seminary. But in addition to these subjects, students in the minor seminary study additional religious courses and engage in routine religious practices. We view the results of our study in the light of the peculiar demands of the seminary training where students are expected to adhere to strict disciplinary measures and academic standards. To the extent that students in the seminary study the regular subjects as the students in the other regular secondary schools, they may have similar academic engagement. However, there may be variations in engagement when we consider the other religious aspects of their education and training which are mandatory. The seminary may also entail a certain higher level of sense of community than what is obtainable in conventional secondary schools because students in the minor seminary are away from their family for a longer period during the academic term. They live in the dormitories and are only allowed to travel home when there is an important reason to do so or during the holidays at the end of every term. A term usually lasts for about three months. These long periods of community life may confer a unique sense of bonding to the seminarians.

Limitations of the study and suggestions for further study

The first limitation of this study is the cross-sectional nature of the data collection and the use of self-report measures, which raises concerns about common-method variance. There is need for caution in drawing conclusions about causal relations among our variables. We recommend the adoption of longitudinal designs and if possible, experimental procedures that can enable causality to be established in research on academic outcomes. A similar study needs to be conducted in the context of public /secular schools also to establish the possible role that context plays in these results, as no generalization is possible from the current study. The possible mediating role of other eudaimonic, evaluative and hedonic well-being measures could be explored to deepen the understanding of mediational dynamics. Another limitation of the study is that that participants were only men and seminary students with special characteristics as religiosity and strict disciplinary measures. The results cannot be generalized to other samples of students and female samples.

Conclusion

Our findings imply that both components of the mediational pathway (meaning in life and subjective wellbeing), may independently serve as potential targets for improving academic vigour and dedication in academic work. However, it may be useful to target in particular subjective well-being, including both the affective (positive emotions) and cognitive (evaluative) components, as a mechanism to enhance academic engagement. This work contributes to the agenda for positive education by highlighting the importance of considering the pathways of relationships in engagement. We hope that the preliminary evidence of direct and indirect effects will stimulate further research that will inform positive actions to improve the wellbeing and learning outcomes of students.

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Conflict of interest/Ethical statement

The authors declare that there was no conflict of interest in the course of conducting this study. In addition, the authors ensured Privacy and confidentiality of data in the distribution and retrieval of the survey instrument. As such, before the collection of the data, the informed consent of the respondents was obtained and they were assured of their anonymity.

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Evaluation of Recognition Memory Through Oculomotorius Behavior in Alzheimer Disease

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Abstract

Introduction. The study of ocular movements in patients with Alzheimer disease is a useful tool to evaluate recognition memory.

Methods. Assessment of this specific type of explicit memory in 15 individuals diagnosed with Alzheimer disease and 15 controls. The parameters of ocular fixation were examined using the Eye-Tracking Tobii Tx300 through Pair-wised ranking with the paradigm novel object recognition.

Discussion. The analysis of oculomotorius behavior can simplify the evaluation of recognition memory without appealing to verbal report and the visual paired comparison task. This contributes to the comprehension of the relationship among spatial attention, working memory, and episodic memory.

Results: People with Alzheimer disease present difficulties in the recognition of previously presented stimulus when the latency of presentation of the familiarization and the test period is longer than two minutes.

***Keywords*:** Alzheimer's disease, eye tracking, Memory, Recognition, visual pair comparison task.

Evaluación de la memoria de reconocimiento a través del comportamiento oculomotor en la enfermedad de Alzheimer

Resumen

Introducción. el estudio de los movimientos oculares en pacientes con enfermedad de Alzheimer es una herramienta útil para evaluar la memoria de reconocimiento.

Métodos. la evaluación de este tipo específico de memoria explícita en 15 individuos diagnosticados con la enfermedad de Alzheimer y 15 controles. Se examinaron los parámetros de fijación ocular utilizando el *Eye-Tracking Tobii* Tx300 mediante clasificación por pares con el paradigma de reconocimiento de objetos novedosos.

Discusión. El análisis del comportamiento oculomotor puede simplificar la evaluación de la memoria de reconocimiento sin apelar al informe verbal y a la tarea de comparación visual por pares. Esto contribuye a la comprensión de la relación entre atención espacial, memoria de trabajo y memoria episódica.

Resultados. Las personas con enfermedad de Alzheimer presentan dificultades en el reconocimiento de estímulos previamente presentados cuando la latencia de presentación de la familiarización y el período de prueba es superior a dos minutos.

Palabras clave: Enfermedad de Alzheimer, memoria, reconocimiento, seguimiento ocular, tarea de comparación de pares visuales.

BACKGROUND

Alzheimer disease (*AD*) is considered as the most common progressive neurodegenerative disorder and the most frequent form of dementia (Perneczky, 2019). According to the World Health Organization (WHO, 2012) Alzheimer disease is an important cause of morbidity and contributes significantly to the world statistics of mental and neurological disorders (Lopez & Kuller, 2019).

The efforts focused in the early diagnosis of *AD* are the best long terms strategies to delay the disease because they make possible for the patient to take advantage of the therapies available for the early phases (Karr et al., 2018). In that way, the seek for different tools that facilitate the diagnosis of *AD* is gaining relevance (Marandi & Gazerani, 2019; Zetterberg & Bendlin, 2021).

The cognitive function that is more affected for Alzheimer disease is memory. The study of ocular behavior patterns has evidenced that ocular movements in the patient with *AD* can reveal elements about previous experiences related with memory, without resorting to oral reports or requiring conscious memories from the person (Wilcockson et al., 2019). As stated by Crutcher, Calhoun-Haney, Manzanares, Lah, Levey y Zola (2009) the monitoring of ocular movements enables the evaluation of the memory related with early detection of mild cognitive impairment as well as the evaluation of relevant aspects of that function for Alzheimer disease.

Recognition is one of the relevant aspects of the declarative episodic memory, which is related with the ability to remember facts or events in a conscious way, that can be studied through recordings of ocular movements. The importance of the study of recognition in patients with memory deficits, directly depends on the integrity of the medial temporal lobe that includes the hippocampal region, and area that is considerably compromised in patients with mnemonic alterations and neurodegenerative disorders such as *AD* (Monacis et al., 2019).

Additionally, the recognition memory is related to the functioning and integrity of the parietal medial posterior cortex and the prefrontal left cortex, as it is evidenced the activation of the Precuneus and the frontal lateral inferior left cortex in tasks related with the recuperation of the episodic memory (Ryan et al., 2022; Urgolites et al., 2018). Considering that this type of memory allows the association of current knowledge with previous experiences, it requires of two different processes: memory and familiarity. The memory implies the recognition that associates the facts with previous experiences, while familiarity is related with the sense of similarity of the visual stimulus (Schwedes & Wentura, 2019).

The posterior Precuneus and the hippocampal region activate during the recuperation of mental images. In that way, it is expected that the subjects with *AD*, who present a significant deterioration of the parietal areas, present difficulties in the regeneration or recuperation of the contextual associations of mental images, particularly when the evocation or recuperation of the information must be in latency periods longer than a minute (Serra et al., 2020). In this case, the ability to code the information can be preserved but the effectivity in the evocation diminishes as latency increases.

Furthermore, from the studies of neuroimage it has been proved that the recovery of the recognition memory implies the activity of the left prefrontal cortex, because this region facilitates and guides the access to knowledge of the semantics of information, maintains the signals of recuperation and participated in the selection of relevant information (Lundstrom et al., 2005; Neri et al., 2021).

Crutcher, et al. (2009) proposes that the evaluation of the element of recognition that was mentioned before can be developed from the paradigm of the visual paired-comparison task. This task can be considered as a memory test that is sensitive to the detection of memory disorders and deficits in prodromal stages of *AD*. In addition to that, the authors affirm that the task is highly sensitive to minimum damages in

the hippocampus, as it was observed in studies developed with rats, monkeys and human beings.

The *VPC* task is a task of recognition memory that evaluated the preference of the individual through the proportion of observation time that the subject has in relation to a new image, in comparison to an image that has been seen previously. For this task, the analysis of ocular movements is oriented to the percentage and length of the fixations. In healthy individuals, the percentage of fixations and its length increases in a disproportioned way until they reach approximately 70% upon new aspects (Zola et al., 2013). In individuals with memory deficits the proportion of fixations is distributed in an almost equitable way between the new stimulus and the previous ones (Crutcher et al., 2009).

Different studies (Bueno et al., 2019; Marandi & Gazerani, 2019; Opwonya et al., 2022) mentioned suggest that the analysis of ocular movements can reach an important value in the evaluation of behavioral measures. The effects of the alterations in the cognitive function of the memory over the behavior of ocular movements are promising alternatives for the diagnose and characterization of disorders as Alzheimer disease (Marandi & Gazerani, 2019; Zetterberg & Bendlin, 2021). Therefore, this project has as main aim to evaluate the recognition memory through oculomotorius behavior in visual paired-comparison task on patients with Alzheimer disease and a control group Spanish speaker.

METHODS

Participants

Two groups were evaluated: *AD* and control. A total of 30 subjects (23 women, 7 men, M_{age} = 72,8 years old, range 63 – 83) participated. 15 of them belong to the group *AD* and 15 to the control group. One of the participants in the *AD* group had a *GDS* 4, the rest of the participants had a diagnosis of *AD* correspondent to *GDS* 5.

Table 1
Participants

	EA	CONTROL
N	15	15
Gender	3 M; 12 F	4 M; 11 F
Age	*M* = 72,83 (5,66)	*M* = 72,42 (5,22)
Years of education	*M* = 12,43 (3,60)	*M* = 12,41 (3,71)

The participants who presented non-corrected visual or hearing alterations or who had glasses in bad condition that could prevent the development of the task and the comprehension of simple instructions were excluded of the sample. Additionally, the participants who were in an advanced stage of de disease (*GDS* 6) at the moment to develop the tests were not considered.

The participants were evaluated and diagnosed in consensus with possible *AD* by the interdisciplinary group for the study of dementias of Universidad Nacional de Colombia. Participants completed a neuropsychological test MoCA (Nasreddine et al., 2005) and agreed voluntarily to participate in the study through an informed consent in agreement with the regulations of the ethics committee of the Medical Department of the Universidad Nacional de Colombia.

Equipment and Stimuli

The oculomotorius behavior was registered using the Eye-Tracking Tobii Tx300. This device recognizes and storages information about ocular movements with a frequency of

300Hz (data collected per eye per second). The stimulus was presented in a 23 inches *LCD* screen with 1920×1080 of resolution. The mathematic algorithm of speed umbral filter *(I-VT)* incorporated in the software Tobii Studio was used to differentiate the ocular fixation of saccadic movements through speed umbral. An umbral of ocular speed of de 30°/s was stablished to define the start and the end of a fixation.

Procedure

Initially, the cognitive screening assessment *MoCA* was applied to all the participants of the *AD* group and the control group.

In each session, the participant was sitting in front of the Eye-Tracker in a static chair located 29 inches from the screen under constant illumination conditions. After that, a short calibration session of nine points located at ≤18° was developed. After the calibration, it was presented to the participants the visual paired-comparison task. The participants had four rehearsals to ensure the comprehension of the task. Additionally, to guarantee that the memory deficit, characteristic of *AD,* did not intervene in the successful execution of the task, the instructions were repeated to all the participants in the control group and the *AD* group before each activity.

The task had two phases: familiarization and test. During the familiarization phase, two identic images located one next to the other were presented for 5000 milliseconds. After a period of 2000 milliseconds or 2 minutes, the test phase where to images were presented in the screen for 5000 milliseconds started (Zola et al., 2013). In the test phase, the screen showed an image identic to the one presented in the familiarization phase and a new one. The participants were asked to observe the images on the screen as if they were watching *TV*.

RESULTS

For each one of the groups, all the variables related with the parameters of ocular movements showed a normal or normalized distribution ($p>0.05$) and for the average comparison test six variables presented different variances. For those variables, the comparison test t'-Student for independent sample was used, while the other variables were analyzed with the t-Student comparison test for independent variables because they presented homogenous variances. All the date of ocular movement and fixation were extracted from the Tobii Studio software and analyzed in *SPSS*.

During the familiarization phase, two identic stimuli were presented to the subjects during 5000ms, followed by the test phase with a delay interval of 2000ms or two minutes.

The analysis through the identification of interest areas in the familiarization phase, evidenced that there are not significate differences between the control group and the *AD* group in any of the observed variables (total length of the visit and number of fixations), which suggests that the two groups do not differ in the amount of time they spent looking at the familiarization images, regardless the variations in the delay interval. Results indicate that the participants with *AD* as well as the control subjects show a similar number of fixations during the familiarization phase.

During the test phase, the original image, which was previously presented during the familiarization phase, was projected for the participants along with a new image during a time slot of 5000ms.

Table 2
Visual Pair Comparison task in the familiarization phase

Variables of visual tracking in the familiarization phase	Group	Mean	Standard Deviation	% *CV*	Sig (p)
Total number of fixations	*EA*	7,31	1,51	20,7	**0,22**
	Control	7,99	1,41	17,6	
Total Time of the Visit in Area of Interest AoI (ms)	*EA*	1975,29	401,91	20,3	**0,53**
	Control	2062,67	343,80	16,7	

* ($p < 0.05$)

Table 3
Visual Pair comparison task in the test phase

Variables of visual tracking in the test phase	EA Group		Control Group		Sig (*p*)
	Mean (*SD*)	% *CV*	**Mean (*SD*)**	% *CV*	
Delay interval of 2000 ms					
New image					
Number of fixations	7,79 (2,05)	26,3	8,44 (2,18)	25,8	0,42
Total Time of the Visit *(ms)*	2279,36 (600,94)	26,4	2324,96 (619,50	26,6	0,84
Familiar image					
Number of fixations	5,70 (1,45)	25,4	6,01 (1,85)	30,8	0,62
Total Time of the Visit *(ms)*	1627,99 (493,56)	30,3	1580,85 (412,10)	26,1	0,78
Delay interval of 2 minutes					
New image					
Number of fixations	6,89 (2,07)	30,1	8,95 (1,80)	20,1	0,01 *
Total Time of the Visit (ms)	1950,71 (487,34)	25,0	2521,60 (624,89)	24,8	0,01*
Familiar image					
Number of fixations	6,29 (1,87)	29,7	5,55 (1,75)	31,6	0,28
Total Time of the Visit (ms)	1801,14 (629,78)	35,0	1361,07 (422,06)	31,0	0,03*

* ($p < 0.05$)

It was interesting for this research the percentage of time or duration of the visit over the area of interest of the new image in comparison with the familiar image, considering the two delay intervals (2000ms and two minutes). The two groups of participants spent similar amounts of time looking at the new image when the delay interval of the presentation of the familiarization phase and the test phase was 2000ms, showing that there are not significant differences between the two groups in any of the analyzed variables.

On the other hand, for the delay interval of two minutes, the groups differ in the percentage of time they spend observing the new image ($p<0,01$), as the participants in the control group look at the image longer than the *AD* group. In the same way, significant differences are presented in the average of time of duration of the visit over the familiar

image between the two groups, because the *AD* group looks at the familiar image in the test phase longer than the control group.

Likewise, differences in the average of fixation developed over the interest area during the test phase in the delay interval of two minutes ($p<0,01$) were identified. The participants in the AD group present a lower number of fixations over the new image in comparison with the control group.

Discussion and Conclusions

In first place, it is necessary to remember that the recognition memory is related with the declarative memory and depends on the integrity of the medial temporal lobe, the hippocampus and the diencephalic structures (Ryan et al., 2020). Additionally, Zola (2000) highlights that the results obtained in tests on rats, monkeys and human beings with bilateral lesions of the hippocampus and structures related with the temporal medial lobe, evidence that the development in the visual paired-comparison task (*CVP)* depend of the declarative memory.

It suggests that this kind of memory can be evaluated through the visual paired comparison, as the task is sensitive to the minimum damage of the involved structures and even detects deterioration of the memory associated with the mild cognitive impairment (Lagun, et al., 2011).

In patients diagnosed with *AD*, one of the most affected aspects is the declarative memory, understood as the capacity to consciously remember facts and events which entails the recognition memory, because this alteration is related with the level of cerebral atrophy, particularly the medial temporal lobe, the entorhinal cortex, and the hippocampus; alterations that are evident in patients with this disease (Pandey & Ramakrishnan, 2020).

In the same way, the execution of the *CVP* task can be measured through the register of ocular movements with higher detail, in a quantitative and objective way, in comparison with the presentation of the task that requires the verbalization of the participant's answers (Haque, et. al., 2019). Since the last century, studies as the one developed by Daffner et al (1992) have taken advantage of the techniques of register of ocular movements with individuals who were diagnosed with *AD*, however, there have not been many projects in Spanish population this field reported so far.

This study evaluated the recognition memory using the *cvp* task through the register of oculomotorius behavior. To begin with, the results evidence that there is no relationship between the performance of the participants in the *CVP* task and the total score in *MOCA*. It is possible that this happens because the task is particularly focused in the measurement of the explicit memory (Crutcher, et al., 2009), while *MOCA* evaluates seven different cognitive areas: visuospatial/ executive, nomination, memory, attention, language, abstraction and orientation (Roalf, et al., 2013).

From the analysis of two aspects, the duration of the visit and the average of fixations during the familiarization phase and the test phase, it is possible to affirm that there is no evidence of statistically significant differences during the familiarization phase of the task in the two group. As expected, there are significant differences between the two groups in terms of the amount of time that the participants spend looking at the new image when the interval of time is two minutes. In this case, the participants in the *AD* group show a decrease in the average length of the visit to the new image. These findings are in agreement with the information obtained by Lagun et al (2011).

Similarly, the results are congruent with the research by Crutcher (et al., 2009) at certain extent. Even though their study was developed with three different groups: control, Parkinson disease, and *DCL*, differences were found in the *DLC* group, associated with Alzheimer disease, and the control group during the test phase in relation to the duration of the visit over the new image and the two-minute delay.

In that way, in accordance with the mentioned studies (Crutcher et al., 2009; Lagun et al., 2011) the control group as well as the *AD* group evidenced an

equivalent performance in recognition memory, related with the increase in the visualization time of the new image, in regard to the familiar image, when the delay time was just two seconds. There were not differences in the average of fixations in any of the presented conditions.

To sum up, results suggest that an interval of delay of two minutes between the presentation of the familiarization phase and the test phase, is enough to prove the recognition memory as the subjects of the *AD* group are not able to remember that the familiar image had been observed before (Crutcher et al., 2009).

The proposal by De Chastelaine et al. (2016) and Dörfel, et al. (2009) can be considered as a possible pathophysiological explanation for this phenomenon. The findings of the present study can be the consequence of the degeneration of areas of the parietal medial posterior cortex, of the Precuneus, of the left prefrontal cortex and the hippocampal region, which are characteristics of early stages in *AD*.

Furthermore, in agreement with the model of Knudsen (2007), this kind of task and the findings evidence that the participants with AD have difficulties in the processes that contribute to spatial attention and its functional components. The commitment of the patients with *AD* diagnosis in the domain of the episodic memory can affect the construction of neuronal representations related with this element. That is why the competitive selection of the representation with a higher intensity does not happen just over the new image but over both. The familiar image as well as the new one, enter in the circuit that underlies the working memory, directing the ocular movements and the voluntary visual attention in a similar way for both types of images.

In consequence, the *CVP* task reveals the relations between spatial attention, working memory, visuospatial control, ocular movements and episodic memory in patients with neurodegenerative alterations. Baddeley (2000) affirms that recent research in the field of cognitive neuroscience consider that the working memory and long term memory are related, as the subcortical current originated in the hippocampus and the anterior cingulum, implied in the representation of the world and the construction of spatial-temporal coordinates, are extended to the prefrontal cortex to direct the attention to internal and external events (Eriksson et al., 2015; Wanke & Schwabe, 2020).

All things considered, it is precise to highlight that the task of recognition memory and its evaluation though the *CVP* task, developed through the analysis of ocular movements is an useful screening tool for the differentiation of people with *AD*, even in early stages of the disorder and in healthy individuals. Although the *CVP* task is not part of the neuropsychological protocols of evaluation, its implementation can contribute to the identification in deficits in the recognition memory and the comprehension of processing models that involve spatial attention, working memory and episodic memory.

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Post-Traumatic Stress Disorder, Depression, and Perceived Social Support among Iraqi and Syrian Immigrant and Refugee Adolescents in Türkiye

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This study is based on the first author's master thesis, in the department of guidance and counseling psychology, at Bolu Abant İzzet Baysal University, Bolu, Türkiye

SCIENTIFIC RESEARCH ARTICLE

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Post-Traumatic Stress Disorder, Depression, and Perceived Social Support among Iraqi and Syrian Immigrant and Refugee Adolescents in Türkiye

Abstract

This study aimed to determine the levels of Post-Traumatic Stress Disorder (PTSD), depression, and perceived social support among immigrant secondary school students residing in Bolu, Türkiye. The refugee children had significantly higher scores for both PTSD and depression, and lower scores for social support. While there were no significant gender differences for the three variables, older students had higher PTSD scores. Immigrant students who had lived in Türkiye for four years or longer had lower depression, higher social support, and social support from a special person. Surprisingly, students whose families had immigrated for educational reasons had higher PTSD scores and lower family social support scores than those that immigrated due to conflicts. A regression analysis, conducted to predict depression via PTSD and social support, showed that the two variables accounted for 25% of the variance in depression scores.

Keywords: Depression, immigrant children, PTSD, refugee children, social support.

Estrés postraumático, depresión y apoyo social percibido entre población iraquí y siria inmigrante y adolescentes refugiados en Turquía

Resumen

Este estudio tuvo como objetivo determinar los niveles de Trastorno de Estrés Postraumático (PTSD), la depresión y apoyo social entre estudiantes de secundaria, inmigrantes y sirios que actualmente residen en Bolu, Turquía. Los resultados revelaron que los niños refugiados tenían puntuaciones significativamente más altas tanto en PTSD como en depresión y puntuaciones más bajas en apoyo social. Con respecto al tiempo que pasaron en Turquía, los estudiantes inmigrantes que habían permanecido en Turquía durante 4 años o más demostraron menor puntuación de depresión, mayor apoyo social recibido y apoyo social de una persona especial. En cuanto a las razones de inmigración, sorprendentemente, el grupo que inmigró por razones de educación tuvo puntuaciones más altas de PTSD y más bajas en apoyo social familiar que el grupo que emigró debido a conflictos. Se realizó un análisis de regresión para predecir la depresión infantil a través del PTSD y el apoyo social. Los resultados arrojaron que el 25% de la depresión se debió al PTSD y al apoyo social.

Palabras clave*:* Apoyo Social, Depresión, Niños Refugiados, Niños Inmigrantes, PTSD.

This article is based on first author's master thesis.

Introduction

Refugee Children and Mental Health

Life events can negatively impact children's mental health both before and during immigration due to traumatic experiences like war, losses (Adjukovic & Dean, 2009; Frounfelker, et al., 2020), separation from family, exposure to violence, sexual and physical abuse (Pinto-Wiesse & Burhorst, 2007). Children also face post-immigration adaptation problems, as having the status of asylum-seeker and refugee, being unable to access mental health support services (Majumder et al., 2014), loneliness (Huemer et al., 2009), socio-economic and cultural factors (Reed et al., 2012), family relations (Henley & Robinson, 2011), adaptation to school, and peer problems (Karaman & Bulut, 2018; Schultz et al., 2012). Given the challenging life events that immigrant children experience before, during, and after immigration, they show symptoms of post-traumatic stress disorder (PTSD), anxiety disorders, mood disorders, and externalization disorders (Anognostopoulos et al., 2016; Khamis, 2019; Scharpf et al., 2021; Kisombe, 2020; Oppedal, Özer & Şirin, 2018; Scherer, et al., 2020). Similarly, post-traumatic stress disorder, depression, anxiety, somatic symptoms, isolation, loss of confidence, distress and worry, anger, and aggressive and risk-taking behaviors are among emotional and behavioral problems found by the interviews done with children and adolescents (Dehnel et al., 2022; McFarlane, Kaplan & Lawrence, 2011). Pre-immigration traumatic experiences and post-immigration asylum-seeker status and insufficient social support can all exacerbate PTSD and increase post-immigration problems (E.G., adaptation problems, discrimination, racist discourse, etc.) (Bronstein et al., 2012). Jabbar and Zaza, (2014) compared Syrian child asylum-seekers who had been closely exposed to war, distantly witnessed war, or never subjected to war. The first two groups exhibited more signs of anxiety and depression.

Traumatic experiences as conflicts, residing in concentration camps, and natural disasters are described as challenging and life threatening experiences (Butcher et al., 2013). Derluyn and Broekaert (2007) found that anxiety, depression, and PTSD was more frequent among immigrant children who had lost family members and lived away from their family than those who lived with their families. Adaptation following traumas due to human-caused violence, crime, and terror may be more challenging than traumas following natural disasters (Herbert, 2007). Ehntholt and Yule (2006) found that the severity of war trauma can either accelerate or slow recovery among children and adolescents. When accompanied by incidents like losing a parent or home, this can cause multiple traumas, resulting in negative emotions.

The longevity of reactions to traumatic experiences can provide diagnostic information about PTSD (Bulut, 2010). For example, re-experiencing, avoidance, and alertness tend to decline about a year following traumatic experiences, so continued reactions can indicate chronic PTSD.

Hodes, Jagdev, Chandra, and Cunniff (2008) compared children that had experienced war and were abandoned with those who were not. The abandoned children had higher PTSD, with girls showing more depressive symptoms. In contrast, Thabet, Abed and Vostanis (2004) found not significant gender difference in children's PTSD scores. Several studies have shown that depression is positively related to post-immigration challenges, as having asylum-seeker status and financial difficulties, and problems between parents, perceived lack of support, and language problems among children (Duren & Yalcin, 2021; Green et al., 2021; Heptinstall, Sethna, & Taylor, 2004). Emery et al. (2015) reported that family rules and family engagement after immigration were associated with lower depression in children and adolescents and vice versa for physical abuse and post migration adversity.

Despite being at great risk of mental health problems, few refugee children use mental health services, with those most in need being the least likely to do (Ziaian et al., 2012). Depressive refugee

adolescents have poor psychological schemas (perspective of self and the world), poor social relations skills, and no future plans. They often have conflicts with their parents and poor skills in regulating their environment (Begovac et al., 2004).

Depression in immigrant children is related to war-related trauma, gender challenges, being an immigrant and from an ethnic minority, and general acculturation problems and conflicts (Keleş et al., 2016). Depression is also related to post-immigration exposure to violence and being a woman (Berthold, 2000).

Adaptational problems, immigration infrastructure, and changing culture can increase depression in the long term, whereas social support and alleviate the negative effects of depression (Oppedal & Idsoe, 2015).

Immigration and Social Support

Immigrants may experience social exclusion after immigration, as problems in renting accommodation, finding a job appropriate to their skills and effort, settling down in low socio-economic areas, and being excluded from community activities. They may also encounter insults and other discrimination due to cultural differences, and exclusion due to over-generalization of individual cases to all immigrants in politics, education, and health (Deniz et al., 2016; Nakeyar et al., 2018).

A number of studies have shown that problems can be mitigated. Although immigrant children may have problems with their peers (Almqvist & Brandell-Forsberg, 1997), but those who are living with their family in their home report better social relations (Correa-Velez et al., 2010). Providing psychoeducation for immigrant parents can mitigate children' depressive symptoms. Time is also important. For example, immigrant children who have lived in Sweden for years have similar social adaptation to their Swedish peers and fewer problems in peer relations than those who have only lived in Sweden for a shorter time (Dekeyser et al., 2011). Kağnıcı (2017) identified which tasks school psychological counselors should prioritize regarding refugee children's adaptation problems. In particular, knowledge of cultural adaptation and trauma and being advocates of children's rights are important to help immigrant children successfully adapt.

Method

Purpose of the Study

Research indicates that among immigrant children, depression and PTSD levels may be high, whereas perceived social support levels may be low. This can hinder their adaptation and impact their mental health. However, few studies have investigated refugee adolescents' mental health, despite the many wars, ethnic conflicts, and forced migration in Middle East countries in recent decades. This has made Arab children and adolescents particularly at great risk of mental health problems. Thus, the present study aimed to determine levels of PTSD, depression, and perceived social support among refugee adolescents in Türkiye, and examine the relationships between these three variables and other factors. This leads to the following two research questions:

What is the prevalence and severity of PTSD, depression, and perceived social support among refugee adolescents compared to local Turkish adolescent students?

Do refugee adolescents' scores of perceived social support, depression, and PTSD differ by nationality, gender, age, time spent in Türkiye, ability to speak Turkish, having a Turkish friend, and reasons for leaving their home country?

Do PTSD and perceived social support scores predict the depression scores of refugee adolescents?

Method

A correlational survey model was used for this research to explore the differences between variables and relationships between variables without any intervention (Fraenkel & Wallen, 2006). Research permissions were received from the researcher's university Institutional Review Board

and ethical committees. The research purpose and scales were then submitted to the Provincial Directorate of National Education and Directorate General of Migration to receive official permissions. Permissions were granted via e-mail correspondence from the instrument developers, translators, and experts who made the adaptations. The survey packages were prepared in Turkish for local Turkish participants and in Arabic as the native language for refugee and immigrant adolescents. A pilot study was conducted with two groups of adolescents to check if the survey packages were understandable, and age and language appropriate. The surveys were distributed by the researchers, who provided necessary information when the participants had questions.

Study group

The study was carried out with 282 Iraqi and Syrian refugee children residing in Bolu Province, in northwest Turkey, and officially enrolled in the school system. All refugee students were initially targeted for inclusion. However, 21 students were deleted from the data set for providing outlier responses or leaving the survey instruments blank. Ultimately, 143 Turkish (M = 12.87, SD = .62) (36.8%), 109 Iraqi (M = 12.96, SD = .75) (28.1%), and 136 Syrian (M = 13.01, SD = .80) (35.1%) adolescent students participated.

Of these, 54.6% (N = 212) were boys and 45.4% (n = 176) were girls. Regarding age, 29.1% (N = 113), 47.7% (N = 185), and 23.1% (N = 90) were 12, 13, or 14 years or more, respectively. This population was chosen, as being mature enough to verbalize their emotions and able to complete self-report instruments comfortably.

About 46.5% (N = 114), 20% (N = 49) , 16.3% (N = 40), and 17.2% (N = 42) of the immigrant students had been living in Turkey for one, two, three, or four years or longer, respectively. Moreover, 50.6% (N = 124) had had been studying for one year, 22% (N = 54) for two years, 13% (N = 32) for three years, and 14.4% (N = 35) for four years or more. Regarding reasons for immigration, 88.1% (N = 216) had immigrated due to conflicts in their countries and 11.9% (N = 29) for a better education. Regarding language level, 76.7% (N = 188) reported that they could speak Turkish fluently while 23.3% (N = 57) could not.

Measures

Child Post-Traumatic Stress Disorder Reaction Index (CPTSD-RI)

This instrument was developed by Pynoos et al. (1987). A 20-item self-report scale designed to assess posttraumatic stress reactions of children of 6 to 16 years following exposure to a broad range of traumatic events. Items are rated on a 0 to 4 scale. Scores were classified as "mild PTSD reaction" (total score of 12 to 24), "moderate" (25 to 39), "severe" (40 to 59), and "very severe" (above 60). The validity and reliability study for the Turkish version reported a test-retest reliability coefficient of .86 and a Cronbach's alpha reliability coefficient of .75. As a result of construct validity studies, the relationship of the scale with DSM-IV criteria was examined. Chi-square results were found to be significant (beetwen P<.000 and P< .01) (Erden et al., 1999). The CPTSD-RI was adapted into Arabic by Thabet and Vostanis (1999). In the present study, the reliability coefficients were .84 and .81 for the Turkish and Arabic forms, respectively.

Children's Depression Inventory (CDI)

This instrument was developed by Kovacs (1981), based on Beck's Depression Inventory. The validity and reliability study for the Turkish version reported a test-retest reliability of .72 and a Cronbach Alpha's reliability coefficient of .86 (Öy, 1991). The 27-item scale is designed for children aged 6-17 years. Depending on their competency, the child can complete the scale independently or the items can be read to them. Responses are given on a scale from 0 to 2. For total scores beyond 19, higher scores indicate higher depression, with a maximum possible score of 54 (Öy, 1991). The CDI was adapted into

Arabic by Ghareeb et al. (1995). Using the Beck Depression Inventory as a parallel form, the validity score was .87 while the test-retest reliability score was.77. In the present study, the reliability coefficients were .83 and .81 for the Turkish and Arabic forms, respectively.

Multi-Dimensional Scale of Perceived Social Support (MSPSS)

This instrument was developed by Zimet et al. (1988). The 12-item scale comprises three 4-item subscales: family, friends, and significant other. The total social support score is the sum of the subscale scores. Responses are given on a 7-point Likert-type scale, with higher scores indicating higher perceived social support (Eker & Arkar, 1995). The scale was adapted into Turkish by Eker and Arkar (1995). Cronbach's alpha scores varied between 0.80 and 0.90 and were high for all subscales (Eker et al., 2001). The scale was adapted into Arabic by Merhi and Kazarian (2012), who reported Cronbach alpha reliability coefficients of .85. In the present study, the coefficients for the Turkish version were also .85. The reliability coefficients were .66 fır the Arabic forms.

Findings

Before the statistical analysis, normality assumptions were tested by the skewness-kurtosis values. Values between +2 and -2 were accepted as indicating normality (George & Mallery, 2011). For the ANOVA tests, homogeneity tests were performed to test for homogeneity of variances. The results revealed that the variances were homogenous. An ANOVA results were used in cases where homogeneity was ensured and Tukey tests were performed for pairwise comparisons. For some analyses the homogeneity assumption was not met, so Brown-Forsythe and Welsch tests were used, and Games Howell test results were used for pairwise comparisons.

Immigrant, refuge, and local adolescent's levels of perceived social support, depression, and PTSD

As no cutoff score was determined for perceived social support, it is not included in Table 1. For depression, a score above 19 indicates a high level. For PTSD, scores of 12-24, 24-39, 40-60, and 60+ indicate low, moderate, high, and very high levels, respectively.

Table 1
Distributions by cutoff scores for depression and PTSD scores

Country	N	Depression		PTSD			
		Low	High	Low	Medium	High	Very high
		Below 19	19 plus	12-24	25-39	40-60	60-
Iraqi	109	51 (46.8%)	58 (53.2%)	18 (16.5%)	55 (50.7%)	30 (27.5%)	6 (5.3%)
Syrian	136	80 (58.83%)	56 (41.17%)	30 (22.1%)	55 (40.4%)	49 (36%)	2 (1.5%)
Turkish	143	126 (88.1%)	17 (11.9%)	40 (28%)	55 (48.3%)	32 (22.4%)	2 (1.3%)
Total	245	131 (53.5%)	114 (46.5%)	48 (19.6%)	110 (44.9%)	79 (32.2%)	8 (3.3%)

As Table 1 shows, 53.2% (N = 58) of Iraqi students and 41.17% (N = 56) of Syrian students had high depression scores. For PTSD, 32.2% (N = 79) of immigrant students had high PTSD scores while 3.3% (N = 8) had very high PTSD scores. Regarding Iraqi students, specifically, 27.5% (N = 30) and 5.3% (N = 6) had high or very high PTSD scores, respectively. Among Syrian students, 36% (n = 49) and 1.5% (N = 2) had high or very high PTSD scores, respectively. In contrast, among Turkish students, 88.1% (N = 126) had low scores whereas only 11.9 (%17) had high depression scores while 22.4% (N = 32) had high and 1.3% (N = 2) had very high PTSD scores.

Table 2
Mean total perceived social support and subscale scores

Country	*N*	Total perceived social support	Friend Social support	Family social support	Special person social support
Iraqı	109	53.67	17.15	19.97	16.60
Syrian	136	56.53	18.39	20.73	17.40
Turkish	143	70.83	22.14	25.05	23.63
Maximum		84	28	28	28

Table 2 shows the perceived social support scores. Local Turkish children and adolescents had the highest (70.83) total scores, followed by Syrian (56.53) and Iraqi (53.67) adolescents. However, the total score and subscale scores were not significantly different between Syrian and Iraqi children and adolescents ($P > 0.05$). That is, they receive almost the same amount of perceived social support. The Turkish students scored higher than the other two groups for all three subscales. Iraqi students perceived the lowest level of social support in all three dimensions.

Difference Analysis

Table 3 presents the ANOVA results, which indicate no significant differences in scale scores related to gender or language ($P > 0.05$). However, there were significant differences in depression, PTSD, and social support scores related to nationality, peer relations in the new place of residence, time spent in Turkey, age, and reasons for immigration. Each of these are examined in turn below.

Table 3
One-way ANOVA results for PTSD and social support scores of Syrian, Iraqi, and Turkish adolescents

		Sum squares	*S D.*	*Mean squares*	*F*	*P*	*Sig. difference*
PTSD	Between groups	3300.374	2	1650.187	9.718	.000	T-I
	Within groups	65373.566	385	169.801			T-S
	Total	68673.940	387				
Social support	Between groups	23275.030	2	11637.515	77.706	.000	T-I
	Within groups	57658.582	385	149.763			T-S
	Total	80933.612	387				
Significant person support	Between groups	4064.343	2	2032.171	74.006	.000	T-I
	Within groups	10571.934	385	27.460			T-S
	Total	14636.276	387				

Note. T: Turkish I: Iraqi S: Syrian

Nationality

The PTSD scores differed significantly by nationality ($F_{2,385}$ = 9.718, P < 0.05, η^2 = 0.048). There was a significant difference between Turkish students and Iraqi and Syrian students (P < 0.05), but no significant difference between Iraqi and Syrian students (P > 0.05). That is, the mean PTSD scores of Syrian and Iraqi students were higher than those of Turkish students (P < 0.05).

The perceived social support scores also differed significantly by nationality ($F_{2,385}$ = 77.706, P < 0.05, η^2 = 0.287). Turkish students had higher mean scores than Syrian (and Iraqi students (P < 0.05). Mean scores for the social support from a special person subscale also differed significantly by nationality ($F_{2,385}$ = 74.006, P < 0.05, N^2 = 0.277), with Turkish students having higher scores (23.63) than both Syrian (17.40) and Iraqi (16.60) students, as reported in Table 2.

The depression scores of Iraqi and Syrian students (P > 0.05) did not differ significantly, although there was a significant difference between the scores of Turkish students and Iraqi and Syrian students (P < 0.05). The mean scores of Syrian and Iraqi students were higher those of Turkish students (P < 0.05).

There were also significant differences between nationalities for peer and family social support scores (P < 0.05). Turkish students had significantly higher scores peer social support than both Iraqi and Syrian students (P < 0.05). Turkish students had significantly higher family social support scores than both Iraqi) and Syrian students as reported in Table-4. (P < 0.05).

Based on these findings, data for Iraqi and Syrian students are combined for the following analyses as one immigrant group for comparison with local Turkish students.

Table 4
Welsch and Brown-Forsythe Test results for Depression, Peer social support, and Family social support Scores

		Statistics	*DF1*	*DF2*	*P*	*Sig. Difference*
Depression	Welsch	45.456	2	237.124	.000	T-I
	Brown-Forsythe	39.398	2	336.760	.000	T-S
Friend social support	Welsch	36.903	2	250.177	.000	T-I
	Brown-Forsythe	41.928	2	370.822	.000	T-S
Family social support	Welsch	38.021	2	222.618	.000	T-I
	Brown-Forsythe	29.179	2	313.838	.000	T-S

Note. T: Turkish I: Iraqi S: Syrian.

Table 5
Welsch and Brown-Forsythe results for PTSD scores

		Values	**DF1**	**DF2**	**P**	**Sig. Difference**
PTSD	Welsch	6.035	2	149.216	.003	14-13
	Brown-Forsythe	7.105	2	207.154	.001	14-12

Note. 12: 12 years old, 13: 13 years old, 14: 14 years old and older.

Age

The only significant age-related differences were for PTSD scores ($p < 0.05$) for both Turkish and immigrant participants. Table-5 was showed The Games Howell test results indicated significant differences between the 14+ age group and the 12- and 13-year-old groups ($p < 0.05$), with 14-year-old students having higher mean PTSD scores (=39.62) than 12-year-old (= 33.05) and 13-year-old students (= 32.84).

Time Spent in Turkey

The only significant differences in relation to time spent in Turkey were for depression ($F_{(3,241)} = 3.924$, $p < 0.05$, $N^2 = 0.046$), perceived social support ($F_{(3,241)}=3.585$, $p < 0.05$, $N^2 = 0.042$), and social support from a special person ($F_{(3,241)} = 4.546$, $p < 0.05$, $N^2 = 0.053$). Regarding pairwise comparisons, there was a significant difference in mean depression score between those living in Turkey for 3 years and 4 years or longer ($p < 0.05$), with the former having higher scores (= 19.93) than the latter (X = 14.14). Regarding social support from a special person, the mean score was significantly higher (X = 14.40) for those living in Turkey for 3 years than those living in Turkey for 1, 2, or 4 plus years (P < 0.05), whose mean scores were 17.28, 17.32, and 18.09, respectively. Regarding pairwise comparisons, there was a significant difference in mean perceived social support score between those living in Turkey for 3 years than those living Turkey 2 and 4 plus years (P < 0.05).

Table 6
ANOVA results for the scores by time spent in Turkey

		Sum of square	SD	*Square means*	F	P	*Significant difference*
Depression	Between groups	768.67	3	256.22	3.924	.009	3-4
	Within groups	15736.02	241	65.29			
	Total	16504.70	244				
Perceived social support	Between groups	1635.82	3	545.27	3.585	.014	3-2
	Within groups	36653.93	241	152.09			3-4
	Total	38289.76	244				
Significant person social support	Between groups	334.58	3	111.52	4.546	.004	1-3
	Within groups	5913.01	241	24.53			2-3
	Total	6247.59	244				3-4

Note. 1: one year, 2: two year, 3: three year, 4: four years and longer

Table 7
T-TEST results for perceived social and family social support by having a Turkish friend

	Have a Friend	**N**		**S**	**T**	**P**
Total perceived social support	Yes	192	55.82	12.53	2.128	.034
	No	53	51.71	12.08		
Family social support	Yes	192	20.77	6.55	2.082	.038

Peer Relations in New Place of Residence

Perceived social support scores differed significantly in relation to peer relations (T_{243} =2.128, $p < 0.05$, $N^2 = 0.018$), with immigrant students who had a Turkish friends reporting significantly higher social support scores (X = 55.82) than those with no Turkish friends (X = 51.71). Family social support scores ($T_{243} = 2.082$, $p < 0.05$, $N^2 = 0.017$) also differed significantly, with immigrant students who had Turkish friends reporting significantly higher family social support scores (X = 20.77) than those with no Turkish friends (X = 18.62).

Reason for Immigration (Forced or Voluntary)

Significant differences were found between voluntarily and forcefully left immigrant groups' scores for depression ($T_{243} = 2.184$, $p < 0.05$, $N^2 = 0.019$) and family social support ($T_{243} = -2.560$, $p < 0.05$, $N^2 = 0.026$). Surprisingly, students who had immigrated voluntarily for educational reasons had significantly higher scores (= 20.44) than those who immigrated due to conflicts (= 16.92), although the effect size was small. Regarding family support, students who immigrated due to conflicts had higher family social support scores (= 20.71) than those who immigrated for education (= 17.34).

Table 8
T-test for depression and family social support by reasons for immigration

	Reason of migration	*N*		*S*	*T*	*P*
Depression	Conflicts	216	16.92	8.20	2.184	.030
	Education	29	20.44	7.80		
Family social support	Conflicts	216	20.71	6.66	-2.560	.011
	Education	29	17.34	6.55		

Regression Analysis Results

Before conducting the regression analysis, the inter-variable correlations were calculated and examined. Significant correlations were found between depression and PTSD, perceived social support, and social support scores, while PTSD, perceived social support, and family social support were highly correlated. Thus, they were considered independent variables. The relationships between the independent variables were examined to ensure that they were not too strong. The results revealed a high correlation between perceived social support and family social support. The regression analysis was run by holding depression as a constant and PTSD and perceived social support as predictor variables (Tabachnick & Fidell, 2011).

Table 9
Model 1. Multiple regression analysis results

Model	*R*	*R^2*	*Adjusted R^2*	*F*	**P**
1	.500	.250	.243	40.251	.000
Variables	Unstandardized			Standardized	
	B	*Standard error*		*Beta*	*T*	*P*
PTSD	.251	.037		.388	6.874	.000
Perceived social support	-.167	.037		-.255	-4.509	.000

Model 1

As shown in Table 9, the multiple regression analysis results for Model 1 showed that PTSD and perceived social support are both significantly related to depression (R = .500, R^2 = .250, $F_{2\text{-}242}$ = 40.251, $P < 0.05$), together explaining approximately 25% of the variance in depression scores.

Model 2

As shown in Table 10, the multiple regression analysis for Model 2 showed that PTSD and family social support both significantly related to depression (R = .503, R^2 = .253, $F_{2\text{-}242}$ = 40.926, $P < 0.05$), together explaining approximately 25.3% of the variance in depression scores.

Table 10
Model 2 multiple regression analysis results

Model	*R*	*R²*	*Adjusted R²*	*F*	*P*
2	.503	.253	.247	40.926	.000
Variables	Unstandardized		Standardized		
	B	Standard error	*Beta*	*T*	*P*
PTSD	.253	.036	.391	6.946	.000
Family social support	-.319	.069	-.260	-4.629	.000

Discussion

Results revealed surprising results. As such, over half of Iraqi students (53%) had depression scores above the cutoff limit of 19, while a majority had moderate or above moderate PTSD scores. While Syrian students had similar PTSD scores, fewer had high depression scores. Similarly, Derluyn, and Broekaert (2007) found that 34.5% of refuge child and adolescents had PTSD scores or above the cutoff score while 47% of depression scores were above. In a study performed in conflict area of Palestine, Thabet and Vostanis (1999) reported PTSD prevalence of 40.6% for children, 26.9% for parents, and 43.6% for teachers.

Regarding the effects of nationality, Iraqi and Syrian students did not differ from each other but differed significantly from Turkish students. Turkish students had lower PTSD and depression scores, but higher social support scores. The lack of difference between Iraqi and Syrian students could be because their statuses (i.e., refugee, asylum-seeker, temporary protection) are not so distinct in Türkiye or they faced similar life events before immigrating. This contradicts Hodes et al. (2008), who found that among individuals from Middle East living in the UK, asylum-seekers had higher PTSD scores than refugees. Similarly, Dekeyser et al. (2011) found differences in social adaptation between children with Swedish parents and immigrant parents and more emotional problems among children with immigrant parents. In another study in Sweden, PTSD rates varied from zero to individuals who had never experienced trauma to 11% and 38%, respectively, for those who had experienced trauma a few times and those who had experienced severe trauma (Almqvist & Brandell-Forsberg, 1997).

In the present study, age had no effect on depression, social support, and social support scores, whereas it significantly affected PTSD scores, with 14-year-old students having higher PTSD scores than 12- and 13-year-old ones. This is supported by Thabet et al. (2004), who found that older children are at higher risk for PTSD. Similarly, Correa-Velez, Gifford and Barnett (2010) reported that older children are at higher risk for mental health problems generally.

Surprisingly perhaps, immigrant students living in Türkiye for four years had significantly lower depression scores than those living there for only three years. This may be because the former had acquired social support systems and overcome adaptational problems. Similarly, Thabet and Vostanis (2000) found social avoidance drops from 27% to 14% as immigrant children and adolescents spend more time in the host county and learn the language and get better adjusted.

In the present study, immigrant children with Turkish friends reported higher family social support scores than those without. This could be because immigrant children facing difficulty adapting to the local culture may struggle to form peer relations, which leads to isolation (McFarlane et al., 2011). Such adverse outcomes may be avoided if immigrant families support their children through forming social relations, friendships, playing, and spending time with friends from the host country.

More generally, previous studies have reported a relationship between family social support and psychological well-being. Correa-Velez et al. (2010) for example found that family social support had a positive effect on psychological well-being among refugee youth in Australia. Our findings are also consistent with Oppedal and Idsoe (2015), who found that immigrant children in Norway overcame communication barriers more easily and received peer support more successfully if they had more family social support. Thus, family attitudes and support appear imperative for immigrant children to develop positive attitudes to adjust better. In Türkiye, however, we observe that Arab immigrant families mostly have conservative Muslim backgrounds, making them fear that their children will lose their own cultural identity and weaken their conservative beliefs. It will take time, courage, and effort for them to realize that they can retain their own cultural ties and protect their own values while also learning the local culture and language and adjusting better to the host country.

Regarding reasons of immigration, students who immigrated for educational purposes had higher depression scores than those who immigrated due to civil war or ethnic conflicts. Those who immigrated for education also had lower family social support scores than those who immigrated due to conflicts. One possible explanation is that the former groups have felt safe after immigration, whereas the latter group may have been affected negatively by adaptation problems. It is thus important to have effective orientation processes for immigrant students, organized by school administrators, teachers, and psychological counselors (Eichler, 2019). An important step is providing Turkish lessons (Kağnıcı, 2017) because learning the host country's language will ease language difficulties and problems that immigrants can face in the new country.

Finally, regarding the multiple regression analyses, PTSD and perceived social support predicted depression in the first model while PTSD and family social support predict depression in the second model. These findings are supported by previous research. For example, Keles et al. (2016) found that social support problems stemming from acculturation explained 33% of the variance in depression among unaccompanied child refugees living in Norway. Similarly, PTSD explained 16% of the variance in depression among immigrant children in the UK (Bronstein, Montgomery & Ott, 2013). Finally, Oppedal and Idsoe (2015) found that social support negatively predicted depression among adolescent refugee children. This support did not have to involve face-to-face contact with immigrant family members because phone calls or other ways of communication also helped to ease the burden on these children.

In this study, it was revealed how the depression, PTSD and social support levels of children and adolescents who migrated from Syria and Iraq differed according to their demographic characteristics and the predictive power of PTSD and social support for depression. When the results were

examined, the depression and PTSD levels of Syrian and Iraqi children and adolescents were higher than Turkish children and adolescents. Perceived social support levels of Syrian and Iraqi children and adolescents are lower. The results obtained were discussed in the context of the literature. It is important for psychological counselors who have immigrant and refugee students in their schools to know that migration is a traumatic experience in itself and to carry out studies that will accelerate the adaptation of students in schools.

When the limitations of the study are examined; the language problem experienced by immigrant and refugee children and adolescents and the fact that the study was conducted only with the immigrant group living in Bolu come to the fore. In addition to these, the study was carried out only with the feedback received from children and adolescents. It is thought that conducting more comprehensive studies in which teachers and families are also included in the process while studying the research topic will contribute to our understanding of refugee adolescents adoption and schooling.

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Título: que corresponda a la información y al propósito del manuscrito.

Resumen: breve texto de máximo 160 palabras, en el que se condensen los aspectos más relevantes en cuanto a la metodología, los resultados y las conclusiones. Se deben incluir cinco palabras clave referentes al contenido y al área de la psicología a la que pertenece el trabajo, así como una versión en inglés del resumen y de las palabras clave.

Introducción: texto en el que se exponen tanto los antecedentes en el área de investigación como la descripción del problema de investigación o pregunta, cuya justificación debe ser clara, coherente y basada en la literatura consultada.

Sujetos o Participantes: el artículo debe explicitar las características principales de los participantes, así como el proceso de selección y asignación a grupos cuando sea pertinente. La APA recomienda el uso del término *participantes* cuando se trata de investigaciones con humanos, y el término *sujetos*, cuando es con animales.

Instrumentos: es indispensable que se identifiquen y describan claramente los instrumentos utilizados para la recolección de la información; si se trata de pruebas psicológicas, se deben mencionar sus propiedades psicométricas.

Procedimiento: es necesario describir las acciones relevantes durante la recolección de la información y el análisis de los datos.

Resultados: los resultados (expresados en datos) relevantes para los objetivos del estudio deben ser explícitos y claros. Cuando se requieran elementos complementarios, como tablas o figuras, los datos deben estar ordenados debidamente como lo indica la APA. Se recomienda evitar repeticiones de los datos en el cuerpo del texto y en las tablas.

Discusión y Conclusiones: toda discusión respecto a los resultados debe responder a las preguntas de investigación y hacerse a la luz de la literatura relevante. Asimismo, se deben presentar las conclusiones del estudio.

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