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## Editorial

EN LOS últimos diez años, la Revista Colombiana de Psicología ha evidenciado un giro notable hacia la discusión de problemáticas sociales que atraviesan la vida cotidiana, las dinámicas colectivas y los procesos sociales. Temas como la diversidad cultural, las transformaciones en la educación, la construcción de ciudadanía y las tensiones en torno a la identidad y la convivencia han ocupado un lugar central. De la misma forma, preguntas asociadas a la diversidad, el bienestar y la prevención de la enfermedad también han tenido un crecimiento importante. Este énfasis refleja la necesidad de una psicología que dialogue con la realidad cambiante del país y de la región, situando la disciplina en la intersección entre el conocimiento académico y las demandas sociales.

En la última década se publicaron artículos sobre la participación familiar en la educación infantil, la homonegatividad internalizada en población LGBTQ+, y los estudios sobre sueño y salud en diferentes grupos etarios son solo algunos ejemplos de la orientación hacia problemáticas contemporáneas de gran relevancia social y aplicada. Estos trabajos reflejan una renovada sensibilidad hacia la diversidad cultural, social y de género, además de una mayor apertura a temáticas que inciden directamente en el bienestar colectivo y en las transformaciones sociales de nuestro tiempo.

Contrastando con décadas anteriores, los artículos más antiguos tienden a abordar tópicos con un sesgo histórico, teórico o institucional. Estudios sobre el aprendizaje animal, la evolución de la psicología de la salud en Colombia, o el origen de la psicología profesional en el país muestran un fuerte interés en comprender los fundamentos y raíces de la disciplina. Estos contenidos, más enfocados en construir una memoria académica y profesional, contrastan con las temáticas aplicadas y actuales que predominan en los volúmenes recientes.

Finalmente, es importante destacar que las líneas de investigación social que nutren los números recientes de la revista dialogan estrechamente con las tendencias globales en psicología. La atención a la diversidad, la perspectiva intercultural, el estudio de fenómenos colectivos y la búsqueda de mayor incidencia social en la investigación reflejan un horizonte compartido por comunidades académicas en todo el mundo. Así, la revista no solo contribuye a la construcción de conocimiento situado en Colombia y América Latina, sino que también fortalece su inserción en la conversación internacional que define el presente y el futuro de la disciplina. Por esto, nuestra invitación a los autores potenciales en la revista es no quedarse en tendencias del pasado, normalmente auto contenidas, locales y concentradas en problemas bibliométricos o históricos y no disciplinares, y revisar las tendencias en

las grandes revistas (E.G., Annual Review of Psychology, Educational Psychologist, Psychological Bulletin, Psychological Science in the Public Interest) y en las grandes conferencias (APS, APA, Psychonomics), ambas fuentes disponibles en Internet. También los invitamos a cruzar estos temas con las problemáticas sociales existentes en nuestras sociedades y las particularidades de nuestros contextos para dar respuestas fructíferas desde la psicología.

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## **Artículos**

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# State Of the Art on Psychological Capital Interventions and Alternatives for Their Practice in Organizational Contexts

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

In the contemporary organizational environment, understanding and developing different types of capital —human, social, and psychological— is essential for maximizing employee performance and well-being. Psychological capital (PsyCap) is composed of measurable and developable positive qualities, as self-efficacy, hope, resilience, and optimism, which significantly impact employee motivation and performance. This study conducted a state-of-the-art review to evaluate the effectiveness of PsyCap interventions. It reviewed 64 articles from the Scopus, ScienceDirect, and Web of Science databases, resulting in a final sample of 16 articles after removing duplicates and ineligible articles. The results indicate that PsyCap interventions promote the development of these qualities, improving psychological well-being and employee performance. Successful implementation of these interventions requires a clear understanding of workers' needs and strong support from organizational leadership.

*Keywords:* interventions, psychological capital, organizational context.

### **Estado Actual de las Intervenciones sobre Capital Psicológico y Alternativas para su Práctica en Contextos Organizacionales**

#### **Resumen**

En el entorno organizacional contemporáneo, comprender y desarrollar diferentes tipos de capital —humano, social y psicológico— es esencial para maximizar el desempeño y el bienestar de los empleados. El capital psicológico (PsyCap) se compone de cualidades positivas medibles y desarrollables, como la autoeficacia, la esperanza, la resiliencia y el optimismo, que impactan significativamente la motivación y el desempeño de los empleados. Este estudio realizó una revisión del estado del arte con el objetivo de evaluar la efectividad de las intervenciones de PsyCap. Se revisaron 64 artículos de las bases de datos Scopus, ScienceDirect y Web of Science, resultando en una muestra final de 16 artículos después de eliminar duplicados y artículos no elegibles. Los resultados indican que las intervenciones de PsyCap promueven el desarrollo de estas cualidades, mejorando el bienestar psicológico y el desempeño de los empleados. La implementación exitosa de estas intervenciones requiere un entendimiento claro de las necesidades de los trabajadores y un fuerte apoyo del liderazgo organizacional.

*Palabras clave:* intervenciones, capital psicológico, contexto organizacional.

## Introduction

In the contemporary organizational environment, understanding and developing different types of capital are essential for maximizing employee performance and well-being. Human capital refers to the set of knowledge, skills, and experiences an individual accumulates through education and training, while social capital pertains to the networks and relationships that facilitate cooperation and access to resources (Huang et al., 2021; Xu et al., 2022). Psychological capital (PsyCap) has been consolidated as an important resource in the organizational context, consisting of four main dimensions: self-efficacy, hope, optimism, and resilience (Luthans et al., 2007). Investment in the development of PsyCap has been widely studied in several sectors, demonstrating its positive influence on productivity, job satisfaction, engagement, and employee well-being. However, despite the growing interest in the topic, there are still gaps in the understanding of the application of PsyCap in broad organizational contexts.

Initially, it is appropriate to contextualize and operationally define what is understood as psychological capital. For this purpose we refer to the pioneering study on the subject (Luthans et al., 2006), in which the construct is defined as a positive developmental state of an individual characterized by: (1) Self-Efficacy (Confidence): The belief in one's own ability to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over life events; (2) Hope: A positive motivational state based on an interactively derived sense of successful agency (goal-directed energy) and pathways (planning to meet goals); (3) Optimism: Attributing success to internal and stable causes while attributing failures to external and unstable causes, maintaining a positive and realistic view of the future; and (4) Resilience: The ability to bounce back quickly from adversity, setbacks, conflicts, and failures, as well as adapt to changes and continue moving forward. Luthans et al. (2006) emphasize that these four components are measurable, developable,

and manageable, making PsyCap a practical and applicable approach in various contexts, as organizational settings, to enhance employee performance and well-being.

The impact of PsyCap is observed in different organizational contexts, highlighting its role in increasing employee motivation and improving the services offered. In the hotel industry, it has been associated with improving service quality and greater customer satisfaction (Han & Hwang, 2019). In tourism and hospitality, its relationship with work engagement is crucial for retaining talent and reducing turnover (Tsaur et al., 2019). Furthermore, in community programs, PsyCap is an essential factor for social inclusion and overcoming socioeconomic barriers (Morgan et al., 2019) the acquisition of capital to expedite the (re. The relevance of this psychological capital is also evident in the corporate environment, where leaders who encourage its development among subordinates promote a significant increase in proactivity and innovation (Li et al., 2019).

Recent studies indicate that PsyCap interacts with human and social capital in a complex and interdependent manner, significantly influencing professional performance. For example, research conducted in luxury hotels in China shows that PsyCap has a stronger impact on employees' self-rated performance compared to human and social capital (Huang et al., 2021). Similarly, a study of career adaptability among college students found that PsyCap is the most influential factor in this context, followed by human capital and, to a lesser extent, social capital (Xu et al., 2024). This perspective reinforces the importance of a holistic approach to building organizational capabilities, fostering not only technical skills and knowledge, but also social networks and positive psychological competencies.

PsyCap Interventions (PCI) have been shown to be effective in helping employees cope better with adversity, adapt quickly to change, and maintain a positive attitude in the face of challenges. In a corporate environment characterized by

rapid transformations and high competitiveness, these programs can contribute to job satisfaction, organizational commitment, and organizational citizenship behaviors, promoting well-being and engagement (Bayona & Guevara, 2019; Kong et al., 2018; Salanova et al., 2012; Xu et al., 2022). In sectors with high customer interaction, as hospitality and healthcare, PsyCap is positively correlated with job performance and employee satisfaction (Kong et al., 2018; Youssef & Luthans, 2013). Other studies highlight that interventions aimed at developing PsyCap reduce occupational stress and turnover intention, since resilience and hope enable employees to face adversity more effectively, reducing the desire to leave the organization (Kong et al., 2018). In the educational context, PsyCap is essential for students' career adaptability, helping them transition into the job market (Xu et al., 2024).

Another relevant aspect for discussion is the interaction between positive psychological capital and social capital. PsyCap is intrinsically linked to the strengthening of support networks within organizations, promoting greater collaboration between individuals and a healthier work environment (Wang et al., 2019). In business contexts the existence of positive interpersonal relationships amplifies the effects of PsyCap, favoring psychological safety and organizational cooperation (Morgan et al., 2019).

Given this scenario, this study presents a state-of-the-art review of the literature on interventions designed to develop PsyCap in organizational settings. Practices implemented to strengthen this psychological capital among workers were analyzed, considering the context of application, the methodology adopted, the duration of the interventions, and which dimensions of PsyCap were worked on. In addition, variables as the cultural context of the companies, the sector of activity, and the methodological rigor of the research, including the randomization of participants, were evaluated.

In this way, we seek to provide a comprehensive and evidence-based view of how organizations

are promoting PsyCap and which factors influence its effectiveness, contributing to the theoretical and practical advancement of this area of study. In addition, it is understood that strengthening PsyCap is directly associated with a more positive and collaborative work environment, impacting organizational well-being (Bayona & Guevara, 2019; Salanova & Ortega-Maldonado, 2019). Companies that invest in developing qualities as optimism and hope observe improvements in the organizational climate, greater employee engagement, and an increase in group morale, favoring positive organizational behavior (Youssef & Luthans, 2013). As the practical importance and theoretical foundation of PsyCap grow, it becomes essential to conduct new studies to deepen the understanding of its functions and implications in different organizational contexts (Tsai et al., 2020).

## Methodology

To explore the state of the art on interventions aimed at enhancing and developing Psychological Capital, a search for published articles was conducted in the Scopus, ScienceDirect, and Web of Science databases. This selection is based on their breadth, quality, and advanced features. Scopus is one of the largest abstract and citation databases, covering a wide range of disciplines and offering advanced citation analysis tools. ScienceDirect, operated by Elsevier, is a leading repository of full-text articles, providing access to comprehensive journals influential in the field of psychology. Web of Science offers a robust platform for citation analysis and trend discovery, with extensive disciplinary coverage. All these databases are highly respected, ensuring access to high-relevance and scientifically rigorous research. Additionally, their intuitive interfaces and advanced search functionalities facilitate the precise location of relevant articles, making them indispensable for effective and comprehensive research in psychology. Comparative studies, as those by Falagas et al. (2008) and Mongeon and Paul-Hus (2016), corroborate the superiority of these databases in

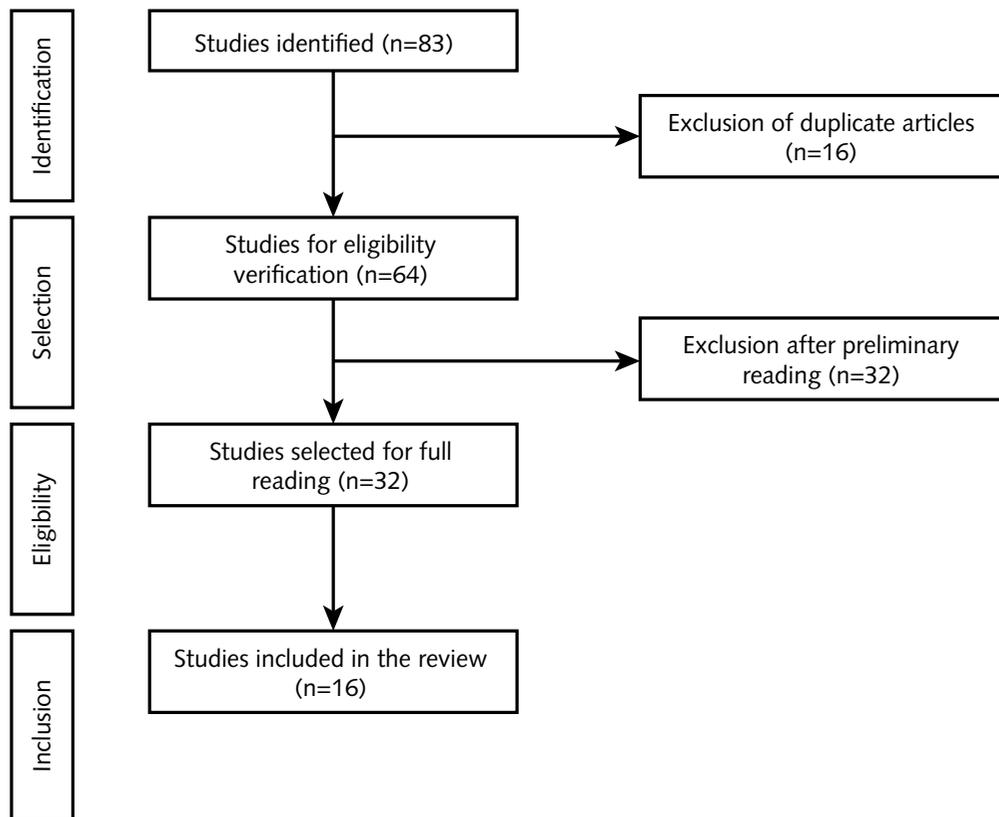
terms of coverage and analysis tools, reinforcing their choice for high-quality academic research.

The initial criterion for article selection was solely based on the search for the expressions: “psychological capital intervention” OR “psycap intervention” contained in the title, abstract, or keywords of the articles. The initial search was conducted on May 31, 2024, and identified 83 articles.

After excluding duplicates, 64 articles published between 2006 and 2024 remained.

The article selection process is presented in the flowchart suggested by the Preferred Reporting of Systematic Reviews and Meta-Analyses [PRISMA] (Moher et al., 2009) and is represented in Figure 1.

Figure 1. Flowchart of Database Search.



Note: **created** by authors.

## Results

An initial observation of the current landscape on the investigated topic reveals an upward trend in publications, especially since 2013 (as illustrated in Figure 2), reflecting a growing interest in Psychological Capital and practices for its development in the organizational context. Between 2014 and 2016 this interest remained steady, with studies

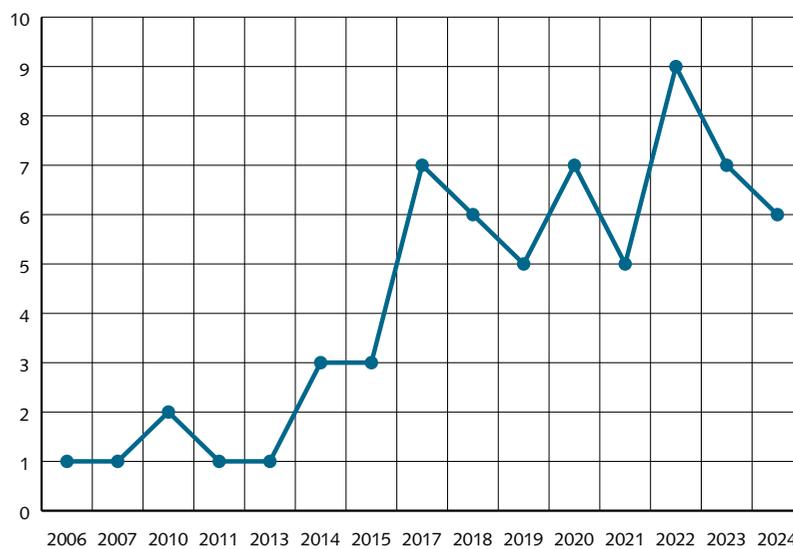
expanding to different sectors and examining the role of PsyCap in various organizational environments. From 2017 onwards, research began to focus more on intervention programs (PsyCap Interventions - PCI) and their effectiveness in enhancing PsyCap among employees. Articles published between 2020 and 2022 paid greater attention to

the application of PCI in high-interaction sectors as hospitality and healthcare, highlighting its role in improving job performance and reducing occupational stress. The most recent publications, from 2023 onwards, indicate greater diversification of research topics, including the impact of PCI on career adaptability among students and its potential to reduce employee turnover. Additionally, these studies address the holistic development

of PsyCap, integrating it with human and social capital to promote overall employee well-being and organizational performance.

However, it is important to note that, to date, only 64 studies have been identified in three major international databases. This suggests that the subject is still in an early stage of development, leaving room for identifying gaps and opportunities for both theoretical and empirical advancements.

**Figure 2.** Timeline of Publications on pci.



Note: X-axis = Years; Y-axis = Number of Publications.

The preliminary analysis of the articles was conducted by reading the title, abstract, and keywords. This analysis resulted in 32 documents presenting proposals for interventions aimed at developing Psychological Capital. The other 32 documents pertained to theoretical or empirical studies that dealt with the definition of the concept and its relationship with other behavioral phenomena and organizational or academic outcomes, predominantly.

The publication of interventions for the development of PsyCap in organizational and work contexts has gained prominence since 2019. An in-depth reading of the articles allowed the establishment of additional criteria for the inclusion of

articles in this review. Peer-reviewed articles and open-access chapters were retained, as some documents originated from conference proceedings or book chapters for which full-text access was not available. Additionally, the articles were divided into two major groups: interventions in organizational contexts and interventions in educational contexts. Only one article did not belong to either of these groups; it was conducted with homeless women. Given the study's objective, articles whose interventions were carried out in organizational contexts with workers were retained. Consequently, the final sample consisted of 16 documents, which are briefly presented in Table 1:

**Table 1**  
Characterization of Studies and Interventions

Article data	Intervention Characteristics
<p>Article 1 - Luthans et al., (2010)            Title: The Development and Resulting Performance Impact of Positive Psychological Capital            Summary: The conducted study utilized a PsyCap Intervention model with a randomized control group, followed by a study with managers to evaluate whether the intervention enhanced participant performance.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (<b>pci</b>)  <b>Duration:</b> Short duration  <b>Sessions:</b> Single session (2 hours)  <b>Format:</b> In-person, group setting  <b>Results:</b> The intervention demonstrated a positive influence on individual psychological dimensions (hope, self-efficacy, resilience, and optimism) and the core construct of positive psychological capital, leading to a positive impact on participant performance.</p>
<p>Article 2 - Alipour et al., (2013)            Title: The Effectiveness of Psychological Capital Intervention Model (<b>pci</b>) on the Mental Health of Experts Working in Iran Khodro Diesel Co., Iran            Summary: This quasi-experimental study used a pre-test and post-test design with an experimental group of 30 participants who underwent 10 two-hour <b>pci</b> sessions, focusing on hope, optimism, self-efficacy, and perseverance.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (<b>pci</b>)  <b>Duration:</b> Long duration  <b>Sessions:</b> 10 sessions (2 hours each)  <b>Format:</b> In-person, group setting  <b>Results:</b> The results showed significant improvement in mental health, social function, anxiety, and depression in the experimental group, with no significant differences in physical symptoms.</p>
<p>Article 3 - Zhang et al., (2014)            Title: A Structured Reading Materials-Based Intervention Program to Develop the Psychological Capital of Chinese Employees            Summary: This study investigates the effectiveness of a structured reading materials-based intervention program to develop the PsyCap of Chinese employees. The study involved 234 participants, comparing the outcomes of an intervention group with a control group.</p>	<p><b>Intervention:</b> Structured Reading Materials-Based Intervention Program  <b>Duration:</b> Short duration  <b>Sessions:</b> Single session (30 minutes)  <b>Format:</b> In-person  <b>Results:</b> Compared to the control group, the intervention group showed significant increases in psychological capital and job performance, with lasting effects observed up to three months after the intervention.</p>
<p>Article 4 - Dello Russo &amp; Stoykova, (2015)            Title: Psychological Capital Intervention (<b>pci</b>): A Replication and Extension. Human Resource Development            Summary: This study explores the PsyCap intervention developed by Luthans et al. (2010), replicating it with different facilitators and evaluating its practical implications for human resource management, suggesting that these can improve employee performance in a lasting manner.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (<b>pci</b>)  <b>Duration:</b> Short duration  <b>Sessions:</b> Single session (3 hours)  <b>Format:</b> In-person  <b>Results:</b> Significant improvements were observed in PsyCap levels, with lasting effects one month after the intervention. It is considered a low-cost and efficient intervention for developing the psychological capital of workers and students.</p>
<p>Article 5 – Akhoundi e Aerab Sheibani (2017)            Title: Effectiveness of the Psychological Capital Intervention Model on Organizational Procrastination of Skill Workers in Iran Khodro Diesel Company, Iran            Summary: This study investigates how PsyCap interventions proposed by Luthans can improve job performance by reducing procrastination.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (<b>pci</b>)  <b>Duration:</b> Long duration  <b>Sessions:</b> 10 sessions (2 hours each)  <b>Format:</b> In-person, group setting  <b>Results:</b> In the experimental group, there was a reduction in organizational procrastination, improvement in inefficiency, anxiety, and turnover. It also resulted in increased motivation and improved worker performance. The effects were lasting up to 2 months post-intervention.</p>
<p>Article 6 - Stratman &amp; Youssef-Morgan (2019)            Title: Can Positivity Promote Safety? Psychological Capital Development Combats Cynicism and Unsafe Behavior            Summary: This study examines how the development of PsyCap can reduce cynicism and unsafe behaviors in the workplace, using a PsyCap development intervention in a quasi-experimental design.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (<b>pci</b>)  <b>Duration:</b> Short duration  <b>Sessions:</b> Single session (approximately 90 minutes)  <b>Format:</b> In-person  <b>Results:</b> The results indicate increased levels of PsyCap, a reduction in cynicism, and a decrease in unsafe behaviors. Cynicism was identified as a full mediator between PsyCap and unsafe behaviors.</p>

<p>Article 7 - Salanova &amp; Ortega-Maldonado (2019)  <b>Title:</b> Psychological Capital Development in Organizations: An Integrative Review of Evidence-Based Intervention Programs  <b>Summary:</b> This article reviews and synthesizes the literature on PsyCap interventions in organizations. It highlights the importance of PsyCap as a developable psychological resource, comprising self-efficacy, optimism, hope, and resilience.</p>	<p><b>Theoretical:</b> This article analyzes different interventions of short and long duration (30 minutes to 3 hours and 1 to 20 sessions).  <b>Results:</b> The review covers various types of interventions, from micro-interventions to broader development programs, and examines cultural differences in the development of PsyCap. The findings show that PsyCap interventions are effective in improving psychological well-being, job performance, and positive attitudes among employees.</p>
<p>Article 8 - Georgiou e Nikolaou, (2019)  <b>Title:</b> The Influence and Development of Psychological Capital in the Job Search Context  <b>Summary:</b> This study highlights how PsyCap can support persistence and success among job seekers.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (pci)  <b>Duration:</b> Short duration  <b>Sessions:</b> Two sessions (3 hours each)  <b>Format:</b> In-person  <b>Results:</b> Increased levels of PsyCap were observed, along with greater persistence in the job search and improved job search outcomes (more interviews).</p>
<p>Article 9 - Da et al., (2020)  <b>Title:</b> Effectiveness of Psychological Capital Intervention and Its Influence on Work-Related Attitudes: Daily Online Self-Learning Method and Randomized Controlled Trial Design  <b>Summary:</b> This study aims to expand the Psychological Capital Intervention (pci) model and examine its influence on work-related attitudes. It tests the proposed intervention (daily online self-learning method) and observes its effectiveness on PsyCap, job satisfaction, and the reduction of turnover intention.</p>	<p><b>Intervention:</b> Daily Online Self-Learning Method  <b>Duration:</b> Long duration  <b>Sessions:</b> 5 sessions (30 minutes each)  <b>Format:</b> Online  <b>Results:</b> The results indicated that the intervention was effective in increasing PsyCap, enhancing job satisfaction, and reducing turnover intention. However, there was no significant impact on job engagement.</p>
<p>Article 10 - Yu e Liu (2021)  <b>Title:</b> Relationship Between Human Capital and Technological Innovation Growth of Regional Economy and Psychology of New Entrepreneurs in Northeast China  <b>Summary:</b> This study explores the impact of human capital on economic growth in Northeast China and the factors influencing the psychological capital of new entrepreneurs in the entrepreneurial process.</p>	<p><b>Intervention:</b> E-PCI-S (External Environment Substitute Psychological Capital Intervention)  <b>Details:</b> The authors do not provide detailed information on the intervention but indicate that this model combines elements of PsyCap with the optimization of the external environment (material capital) and the investment of other types of capital, such as human capital. They consider that the pci model is limited and has potential cost-benefit asymmetries. The E-PCI-S model, on the other hand, presents significant operational potential in the macroeconomic environment.</p>
<p>Article 11 - Qiao et al. (2022)  <b>Title:</b> Effect of Psychological Capital Interventions on Well-Being in New Recruits During Assembly Training: A Comparative Study  <b>Summary:</b> This study investigates the effects of different forms of Psychological Capital (PsyCap) interventions on the well-being of recruits during the training period. Using cluster sampling, 99 recruits were divided into three groups: 8-session intervention, single-session intervention, and control group.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (pci)  <b>Duration:</b> Short and long duration  <b>Sessions:</b> 8 sessions (main group), 1 session (secondary group)  <b>Format:</b> In-person  <b>Results:</b> The 8-session intervention yielded better results. Psychological capital, as a positive psychological resource possessed by individuals, can enhance the perception of happiness. An increase in individual psychological capital leads to a more positive overall state, improving psychological well-being.</p>
<p>Article 12 - Carter e Youssef-Morgan (2022)  <b>Title:</b> Psychological Capital Development Effectiveness of Face-to-Face, Online, and Micro-Learning Interventions  <b>Summary:</b> This study compares the effectiveness of different methods of PsyCap interventions. The study involved 228 participants divided into three groups: face-to-face intervention, online intervention, and micro-learning via a mobile app.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (pci)  <b>Duration:</b> Short and long duration  <b>Sessions and Format:</b>  Face-to-Face: Single session (3 hours)  Online: Single session (3 hours)  Micro-Learning via App: Weekly modules over 6 weeks  <b>Results:</b> Increases in PsyCap were observed in all groups. Micro-learning provided superior content retention and better practical application. The online intervention was equally effective as the face-to-face format, with the added advantage of flexibility. Positive outcomes in terms of well-being and job performance were maintained after six weeks.</p>

<p>Article 13: Schelleman-Offermans et al. (2022) Future Positive, that aims to increase health behaviors among employees with a low socio-economic position (SEP)            Title: The Future Positive Micro-Intervention Protocol: A Program Aiming to Increase a Healthy Lifestyle Among Employees with a Low Socio-Economic Position            Summary: This study investigates the effects of a positive psychology-based micro-coaching intervention (ppmc) on the psychological capital (PsyCap) and goal-related self-efficacy of non-executive workers. The research is based on the premise that short, strength-focused interventions can enhance personal resources and job performance.</p>	<p><b>Intervention:</b> Future Positive Micro-Intervention  <b>Duration:</b> Short duration  <b>Sessions:</b> 4 hours (2 sessions of 2 hours each)  <b>Format:</b> In-person  <b>Results:</b> After the intervention, there was an increase in participants' autonomous motivation to adopt healthy behaviors, improvement in setting smart (specific, measurable, achievable, relevant, and time-bound) goals, and an increase in PsyCap dimensions. Participants reported greater confidence and optimism in achieving their health goals following the intervention.</p>
<p>Article 14 - Pérez-Marqués et al., (2023)            Title: Effects of Three Personal Resources Interventions on Employees' Burnout            Summary: This study evaluates the effectiveness of three personal resources interventions in reducing burnout among workers, focusing on three interventions: job crafting, PsyCap, and a combination of both.</p>	<p><b>Intervention:</b> pci, Job Crafting, and Combined  <b>Duration:</b> Long duration  <b>Sessions:</b> 5 modules (7 weeks)  <b>Format:</b> Online  <b>Results:</b> The study found that all interventions significantly improved participants' burnout levels, reducing cynicism and emotional exhaustion, and increasing professional efficacy and PsyCap. The combined intervention showed similar (slightly superior) efficacy compared to the PsyCap-only intervention.</p>
<p>Article 15 - Sumalrot et al. (2023)            Title: The Development and Effectiveness of Web-Based Psychological Capital Intervention on the Mental Well-Being of Tourism Workers During the COVID-19 Pandemic            Summary: This study evaluates the effectiveness of a psychological capital (PsyCap) intervention on the mental well-being of tourism workers during the COVID-19 pandemic. The intervention was developed using interview techniques and content analysis with 20 entrepreneurs in the tourism sector, resulting in a program based on four main themes: having a goal, tolerance to difficulties, inspiration from a role model, and the right way of thinking.</p>	<p><b>Intervention:</b> Psychological Capital Intervention (pci)  <b>Duration:</b> Long duration (1 month)  <b>Sessions:</b> Not specified  <b>Format:</b> Online  <b>Results:</b> An improvement in the mental well-being of participants was observed one month after the intervention.</p>
<p>Article 16 - Tyne et al. (2024)            Title: Employees' Experiences of Outdoor Adventure Training on Psychological Capital and Wellbeing: A Mixed Methods Case Study            Summary: This study explores the impact of outdoor adventure training (oa) programs on employees' psychological capital (PsyCap) and well-being. The study involved nine employees who participated in a five-day program in the Pyrenees mountains.</p>	<p><b>Intervention:</b> Altitude - Outdoor Adventure Program  <b>Duration:</b> Short duration  <b>Sessions:</b> Various daily activities over 5 days  <b>Format:</b> In-person  <b>Results:</b> The intervention resulted in increased PsyCap scores, greater team cohesion and trust, and improvements in psychological well-being due to the connection with nature and distancing from work demands.</p>

Analysis of the 16 articles on interventions for the development of PsyCap revealed that most interventions were effective in increasing the components of PsyCap (hope, self-efficacy, resilience, and optimism). One article is a literature review (No. 7). The interventions reported in the empirical articles were categorized into five main types: Training, Programs, and Others.

- **Training:** Structured, short-duration interventions (30 minutes to 3 hours or up to 2 sessions) focused on developing specific skills. Seven articles (Articles No. 1, 4, 6, 8, 11, 12, and 13) reported effectiveness.
- **Programs:** Comprehensive programs that include various activities with sessions and modules conducted over time (4, 6, 8, or 10 weeks). Six articles (Articles No. 2, 5, 11, 12, 14, and 15) reported effectiveness.
- **Others:** Unique or unconventional interventions. These interventions include self-learning methodologies with reading, self-guided activities, or outdoor activities. Four articles (Articles No. 3, 9, 10, and 16) reported effectiveness.

The analysis also revealed that interventions for the development of PsyCap can be classified as web-based (online/app) or in-person. Among the articles analyzed, four explicitly mentioned the use of web platforms or online methods for implementing the interventions (Articles No. 9, 12, 14, and 15). The remaining articles indicated in-person interventions or traditional training methods.

### Discussion

Interventions aimed at developing psychological capital (PsyCap) have been widely studied and applied in various organizational contexts. These interventions, which vary in format, duration, and methodology, share the common goal of strengthening the components of PsyCap: self-efficacy, hope, resilience, and optimism, thereby providing significant benefits for both workers and organizations. However, the effectiveness of these interventions varies depending on the format, duration, cultural and sectoral context, and the methodology adopted.

Intervention formats vary from face-to-face to hybrid and online, each with specific advantages. Face-to-face interventions, as described in Articles 1, 3, 8, 15, and 16, allow for direct interaction between participants and facilitators, which can enhance engagement and training effectiveness. On the other hand, online interventions, mentioned in Articles 2, 9, 10, and 12, offer flexibility and accessibility, allowing participants to access the material at any time and place, and are particularly useful in contexts where time availability is limited. Furthermore, the hybrid model, discussed in Article 5, combines elements of both formats, taking advantage of the benefits of face-to-face interaction and the flexibility of remote access.

Some research suggests that the immediate effects of face-to-face interventions are stronger, but that online programs maintain benefits over longer periods and allow for greater scalability (Schelleman-Offermans et al., 2022). Furthermore, studies that adopted a hybrid model combining

in-person sessions with remote monitoring showed better results in retaining the effects of PsyCap over time. Thus, the choice of format can impact learning retention (Carter & Youssef-Morgan, 2022).

The duration of the interventions also varies significantly, from short-term programs lasting a few weeks, as in Article No. 1, to longer programs extending over several months, as in Articles No. 5 and 14. Shorter interventions tend to be more intensive, focusing on practical activities and focused discussions, while longer programs allow for a gradual and sustained development of PsyCap components, providing ample time for the internalization and practical application of the concepts learned.

The interventions analyzed were applied in different sectors, revealing different levels of impact:

- High-touch sectors (hospitality, healthcare, education) – PsyCap interventions have been successfully applied in these sectors, demonstrating significant benefits for psychological well-being and talent retention. Examples include Articles 6, 7, 12, and 13.
- Manufacturing and technology sectors – The impact of interventions in these sectors was more modest, suggesting that the applicability of PsyCap may depend on the emotional demands of the job. Studies have shown that the effects are limited when there is low social interaction and heavy reliance on technical processes. Examples include Articles 3, 9, and 14.
- Crisis-affected sectors (e.g. tourism during the COVID-19 pandemic) – Sectors as tourism and hospitality have been significantly impacted during the pandemic, with workers experiencing high levels of stress. PsyCap interventions have been instrumental in improving the well-being and resilience of these workers. Examples include Articles 2, 10, 15, and 16.

Organizational culture and national cultural context also influence the effectiveness of

interventions. Most studies have been conducted in Western countries (USA and Europe), while there is a dearth of research in Eastern cultures and emerging economies. In countries with a greater emphasis on collectivism, as China and Thailand, group interventions appear to be more effective.

The components of PsyCap are addressed in various ways, depending on the study. For example, self-efficacy is emphasized in interventions that use positive visualization techniques and goal-setting (Alipour et al., 2013; Luthans et al., 2010; Schelleman-Offermans et al., 2022) theory and research have supported psychological capital (PsyCap). Resilience is often developed through cognitive restructuring exercises and mindfulness practices, as in the studies by Dello Russo and Stoykova (2015), Qiao et al. (2022), Sumalrot et al. (2023) and Zhang et al. (2014). Hope and optimism are promoted through goal planning and coping strategies, as described in the articles by Dello Russo and Stoykova (2015) and Georgiou and Nikolaou (2019). Some approaches explore different methods of intervention to effectively develop these components (Qiao et al., 2022).

The methods of implementation vary widely, reflecting the need to adapt the interventions to the specific context of the participants. Stratman and Youssef-Morgan (2019) review various approaches and conclude that group-based interventions, where participants can share experiences and support each other, tend to be more effective. Conversely, Salanova and Ortega-Maldonado (2019) highlight the efficacy of individual interventions, especially when tailored to meet the specific needs of the participants.

One of the studies compares short and long-duration interventions (Qiao et al., 2022). Participants were divided into three groups: 8 sessions, a single session, and a control group. The 8-session training occurred twice a week, approximately 2 hours per session, over 4 consecutive weeks. The single-session intervention group received 3 hours of group training during the same period as the final week of the 8-session

group. It was observed that the group receiving the longer and more intensive intervention showed better results, significantly increasing the participants' psychological capital and happiness levels, proving to be more effective and lasting than a single-session intervention.

Another study, conducted by Carter and Youssef-Morgan (2022) investigates the effects and efficacy of different forms of intervention (in-person, online, and hybrid). The authors conclude that all methods are effective in increasing PsyCap, although individual preference can influence the outcomes. This highlights that the flexibility and adaptability of the method are crucial for the intervention's efficacy.

The relationship between the increase in PsyCap and improvement in organizational outcomes is explored in the analyzed studies (Dello Russo & Stoykova, 2015; Georgiou & Nikolaou, 2019; Luthans et al., 2010; Zhang et al., 2014), including better job performance, higher satisfaction, and lower turnover. For employees, the benefits include greater well-being, improved stress management, and a general sense of competence and control over their work. Additionally, Da et al., (2020) argue that different forms of intervention can have varied impacts, but all tend to improve employee well-being.

Among the convergent points, the overall efficacy of PsyCap interventions in enhancing workers' psychological factors stands out. Most studies, regardless of the format or duration of the intervention, reported significant improvements in PsyCap constructs and organizational outcomes. Schelleman-Offermans et al. (2022) Future Positive, that aims to increase health behaviors among employees with a low socio-economic position (SEP, for example, report that interventions focused on self-efficacy and resilience are particularly effective in high-pressure organizational contexts. However, methodological and contextual differences influence the results and applicability of the interventions. In-person studies often reported higher engagement and immediate feedback, while

online interventions highlighted convenience and scalability.

Organizational culture and managerial support emerge as critical factors for the success of the interventions. There is evidence that the efficacy of the interventions can vary depending on the level of organizational support and managerial involvement (Akhoundi & Aerab Sheibani, 2017). Similarly, Pérez-Marqués et al., (2023) based on their review, and Tyne et al., (2024) in evaluating an outdoor experiential training-based intervention, also emphasize the importance of organizational support and the creation of an environment conducive to PsyCap development.

The comparison between PsyCap and other forms of capital, as human and social capital, provides valuable insights into the unique contributions of PsyCap to organizational outcomes. While human capital, which includes the skills, knowledge, and experiences of individuals, and social capital, which encompasses the networks and relationships that facilitate cooperation and resource access, are crucial for organizational success, PsyCap offers distinct advantages. Studies have shown that PsyCap has a more direct and immediate impact on employee performance and well-being compared to human and social capital (Huang et al., 2021; Xu et al., 2022). For instance, the development of PsyCap components like self-efficacy, hope, resilience, and optimism can directly enhance an individual's motivation and ability to cope with challenges, leading to better job performance and reduced turnover intentions (Dello Russo & Stoykova, 2015; Luthans et al., 2010). This underscores the importance of integrating PsyCap development into organizational strategies, as it complements and enhances the benefits derived from human and social capital. By fostering a holistic approach that includes PsyCap, organizations can achieve more comprehensive and sustainable improvements in employee well-being and organizational performance.

## Conclusions

The analysis revealed that PsyCap interventions are mostly effective, with training programs and structured sessions showing particularly positive results. The diversity in formats and durations of the interventions indicates the flexibility of these initiatives to adapt to the specific needs of organizations and workers. Both web-based and in-person interventions can be effective, each with its specific advantages and challenges. Online interventions overcome geographical barriers and offer flexibility, while in-person interventions foster greater engagement and direct interaction. To maximize effectiveness, a hybrid approach that combines the strengths of both modalities and personalizes the interventions according to the participants' profiles and organizational context can enhance outcomes, promoting a more robust and sustainable development of PsyCap.

Regardless of the format, emphasizing the development of self-efficacy, hope, resilience, and optimism is effective in promoting employee well-being and achieving organizational goals. Successful implementation of these interventions requires a clear understanding of workers' needs and strong organizational leadership support. The combination of theoretical and practical techniques, the use of different formats, and adaptation to participants' needs are essential for success. Studies show that the development of PsyCap brings substantial benefits to both workers and organizations, highlighting the importance of investing in psychological capital as a fundamental strategy for organizational development.

Despite these positive findings, some limitations and biases should be considered. Variability in intervention methods and contexts makes it difficult to standardize results. Many studies rely on self-reports, which can introduce measurement bias and overestimate the effects of interventions. In addition, sample sizes and duration of interventions vary widely, affecting the generalizability and sustainability of results.

The lack of complete randomization in some studies compromises the generalizability of findings, since non-randomized samples can introduce selection bias. Studies that adopted control groups and randomized samples showed greater reliability in their results, as observed in Articles 4, 7, and 12. In addition, the predominance of self-reports in measuring the effects of interventions raises questions about the validity of the findings. Article 7 mentions that, despite improvements reported by participants, there was no objective control of performance, which can lead to an overestimation of the effects. Similarly, Article 9 highlights that the lack of objective assessments can inflate the results reported by participants.

Another important bias is related to the context of the interventions. Many studies were conducted in specific sectors, as hospitality and tourism, which limits the applicability of the findings to other industries. Comparisons between sectors showed that the interventions were more effective in sectors that demand high human interaction, but their effects were less significant in technology and industrial sectors, as reported in Articles 6, 9 and 15.

The studies analyzed suggest several areas for improvement. Increasing sample sizes, including control groups, and extending the duration of programs are essential recommendations to ensure lasting effects. Addressing these limitations and implementing personalization strategies can help organizations develop more robust and effective PsyCap programs, contributing significantly to the well-being and performance of individuals.

Future research should aim to standardize PsyCap intervention protocols to facilitate comparison across studies. Longitudinal studies are needed to assess the long-term sustainability of intervention effects. Additionally, exploring the role of organizational culture and managerial support in more depth could provide insights into maximizing the effectiveness of PsyCap interventions. Expanding research to include diverse cultural and organizational settings will also help

in understanding the global applicability of these interventions.

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# Relationship Between Non-Suicidal Self Injury and Internet Gaming Disorder in Adolescents: A Systematic Review

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### **Abstract**

This systematic review examines the relationship between Internet Gaming Disorder (IGD) and Non-Suicidal Self-Injury (NSSI) in adolescents. Studies were selected based on criteria addressing IGD and NSSI in adolescents (age 9-18). A systematic search was conducted across multiple databases (e.g., Science Direct, Scopus, PubMed) from September 2023 to May 2024, including English and Spanish sources. The risk of bias was assessed using NHLBI's quality tools for observational and case-control studies. Five studies, involving 19 588 adolescents, were included. All studies were from East Asia. Findings indicate a positive association between IGD and NSSI, with gender differences: females had higher NSSI prevalence, while males had greater IGD frequency. Most studies were of fair or good quality. This review underscores the need for longitudinal studies and standardized assessments to better understand the IGD-NSSI relationship and guide future mental health interventions.

*Keywords:* non-suicidal self-injury, internet gaming disorder, adolescents, systematic review.

### **Relación Entre las Autolesiones No Suicidas y el Trastorno por Uso de Videojuegos en Adolescentes: Una Revisión Sistemática**

#### **Resumen**

Esta revisión sistemática examina la relación entre el trastorno por uso de videojuegos (IGD) y las autolesiones no suicidas (NSSI) en adolescentes. Los estudios se seleccionaron en función de criterios relacionados con el IGD y las NSSI en adolescentes (de 9 a 18 años). Se realizó una búsqueda sistemática en múltiples bases de datos (por ejemplo, Science Direct, Scopus, PubMed) desde septiembre de 2023 hasta mayo de 2024, incluyendo fuentes en inglés y español. El riesgo de sesgo se evaluó utilizando las herramientas de calidad del NHLBI para estudios observacionales y de casos y controles. Se incluyeron cinco estudios, en los que participaron 19 588 adolescentes. Todos los estudios procedían de Asia Oriental. Los resultados indican una asociación positiva entre el IGD y la NSSI, con diferencias de género: las mujeres tenían una mayor prevalencia de NSSI, mientras que los hombres tenían una mayor frecuencia de IGD. La mayoría de los estudios eran de calidad aceptable o buena. Esta revisión subraya la necesidad de realizar estudios longitudinales y evaluaciones estandarizadas para comprender mejor la relación entre el IGD y la NSSI y orientar las futuras intervenciones en materia de salud mental.

*Palabras clave:* autolesiones no suicidas, trastorno por uso de videojuegos, adolescentes, revisión sistemática.

## Introduction

Non-Suicidal Self-Injury (NSSI) has been widely studied long before its inclusion in the DSM-5 in 2014, where it was categorized under the section “Conditions for Further Study”. When discussing NSSI, it is essential to clarify that this term refers to the intentional destruction of one’s own body tissue without suicidal intent and for purposes that are not socially sanctioned (Klonsky & Muehlenkamp, 2007). According to the American Psychiatric Association (2022), the defining characteristic of NSSI is the repeated infliction of mild to moderate injuries, often painful, to one’s body surface, without suicidal intent. Generally, this behavior aims to alleviate negative emotions as tension, anxiety, sadness, self-criticism, or, less frequently, to address an interpersonal difficulty. Individuals often report an immediate sense of relief during the act. Research has shown that NSSI is common among adolescents, with significant variation in prevalence across different cultural and demographic contexts.

The prevalence of NSSI varies significantly across cultural and demographic contexts. A study in the United States identified higher NSSI rates in developing countries, ranging from 11.5% to 33.8% (Mannekote et al., 2021). In Australia the prevalence among adolescents is 9.4% (Tatnell et al., 2017), while in Germany and the United States 25.6% of students reported engaging in NSSI (Plener et al., 2009). In Asia 20.5% of 3,561 adolescents experienced at least one episode of NSSI in the past six months (Liu et al., 2023). In Chile, a prevalence of 58% was found among 388 adolescents who reported self-injuring at least once (Méndez et al., 2021), representing one of the highest rates reported. In terms of gender differences, several studies indicate a higher prevalence of NSSI among females (63.7%) compared to males (36.3%) (Da Silva Bandeira et al., 2022), although some findings suggest higher rates among males in some contexts (Wang & Wang, 2023). These studies highlight that NSSI tends to occur most frequently in early adolescence, with a decline

in early adulthood (Brown & Plener, 2017) and suggest that cultural factors may influence these prevalence differences.

Given the high prevalence of NSSI during adolescence, research has begun to explore potential contributing factors, including the influence of digital environments. The current adolescent population, often described as “digital natives”, faces unique challenges due to extensive internet and technology use (Brown, 2006; Jeong et al., 2019; Anzak et al., 2021; Mancinelli et al., 2022). This pervasive digital engagement has led to a rise in behavioral issues, as Internet Gaming Disorder (IGD), which was classified by the DSM-5 in 2014 as an emerging mental health condition associated with excessive online gaming. The increasing prevalence of IGD and other technology-related behaviors has prompted interest in their possible links to mental health concerns, as NSSI, suggesting a relationship that warrants further investigation.

IGD is acknowledged as a clinically significant issue and is included in international diagnostic and disease classification manuals. The DSM-5-TR (American Psychiatric Association, 2022) introduced IGD in section 3, recognizing its unique clinical characteristics while emphasizing the necessity for further research for taxonomic purposes and noting that this diagnostic category remains under investigation. It is defined as the persistent and recurrent use of internet gaming that results in distress or impairment over a minimum period of 12 months (American Psychiatric Association, 2022). Additionally, the World Health Organization (WHO) officially recognized Gaming Disorder as a mental health disorder in the 11<sup>th</sup> revision of the International Classification of Diseases (ICD-11; World Health Organization [WHO], 2019/2021). At present, internet addiction has not yet been classified as a disorder. Starcevic (2013) indicated that internet addiction was considered for inclusion in the same category but was ultimately excluded from the official DSM-5 diagnoses; therefore,

this study will adhere to the nosological concept proposed by the APA.

Research on IGD prevalence highlights significant variability across populations. A study involving 8,067 university students from multiple Asian countries, including Singapore, Hong Kong, Macau, China, South Korea, Taiwan, and Japan, as well as a U.S. university, reported an IGD prevalence of 19%, with higher rates among males (27.9%) compared to females (11.5%) (Tang et al., 2018). Another study by the American Psychiatric Association (2012) reported a 4.7% prevalence over 12 months, showing similar distributions across Eastern and Western countries. Further research supports a link between increased gaming time and a higher likelihood of developing IGD; for instance, individuals gaming over 20 hours per week were 13.5 times more likely to develop IGD than those who played less than one hour (Severo et al., 2020).

A meta-analysis examining risk factors for developing IGD identified that excessive gaming may result from various life situations or challenges; for instance, loneliness, anger, or real-life stress may drive individuals to engage in internet gaming as a means of escape (Ropovik et al., 2023). Examining these variables more closely, IGD has been found to co-occur with several other mental health disorders and issues, as NSSI, and shared risk factors, as emotional dysregulation, have been identified (Barrocas et al., 2014; King & Delfabbro, 2016; Yang et al., 2023). Emotional regulation refers to the set of processes through which the spontaneous flow of felt emotions is redirected (Koole, 2009), and poor emotional regulation may predispose individuals to IGD (Wichstrøm et al., 2019). Moreover, emotional dysregulation may exacerbate negative mood symptoms in individuals with the disorder. Similarly, NSSI serves as an emotional regulator in response to stressors, as individuals relieve tension and/or distress through self-inflicted injuries (Nock, 2009).

A prospective study from Norway identified poor emotional regulation at age 8 as a potential

predictor of greater IGD symptomatology by age 10 (Wichstrøm et al., 2019). Research suggests that NSSI is related to opioid neurotransmitters that may influence self-injurious behavior. Among their functions are “emotion regulation” and “pain suppression”, indicating that self-harm can produce a pleasurable effect by stimulating the release of these neurotransmitters (Favazza, 1996). Nock’s (2009) integrative theory proposes that NSSI serves as an emotional regulator in response to stress.

Based on this context, the present research aims to explore a potential relationship between NSSI and IGD through a systematic review to ensure transparency in the data analyzed, as recent studies suggest a possible link between the two disorders in adolescents (Lam et al., 2009; Strittmatter et al., 2015; Evren et al., 2020; Stevens et al., 2020; Jeong & Kim, 2021). Additionally, it is important to investigate this issue as no literature synthesis has been conducted on studies dedicated to evaluating the relationship between these disorders, despite it being an emerging and growing topic (Leino, 2024). Consequently, this systematic review seeks to answer the question: Is there a relationship between Non-Suicidal Self-Injury (NSSI) and Internet Gaming Disorder (IGD)?

## Method

### Eligibility criteria

For articles to be included, they had to specifically address the topics of NSSI and IGD, excluding behaviors aimed at ending life, known in the literature as self-injurious behaviors. The studies included required to have a sample with an age range covering adolescents up to 18 years, meeting the diagnostic criteria for NSSI and IGD, and to be quantitative studies exploring the relationship between these two constructs. For synthesis, studies were grouped into Observational, Longitudinal, and Case-Control categories. There were no restrictions regarding study sample size, participant sex/gender, or functionality level. Only articles written in English & Spanish were considered.

### Search Strategy & Information Sources

The initial search process began in September 2023 and extended through May 2024. To increase the scope of available literature, the criteria were broadened in 2024 to include Spanish-language resources and additional databases. This comprehensive search utilized major academic and psychological databases, including multidisciplinary platforms (e.g., Science Direct, Scopus), medical and psychological sources (e.g., PubMed, APA PsycArticles, APA PsycInfo, APA PsycTherapy), and specialized psychology databases (e.g., PSYKE, PSICODOC, PePSIC).

In addition, AI-powered tools, as Connected Papers and Research Rabbit, were employed to explore related literature by inputting DOIs from selected studies, enabling efficient tracking of relevant research connections. After selecting initial articles, these AI tools facilitated a final round of screening for additional pertinent publications. The search was conducted in English and Spanish, using “Journal Article” as a consistent filter across all databases.

Search terms included “Non-Suicidal Self-Injury and Internet Gaming Disorder”, “Non-Suicidal Self-Harm and Gaming Addiction”, “Self-Harm and Gaming Disorder”, “Self-Injury and Gaming Disorder”, and “Conducta Autolesiva no Suicida y Trastornos por Juegos de Internet”. The Boolean operator “AND” was applied to refine search outcomes. This strategy was implemented uniformly across databases to ensure a comprehensive collection of relevant studies; searches were exclusively conducted in both English and Spanish without applying additional filters.

### Selection Process and Data Collection

The selection process was executed systematically in multiple phases by a team of three researchers. Initially, the databases for the scientific articles were selected and duplicate records were removed. Titles of all articles retrieved from the database search were then entered into an MS Word document, with potential articles highlighted in

green and those deemed irrelevant, due to lack of alignment with study variables, highlighted in yellow. Subsequently, abstracts of initially selected titles were reviewed, followed by a full-text reading of abstracts to verify compliance with inclusion criteria. A double-review process was applied, where each of the three researchers independently cross-checked the selection of studies to ensure reliability and reduce bias. Additionally, an external reviewer oversaw the entire process to verify strict adherence to established protocols. The search process did not utilize automation tools, and the final review holds an approval letter (N°184/N°231366443/2023) from the Scientific Ethics Committee of the sponsoring university. Table 1 presents the extracted data from selected studies, including study ID, authors, year of publication, country of origin, participant details, psychometric measurement tools, gender differences in NSSI and IGD, and key outcomes.

### Risk of Bias Assessment

The risk of bias was assessed using the “Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies”, developed by the National Heart, Lung, and Blood Institute (NHLBI, 2021). This tool comprises 14 questions designed to evaluate the quality of research, utilizing a three-point rating system: criteria met (green), criteria not met (red), or unclear/not applicable (yellow). The assessment focuses on several critical aspects, including the clarity of the research question, the definition of the age range or population, and whether less than 50% of eligible individuals participated in the study. Inclusion and exclusion criteria were applied to ensure appropriate participant selection from the same or similar populations, alongside justification for sample size to support the ability to identify associations. Furthermore, it examines whether the exposure was measured prior to outcome assessment and whether there was an adequate duration to observe effects. The tool also evaluates whether multiple categories or levels of exposure were considered,

including the methods and instruments used for measurement, and whether exposure was assessed repeatedly throughout the study. Additionally, the reliability and validity of outcome measures are scrutinized, ensuring they are objective and accurate. Follow-up rates are reviewed to confirm participant retention remained at or below 20% loss during the study process. Finally, statistical analyses account for potential confounding factors, and the overall study quality is categorized as “Poor”, “Fair”, or “Good”.

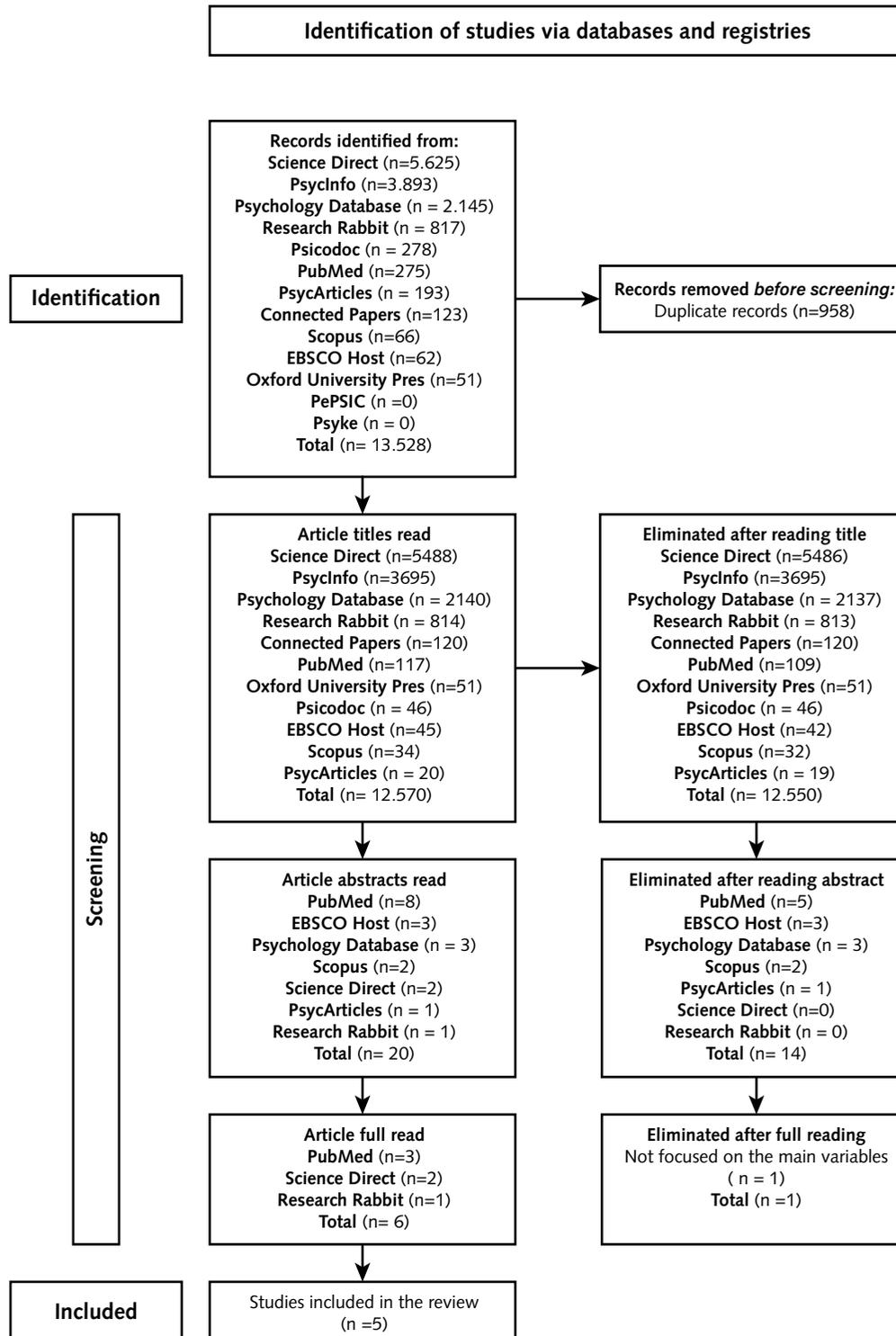
The risk of bias in case-control studies was assessed using “Quality Assessment Tool for Case-Control Studies” (NHLBI, 2021). This tool addresses essential methodological aspects, including the clarity and relevance of the research question, definition of the study population, and presence of a sample size justification. Key criteria included the selection of controls from comparable populations and timeframes, consistent application of inclusion and exclusion criteria, and reliable differentiation of cases from controls. The tool also evaluates the validity and consistency of exposure measurement, confirming that exposures preceded the onset of the case-defining condition. Blinding of exposure assessors and adjustment for confounding variables in statistical analyses were also assessed. Each study was rated as “Poor”, “Fair”, or “Good” based on its overall quality, following the same color-coded system applied to cross-sectional studies.

## Results

### Study Selection

Regarding the PRISMA flow diagram, a total of 13,528 articles were identified from the following databases: APA PsycArticles ( $n = 193$ ), APA PsycInfo ( $n = 3,893$ ), APA PsycTherapy ( $n = 0$ ), EBSCO Host ( $n = 62$ ), Oxford University Press ( $n = 51$ ), PePSIC ( $n = 0$ ), PubMed ( $n = 275$ ), Psycodoc ( $n = 278$ ), Psyke ( $n = 0$ ), Psychology Database ( $n = 2,145$ ), ScienceDirect ( $n = 5,625$ ), Scopus ( $n = 66$ ), Connected Papers ( $n = 123$ ), and Research Rabbit ( $n = 817$ ). After removing 958 duplicates, a total of 12,570 records were screened by title. Subsequently, articles that did not relate to the topic were excluded, with the following removals: APA PsycArticles ( $n = 19$ ), APA PsycInfo ( $n = 3,695$ ), EBSCO Host ( $n = 42$ ), Oxford University Press ( $n = 51$ ), PubMed ( $n = 109$ ), Psycodoc ( $n = 46$ ), Psychology Database ( $n = 2,137$ ), ScienceDirect ( $n = 5,486$ ), Scopus ( $n = 32$ ), Connected Papers ( $n = 120$ ), and Research Rabbit ( $n = 813$ ), leaving a total of 12,550 articles. Next, 20 articles were reviewed for abstracts, leading to the exclusion of 14 articles. A full-text review was then conducted on the remaining 6 articles, resulting in the exclusion of 1 article for not meeting the inclusion criteria, thereby incorporating five articles into the systematic review (See Figure 1).

Figure 1



### Study Characteristics

Of the five studies included (Table 1), the designs encompassed three cross-sectional, one longitudinal, and one case-control study, all published between 2020 and 2023. These studies were conducted in East Asia, with four in China and one in South Korea, reflecting an exclusively Asian sample. Collectively, the studies analyzed data from 19,588 adolescents aged 9 to 18, with an initial enrollment of 24,811, which was reduced due to exclusion criteria. The gender distribution was nearly balanced, with 50.3% male and 49.7% female participants.

Validated measures were commonly used to assess IGD and NSSI across the studies, as the Adolescent Health Questionnaire (AHQ), Chinese-IGD-S, and Video Game Dependence Scale (VDG-S), while some also used author-developed measures based on World Health Organization (WHO) criteria (e.g., Jeong & Kim, 2021). The results of these studies consistently highlight the association between IGD and NSSI, although findings on gender differences and specific outcomes varied.

#### Gender Differences in NSSI and IGD

The studies that examined gender differences reported nuanced findings. For NSSI, Jeong and Kim (2021) observed a significantly higher 12-month prevalence among females (13.4%) compared to males (4.7%), with females showing an increased likelihood of engaging in NSSI behaviors (mOR = 2.73, 95% CI [1.87–3.99]). Similarly, Zhu et al. (2022) found a considerably higher risk for NSSI among females than males (OR = 12.50,  $p = 0.02$ ). Contrastingly, Xu et al. (2023) reported a greater association between NSSI and males ( $B = 0.254$ , 95% CI [0.191–0.316],  $p < 0.001$ ), indicating that gender-specific risk for NSSI might vary with age, cultural context, or assessment methods.

In terms of IGD prevalence, males consistently reported higher levels than females. Jeong and Kim (2021) found that 14.6% of males met IGD criteria, compared to 9.7% of females, while Yang et al. (2023) reported that males were significantly more likely to exhibit IGD symptoms than females (OR = 6.047, 95% CI [2.104–17.382],  $p < 0.001$ ).

#### Outcomes of IGD and NSSI Associations

All studies, except Yang et al. (2023), identified a positive association between IGD and NSSI. For instance, Wang et al. (2020) found that adolescents who engaged in “digital media use” for two or more hours per day during weekdays had a higher likelihood of NSSI (OR = 1.81, 95% CI [1.20–2.74]). Jeong and Kim (2021) further confirmed a positive association between IGD and NSSI (mOR = 1.87, 95% CI [1.20–2.92]). Zhu et al. (2022) specifically associated higher scores on the VDG-S with an increased risk for NSSI behaviors (OR = 1.18, 95% CI [1.07–1.30],  $p = 0.001$ ). Xu et al. (2023) provided additional insight by identifying anxiety as a significant moderator and partial mediator in the relationship between IGD and NSSI, with social anxiety and concentration difficulties accounting for 70.8% of this effect ( $B = 0.002$ ,  $p < 0.001$ ; mediation  $\beta = 0.017$ , 95% CI [0.01–0.02]). In contrast to the other studies, Yang et al. (2023) found no significant association between IGD and NSSI frequency, indicating that IGD alone may not directly influence NSSI behaviors without the presence of additional risk factors or mental health conditions (Mean NSSI frequency = 37.36 for IGD vs. 34.03 for non-IGD;  $T/Z = -1.287$ ,  $p = 0.201$ ).

**Table 1.** Characteristics of the 5 studies included in the Systematic Review

N°	Authors	Year	Country	Participants	Measures	Gender Differences NSSI	Gender Differences IGD	Outcomes
1	Wang et al. Longitudinal*	2020	China	7.072 adolescents, 50% female. Mean age 14.59 years (SD = 1.45).	<ul style="list-style-type: none"> <li>AHQ.</li> <li>Self – Harm Assessment Questions</li> <li>Digital Media Use Frequency.</li> <li>YSR.</li> <li>Eysenck I7.</li> </ul>	Not reported.	Not Reported.	Association between NSSI & "Digital Media Use Frequency" (Internet ≥ 2 h/day on weekdays: OR = 1.81, 95% CI = 1.20–2.74; Internet ≥ 3 h/day on weekends: OR = 1.55, 95% CI = 1.12–2.15).
2	Jeong & Kim	2021	South Korea	1.843 adolescents, 52.3% female. Ages between 12-17 years old.	<ul style="list-style-type: none"> <li>Custom questions to assess NSSI, and gaming disorder based on WHO criteria.</li> </ul>	Females had a higher 12-month prevalence of NSSI (13.4%) than males (4.7%) (mOR 2.73, 95% CI = 1.87–3.99).	The 12-month prevalence of IGD was higher among males (14.6%) compared to females (9.7%).	Positive association of Gaming Disorder with NSSI (mOR 1.87, 95% CI = 1.20–2.92).
3	Zhu et al* Case-Control	2022	China	84 adolescents, 70.2% female. Ages between 12-18 years old.	<ul style="list-style-type: none"> <li>EMBU.</li> <li>PSSS.</li> <li>PSS.</li> <li>BSMAS.</li> <li>VDG-S.</li> <li>OSIC.</li> </ul>	Higher risk of NSSI for women compared to men (OR = 12.50 (p = 0.02).	Not Reported.	Positive association between VDG-S and NSSI characteristics (OR = 1.18, 95% CI = 1.07 – 1.30, p = 0.001).
4	Xu et al.	2023	China	10.479 adolescents, 49.5% female. Ages between 9-18 years old.	<ul style="list-style-type: none"> <li>IGDS9-SF.</li> <li>RCMAS.</li> <li>MASHA.</li> </ul>	Males showed a higher association with NSSI (B = 0.254, 95% CI = 0.191–0.316, p < 0.001) compared to females.	Not Reported.	Positive association between IGD and NSSI, moderated by anxiety (B = 0.002, p < 0.001), anxiety mediating 70.8% of the effect.
5	Yang et al.	2023	China	110 adolescents, 63,6% female. Ages between 11-17 years old. Mean age 14.78 (SD = 1.87).	<ul style="list-style-type: none"> <li>Chinese-IGD-S.</li> <li>ASI-S.</li> <li>DSM-5 Interview</li> <li>NSSI.</li> <li>SAS.</li> <li>SDS.</li> <li>CH-UCLA-Loneliness.</li> </ul>	Not Reported.	Males had a higher prevalence of IGD than females (OR = 6.047, 95% CI= 2.104 – 17.382, p < 0.001).	No significant association of IGD with NSSI frequency (Mean = 37.36 for IGD vs. 34.03 for non-IGD; T/Z = -1.287, P = 0.201).

\* All studies are observational unless otherwise indicated. **AHQ:** Adolescent Health Questionnaire; **ASI-S:** Adolescent Self Injury– Scale; **BSMAS:** Bergen Social Media Addiction Scale; **CI** = Confidence Interval; **Chinese-IGD-S:** Chinese Internet Gaming Disorder Scale; **CH-UCLA Loneliness:** Chinese UCLA Loneliness Scale; **SEMBU:** Egna Minnen Barndoms Uppfostran; **IGDS9-SF:** Nine-Item Internet Gaming Disorder Scale-Short Form; **MASHA:** Modified Adolescent Self-Harm Scale; **OSIC:** Ottawa Self-Injury Inventory Chinese Revised Edition; **OR:** Odds Ratio; **PSS:** Perceived Stress Scale; **PSSS:** Perceived Social Support Scale; **RCMAS:** Revised Children's Manifest Anxiety Scale; **SAS:** Self-Rating Anxiety Scale; **SDS:** Self-Rating Depression Scale; **VDG-S:** Video Game Dependence Scale; **YSR:** Chinese Youth Self-Report.

### Quality of Studies

Four studies were observational (Wang et al., 2021; Jeong & Kim, 2021; Xu et al., 2023; Yang et al., 2023) clearly stated their research questions and defined the study populations within each article. In most cases, the participation rate exceeded 50%, eligibility criteria were specified, and participants were recruited from the same or similar populations. Notably, Wang et al. (2020) and Yan et al. (2023) did not demonstrate statistically significant power in their sample size, in contrast to the studies by Jeong & Kim (2021), and Xu et al. (2023). Wang et al. (2020) met the criteria of measuring exposures of interest prior to assessing outcomes and included a time interval to evaluate the exposure-outcome relationship. However, the remaining studies did not meet these criteria as they were cross-sectional in nature. Regarding exposure levels, most studies lacked clear representation across different exposure levels. The independent and dependent variables were well-defined across all studies; however, exposures were not assessed over time. Bias risk was assessed by examining blinding practices to minimize potential influence from patients or evaluators on study outcomes. It is important to note that, in the first study, outcome assessors were not blinded to participants' exposure status, while the studies by Jeong & Kim (2021), Xu et al. (2023), and Yang et al. (2023) did not precisely report on blinding practices. Attrition rates following initial enrollment were reported only in Wang et al. (2020), with a loss to follow-up of 20%, whereas the other studies did not report on this aspect. Finally, confounding factors were accounted for only in the studies by Wang et al. (2020) & Jeong & Kim (2021).

According to the case-control study by Zhu et al. (2022), the research objectives were explicitly stated, and the population of adolescents with NSSI was clearly defined. The selection of controls from comparable community settings contributed to group comparability. However, the lack of a detailed justification for the sample size

raises concerns about the validity of the findings. Inclusion and exclusion criteria were consistently applied, effectively distinguishing between cases and controls. While concurrent controls were utilized, the absence of random selection in their recruitment introduces potential selection bias. Investigators confirmed that exposure to risk factors preceded the onset of NSSI, although evaluators were not blinded to the case status of participants. Statistical analyses, including logistic regression to adjust for confounding variables, were employed.

### Discussion

This systematic review aimed to examine the relationship between Internet Gaming Disorder (IGD) and Non-Suicidal Self-Injury (NSSI) in adolescents. The primary findings suggest a significant association between NSSI and IGD (Wang et al., 2020; Jeong & Kim, 2021; Zhu et al., 2022; Xu et al., 2023). A notable trend was observed with higher reports of NSSI behaviors among female adolescents (Jeong & Kim, 2021; Zhu et al., 2022) compared to males, although one study (Xu et al., 2023) reported greater male involvement. In contrast, IGD prevalence appears higher among males (Yang et al., 2023). An interesting outcome from Wang et al. (2020) indicates that excessive internet or mobile phone use may be a major risk factor for self-harm. Similarly, Mészáros et al. (2020) found that pathological internet use in adolescents led to a 63.6% increased likelihood of NSSI, while Fan et al. (2023) reported a 12.8% prevalence of "internet addiction" that was significantly associated with NSSI. Lan et al. (2022) further demonstrated that individuals with IGD are more likely to engage in self-injury, though they did not specify whether injuries were non-suicidal. In summary, lifetime NSSI is associated with the severity of IGD symptoms, and gaming-related issues are linked to a higher risk of NSSI (Evren et al., 2020; Leino et al., 2024). Consistent with these findings, evidence indicates that the IGD–NSSI association is moderated by anxiety, with 70% effect size noted for this moderator. Moderators are useful in identifying

specific situations in which a risk factor might increase the likelihood of self-injury among adolescents. Meanwhile, mediators help to explain the underlying psychological factors that connect IGD and NSSI, shedding light on why and how this relationship occurs (Valencia-Agudo et al., 2018).

Regarding NSSI prevalence between genders (Jeong & Kim, 2021; Zhu et al., 2022; Xu et al., 2023), findings show that female adolescents report higher NSSI behaviors than male counterparts (Jeong & Kim, 2021; Zhu et al., 2022), with only one study (Xu et al., 2023) finding higher NSSI recurrence among males. A recent meta-analysis exploring sex differences in global NSSI prevalence aligns with these findings, revealing a predominance of NSSI in female adolescents across North America and Europe, with rates consistent across regions. In contrast, male adolescents showed higher NSSI rates than females, particularly in Asia, where the trend is notably pronounced (Moloney et al., 2024). This is especially relevant, as all studies included in this review sample were conducted in Asia, with only Xu et al. (2023) identifying a stronger association between NSSI and male adolescents. This gender disparity in NSSI prevalence may be partially explained by psychological and sociocultural factors; studies indicate that higher levels of psychological distress in female adolescents are linked to increased NSSI behaviors (Wilkinson et al., 2022; Lutz et al., 2023). Conversely, NSSI in males often manifests in behaviors like wall-punching, which are less likely to be recognized as NSSI and may be perceived as aggression (Curtis & Terry, 2024). This distinction suggests a need for gender-sensitive approaches in NSSI assessment and intervention, especially in regions like Asia where male NSSI rates are significant.

As for IGD differences between males and females, only two studies in this review (Jeong & Kim, 2021; Yang et al., 2023) reported gender-specific findings, with males exhibiting higher IGD scores. Lan et al. (2022) indicated that IGD is also a significant self-injury risk factor among both males and females. Marraudino et al. (2022) argue

that there is insufficient research to clarify why IGD risk is higher among males, as clear evidence is still lacking. One possible explanation is that male adolescents may engage more intensively in online gaming, whereas females more commonly use social media platforms, as noted by Dufour et al. (2016). Likewise, findings by Desai et al. (2010) show that male adolescents reported gaming over 20 hours per week, while females reported fewer than 7 hours. It is notable to compare these findings with those from Wang et al. (2020), who reported that gaming for more than three hours a day may increase the likelihood of developing NSSI. Furthermore, Stevens et al. (2021) found the global prevalence of IGD to be approximately 3.05%, which adjusted to 1.96% in studies with more rigorous sampling and varied depending on the screening tool used. Studies with smaller sample sizes or those focusing on adolescents reported higher prevalence rates, with IGD being approximately 2.5 times more common among males than females. Moreover, studies conducted after 2013, particularly in Asia, reported higher prevalence rates compared to Europe, suggesting possible regional trends. According to Mestre-Bach et al. (2022), Asia appears to be at the forefront of IGD assessment advancement, including new validations and adaptations, with China and Korea leading in the number of studies, highlighting the issue's regional significance.

The studies included in this review exhibit bias risks that may impact the reliability of their findings. Cross-sectional designs in most studies (Wang et al., 2021; Jeong & Kim, 2021; Xu et al., 2023; Yang et al., 2023) hinder causal inference by measuring exposures and outcomes simultaneously. Limited sample sizes in Wang et al. (2020) and Yang et al. (2023) weaken statistical power, and lack of blinding in Wang et al. (2020), with minimal reporting on blinding practices in other studies, raises measurement bias concerns. Additionally, Zhu et al. (2022) did not justify sample size, risking selection bias. Only Wang et al. (2020) and Jeong & Kim (2021) controlled for confounders,

suggesting unaccounted confounding effects may influence the other studies.

In line with these considerations, it is worth noting that all studies employed self-report measures (Wang et al., 2020; Jeong & Kim, 2021; Zhu et al., 2022; Xu et al., 2023; Yang et al., 2023), which could introduce bias due to social desirability tendencies, where participants may distort responses to align with perceived social norms (Ellington et al., 2001, cited in Del Valle & Zamora, 2021). Additionally, Jeong & Kim (2021) utilized a single closed-ended question to assess NSSI and relied on questions based on the WHO criteria for gaming disorder assessment, which also limits the validity of findings, underscoring the need for reliable and valid instruments in these measurements. Furthermore, throughout this review process, we identified a lack of consensus in the conceptualization of NSSI, as the terms “self-injurious behavior” and “self-harm” are often used interchangeably, even though these terms combine self-injury with suicidal components. For instance, Yang et al. (2023) conflated these terms in the measures description, which led us to expand our search from exclusively NSSI to include self-harm terminology. Addressing this inconsistency is crucial for establishing a common clinical language to support transparent reporting in future research. Qu et al. (2023) highlight that the absence of standardized NSSI methods in China limits a comprehensive understanding of NSSI, potentially hindering effective prevention and intervention efforts. Thus, terminological and taxonomical criteria must be clarified to accurately identify studies specifically targeting IGD and NSSI.

To advance understanding in this area, future research would benefit from longitudinal studies to explore underlying mechanisms and etiologies of IGD and NSSI, as well as incorporating considerations for the identified biases, as ensuring adequately powered sample sizes and using longitudinal designs to clarify temporal relationships between these conditions. Standardizing blinding practices and controlling for confounders would further

improve the objectivity and accuracy of findings, reducing observation and response biases. Finally, this review highlights the methodological rigor of the included studies, with an average sample size of 3,918 adolescents and large samples in at least three studies (Wang et al., 2020; Jeong & Kim, 2021; Xu et al., 2023). Furthermore, in line with Xu et al.’s (2023) finding that anxiety serves as a significant moderator between IGD and NSSI, we encourage future research to consider the variable of irritability, as proposed by Stringaris et al. (2018), as a potential moderator in the relationship between these conditions. This line of inquiry is supported by studies as those by Li et al. (2023) and Akbaş & Kilinç (2024), which underscore anger as an emotion closely linked to irritability. Stringaris et al. (2018) define irritability as an “increased proneness to anger relative to peers of the same developmental level”, a symptom observed in various psychiatric disorders, including generalized anxiety disorder, depression, and post-traumatic stress disorder (PTSD). We believe that studying irritability as a moderator in IGD and NSSI, similar to anxiety, could reveal valuable insights, particularly among adolescents, where this trait may contribute to the development of core psychiatric disorders.

This review has several limitations. First, the studies included were exclusively conducted in East Asia, limiting the generalizability of findings to other cultural contexts. Additionally, most studies used cross-sectional designs, which constrained our ability to draw causal inferences between IGD and NSSI. The reliance on self-report measures introduces potential biases, such as social desirability, which may affect the accuracy of the results. Variability in IGD and NSSI measurement tools further complicates comparisons across studies. Moreover, the exploration of moderators, while insightful, remains limited to factors as anxiety, leaving other potential moderators and mediators underexplored. Future research should address these limitations to enhance our understanding

of the IGD-NSSI relationship across diverse populations and study designs.

This review provides important contributions to our knowledge, this is the first systematic review to examine the relationship between IGD and NSSI. By consolidating evidence of their association, our study highlights the need for mental health professionals to assess both conditions, particularly in at-risk youth. The findings on gender differences suggest that tailored interventions may better address the unique risk profiles of male and female adolescents. Additionally, identifying psychological factors, as anxiety, as moderators offers insight into the emotional dimensions that link IGD and NSSI, indicating new avenues for targeted therapies. Although limited to an Asian sample, our review sheds light on cultural aspects that may shape the IGD-NSSI relationship, encouraging future research in diverse cultural contexts. The review highlights the confusion in nomenclature that still exists between the concepts of self-injury, between suicidal and non-suicidal, an element that must be treated with caution in the clinical and academic environment. Finally, the need for longitudinal studies is evident; understanding the long-term interactions between IGD and NSSI is essential for developing preventive and therapeutic interventions that can effectively reduce the risk of these behaviors over time.

### **Conclusion**

This systematic review identifies a significant association between Internet Gaming Disorder (IGD) and Non-Suicidal Self-Injury (NSSI) among adolescents, demonstrating an elevated risk of self-injurious behavior in adolescents with IGD, particularly where anxiety acts as a moderating factor, amplifying this risk. These findings underscore the critical need for clinicians to assess both conditions in vulnerable youth populations, incorporating considerations of cultural and gender-specific influences. Given the limitation of existing studies to East Asian contexts, future research should explore this relationship across

diverse cultural backgrounds to enhance generalizability. Furthermore, longitudinal studies are essential to elucidate the mechanisms underlying this association, thereby informing the development of more effective, culturally sensitive preventive and therapeutic interventions.

### **Additional information**

#### **Registration and Protocol**

The review has been registered on the website of PROSPERO of the International Prospective Register of Systematic Reviews, under the title “Relationship between Non-Suicidal Self-Injury and Internet Gaming Disorder in Adolescent Population: A Systematic Review Study”. The registration was completed on October 22, 2023, and assigned the identification number CRD42023471816. To access the registered review, please visit the official PROSPERO website at <https://www.crd.york.ac.uk/PROSPERO/> and enter the ID number provided.

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#### **Conflict of Interest**

The authors have no conflict of interest to declare.

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# Cognitive Predictors of Suicidal Ideation in Ecuadorian Medical and Nursing Students: The Roles of Perceived Loneliness and Life Satisfaction

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SCIENTIFIC RESEARCH ARTICLE

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### Abstract

Background: This study investigates the relationships between perceived loneliness, life satisfaction, and suicide ideation (SI) in Ecuadorian medical and nursing students, aiming to identify cognitive predictors of SI using structural equation modelling (SEM). **Methods:** A cross-sectional, quantitative, descriptive, correlational and explanatory study was conducted with 618 medical and nursing students from four universities in Tungurahua, Ecuador. **Results:** The results indicate that SI is moderately and positively associated with perceived loneliness ( $r = .581$ ;  $p < .001$ ), and moderately and negatively associated with life satisfaction ( $r = -.408$ ;  $p < .001$ ). Additionally, perceived loneliness and life satisfaction are slightly and negatively related. SEM analysis showed that perceived loneliness ( $R^2 = .252$ ) is a stronger predictor of SI than life satisfaction ( $R^2 = .060$ ), but their combined explanatory power is significant, accounting for 39.2% of the variance in SI. **Conclusions:** This study highlights the importance of perceived loneliness and life satisfaction as cognitive predictors of SI among university students.

*Keywords:* loneliness, life satisfaction, suicidal ideation, medical students, nursing students.

### Predictores Cognitivos de la Ideación Suicida en Estudiantes de Medicina y Enfermería Ecuatorianos: El Papel de la Soledad Percibida y la Satisfacción Vital

#### Resumen

Objetivo: Este estudio investiga las relaciones entre la soledad percibida, la satisfacción vital y la ideación suicida (IS) en estudiantes de medicina y enfermería ecuatorianos, con el objetivo de identificar predictores cognitivos de la IS mediante modelos de ecuaciones estructurales (SEM). **Métodos:** Se realizó un estudio transversal, cuantitativo, descriptivo, correlacional y explicado con 618 estudiantes de medicina y enfermería de cuatro universidades de Tungurahua, Ecuador. **Resultados:** Los resultados indican que la IS está moderada y positivamente asociada con la soledad percibida ( $r = .581$ ;  $p < .001$ ) y moderada y negativamente asociada con la satisfacción vital ( $r = -.408$ ;  $p < .001$ ). Además, la soledad percibida y la satisfacción vital están ligera y negativamente relacionadas. El análisis SEM mostró que la soledad percibida ( $R^2 = .252$ ) es un predictor más fuerte de la IS que la satisfacción vital ( $R^2 = .060$ ), pero su poder explicativo combinado es significativo, lo que representa el 39.2% de la varianza en la IS. **Conclusiones:** Este estudio destaca la importancia de la soledad percibida y la satisfacción vital como predictores cognitivos de la soledad entre estudiantes universitarios.

*Palabras clave:* soledad, satisfacción vital, ideación suicida, estudiantes de medicina, estudiantes de enfermería.

## Introduction

Suicidal behaviours include actions aimed at causing one's own death. Individuals typically progress through various stages, beginning with death wishes, followed by ideation, planning, and the actual attempt (Thompson et al., 2012). Suicide is a significant public health issue, ranking among the top 20 causes of death globally and is the fourth leading cause of death among young people aged 15 to 29 years (World Health Organization [WHO], 2021).

University students are particularly vulnerable to suicide due to academic pressure and developmental transitions (Teixeira et al., 2022). Reports indicate that 22% of university students experience suicidal ideation, 6.1% engage in planning, and 3.2% make non-fatal suicide attempts over their lifetime. In the past year, these figures were 10.6%, 3%, and 1.2%, respectively (Mortier et al., 2018). Furthermore, in health-related fields as medicine or nursing, 7.2% of students are at risk of suicidal thoughts or behaviours (Torres et al., 2018). In Ecuador, alarming rates of suicidal thoughts and behaviours have been reported (Lapo-Taliedo et al., 2023), with approximately 19% of medical students at risk, although it is unclear whether this pertains to ideation, planning, or other behaviours (Rosero-Ordóñez, 2023). Given the significant incidence and potential harm associated with suicidal behaviour, identifying precursors to suicidal behaviour, particularly suicidal ideation (SI), is crucial, as it is considered a critical cognitive predictor (Klonsky et al., 2016).

Suicidal ideation (SI) represents the cognitive aspect of suicide, that arises after death wishes and before any suicidal action. It involves a set of irrational, unreflective, and inflexible ideas about the desire for death, considering it as a means to achieve an objective. In more advanced stages, SI includes establishing parameters for planning its execution, but without evidence of a recent suicide attempt (Beck et al., 1979). In view of these considerations, an in-depth analysis of this situation is necessary, particularly to determine

the conditions under which it arises, as well as mechanisms for its mitigation and prevention.

Currently, SI has gained importance due to the COVID-19 pandemic and its ongoing effects. The conditions derived from the pandemic have significantly altered the psychological dynamics of individuals, leading to mental health issues as anxiety, depression, social dysfunction, post-traumatic stress, and other symptoms in both adults and young people globally (Caycho-Rodríguez et al., 2022; Jovanović et al., 2024; Mazereel et al., 2021) and in Ecuador (Chango-Velva et al., 2025; Moreta-Herrera et al., 2022; 2024; Sánchez-Vélez & Moreta-Herrera, 2022). Similarly, a significant increase in SI has been observed in recent years, both in the general population (Woodward et al., 2022) and among university students (Macalli et al., 2024).

Probable explanations for this increase include social isolation, changes in daily life (Antonelli-Salgado et al., 2021), economic insecurity (Raifman et al., 2022), and other contextual and socio-environmental factors. In terms of psychological factors, these vary widely, but loneliness and life satisfaction stand out as significant areas of study. Firstly, because they share significant associations with SI, and secondly, because both have been significantly affected by COVID-19 thus warranting focused analysis.

## Loneliness, Life Satisfaction, and Suicidal Ideation

As previously mentioned, perceived loneliness and life satisfaction are constructs associated with SI that have shown notable changes in recent years. For example, studies have shown that after COVID-19, individuals experienced increased feelings of loneliness and isolation (Antonelli-Salgado et al., 2021), while aspects of mental well-being, as life satisfaction, deteriorated (Gonzalez-Bernal et al., 2021). From this perspective, these changes raise concern due to their potential impact on future suicide risk.

Perceived loneliness refers to how an individual quantitatively or qualitatively assesses and measures their own isolation. It is considered a process where a person perceives, experiences, and evaluates their isolation and lack of social communication or relationships (de Jong Gierveld, 1987). Generally, perceived loneliness is attributed as a negative condition due to decreased social interaction (Marttila et al., 2021), with adults generally presenting low or moderate levels, and about 10% presenting higher levels (Beutel et al., 2017). The prevalence of loneliness in the university population is higher, with around 32% experiencing it at various intensities (Diehl et al., 2018). Among medical students, approximately 20% experience intense loneliness (Keiner et al., 2023). This indicates a relatively high level of distress.

Regarding perceived loneliness and SI, these constructs have been found to interact, with perceived loneliness being a risk factor (Antonelli-Salgado et al., 2021) and demonstrating a positive correlation of varying intensities (Bennardi et al., 2019). It is also considered a significant predictor of SI and suicidal behaviour (Helm et al., 2020; Klonsky et al., 2016; McClelland et al., 2020). However, these findings are based on data from the general population, without specific consideration of the university population. Therefore, special attention is required for this demographic, as perceived loneliness is considered a modern malady and reports an annual increase (Buecker et al., 2021). This decline may influence suicide-related factors.

The second attribute to consider is life satisfaction, which represents the cognitive component of subjective well-being and involves the evaluation of value judgments that individuals generally have about their lives (Diener et al., 1985). Life satisfaction, globally analyses the positive thinking and feeling about one's current existence (Pavot & Diener, 2013). Generally, it is expected that reaching a certain age and achieving individual milestones as academic completion, employment, and family, for instance, contribute to a positive life assessment (Diener et al., 2015), although this not

always directly reflected in individual's subjective evaluations (Xiao et al., 2022). Evidence indicates that life satisfaction in young and university populations generally registers moderate to high levels (Moreta-Herrera et al., 2023), including medical students (Xiao et al., 2022). However, as previously mentioned, recent global events (Covid-19 pandemic) appear to have negatively impacted the perceived quality of life and subjective well-being, including life satisfaction, among university students (Rogowska et al., 2021).

Regarding the interaction between life satisfaction and SI, research shows a negative covariance with varying intensity (Naseem & Munaf, 2017; Yao et al., 2014). More recent studies suggest that life satisfaction is a significant predictor of SI (Morales-Vives & Dueñas, 2018; O'Brien et al., 2023; Yang et al., 2021), although these findings are based on general population data without precise analyses of university students.

### The Present Study

Although perceived loneliness and life satisfaction have been recognised as predictors of SI, previous studies have investigated these factors independently. While this represents an advancement in the discussion on SI, no comprehensive studies have proposed explanatory models where these predictors operate simultaneously in a multiple manner, clearly identifying their combined effect.

The justification for proposing an explanatory model that integrates these variables is based on: (a) the significant covariance between perceived loneliness and life satisfaction (Hamermesh, 2020; Liu et al., 2022; Marttila et al., 2021; Turan et al., 2020); (b) their importance as independent predictors of SI (Helm et al., 2020; McClelland et al., 2020; Morales-Vives & Dueñas, 2018; O'Brien et al., 2023; Yang et al., 2021); (c) their prevalence and intensity among the university population, especially in light of the recent shifts in their behavioural or psychosocial patterns in recent years, particularly post-COVID-19 (Marttila et al., 2021; Rogowska et al., 2021); and (d) the lack

of predictive studies among university students, despite this being a sensitive population (Teixeira et al., 2022). Therefore, there is a need for a deeper and broader investigation into an area of interest like SI, focusing on a demographic group that faces certain risks of harm.

Based on these antecedents, the objectives of the study are proposed as follows: (a) To assess the current state of perceived loneliness, life satisfaction, and SI in a sample of medical and nursing university students in Ecuador; (b) to identify the mutual relationship between the specified variables using structural equation modelling (SEM) techniques; and (c) to establish perceived loneliness and life satisfaction as multiple predictors of SI. Based on the above, it is hypothesized that SWL levels are high, while loneliness and SI are low (H1). SWL, loneliness, and SI covary significantly with each other, forming a good-fit model (H2); and SWL and loneliness are multiple predictors of SI (H3).

## Methods

### Design

This research is based on a quantitative, descriptive, correlational, explanatory, and cross-sectional study (Ato et al., 2013), employing structural equation modelling (SEM) techniques in a sample of medical and nursing students in Ecuador.

### Participants

The study is based on a population of approximately 30,000 university students in the province of Tungurahua, Ecuador. An appropriate sample size for this condition is estimated, with a sampling error of 4% and a 95% confidence interval based on approximately 596 cases. The sample consists of 618 participants (slightly above the recommended sample size), with 61.8% being men and 38.2% women, aged between 18 and 43 years ( $M = 20.33$ ;  $SD = 2.32$ ). Ethnically, 92.4% self-identify as mestizos, while the remaining 7.6% are distributed among indigenous, Afro-Ecuadorian, and white.

A total of 72.7% reside in urban areas, and 27.3% in rural areas. Academically, the participants are from four universities in the province of Tungurahua, Ecuador, with 60.2% being from public universities and 39.8% from private universities. Of the participants, 85.1% are studying medicine and 14.9% are in nursing programmes. Additionally, 24.4% report being at academic risk due to low performance. It is important to note that the students are not currently undergoing internship or pre-professional practice processes.

Participants were selected using non-probabilistic sampling with inclusion criteria: a) being at least 18 years old; b) being enrolled in a medicine or nursing programme; c) attending the participating universities; and d) voluntarily participating by signing a consent form. And exclusion criteria: a) Minor although he is studying; b) Students of other programmes not related to medicine or nursing; and c) Students who did not provide signed consent. All participants were contacted directly in their classrooms and each of them was provided with the evaluation link.

### Instruments

The short version of the UCLA Loneliness Scale (UCLA; Russell, 1996), translated into Spanish (Velarde-Mayol et al., 2016), was used to assess perceived loneliness. This scale comprises 10 questions answered on a five-point Likert scale, ranging from 0 ('never') to 4 ('always'). While the scale does not provide cut-off points for interpretative categories, higher scores indicate greater perceived loneliness (Min = 0, Max = 40). A criterion for identifying high-risk cases is scores above 30 points.

The UCLA demonstrates a unidimensional factorial structure through Exploratory Factor Analysis (EFA), explaining 71.6% of the total variance, with an internal consistency of  $\alpha = .95$ , indicating high reliability. In the present study, Confirmatory Factor Analysis (CFA) confirmed a similar internal structure with  $\chi^2 = 50.8$ ;  $p < .05$ ;  $df = 35$ ;  $\chi^2/df = 1.45$ ; CFI = .999; TLI = .998;

SRMR = .039; RMSEA = .027 [.006 - .042], and an internal consistency reliability of  $\omega = .945$  [.937 - .953], indicating high reliability.

The Satisfaction with Life Scale (SWLS; Diener et al., 1985), in its Spanish version (Cabañero et al., 2004) and adapted to the Ecuadorian context (Moreta-Herrera et al., 2023), was designed to assess life satisfaction. The SWLS consists of five items answered on a seven-point Likert scale, where 1 corresponds to 'strongly disagree' and 7 to 'strongly agree'. Higher scores indicate greater life satisfaction (Min = 7, Max = 35). A cut-off score of 11 or lower is used to estimate risk in satisfaction processes. The SWLS has a unidimensional structure with an internal consistency of  $\omega = .84$  95% CI [.81 - .87], considered adequate. In this study, CFA confirmed the unidimensional structure with  $\chi^2 = 1.50$ ;  $p < .05$ ;  $df = 5$ ;  $\chi^2/df = .30$ ; CFI = .999; TLI = .999; SRMR = .013; RMSEA = .001 [.000 - .021], and an internal consistency reliability of  $\omega = .939$  95% CI [.929 - .949], indicating high reliability.

The Suicidal Ideation Scale (Paykel et al., 1974), in its Spanish version (Fonseca et al., 2018), assess SI over the past six months. This scale consists of five items answered on a four-point Likert scale, where 0 means 'never' and 4 means 'always'. Higher scores indicate greater SI (Min = 0, Max = 20). A cut-off score above 10 is used to identify high and very high-risk levels. The scale has a unidimensional factorial structure with an internal consistency of  $\omega = .823$ , considered adequate. In this study, CFA confirmed a similar structure with adequate fit indices of  $\chi^2 = 7.24$ ;  $p < .05$ ;  $df = 5$ ;  $\chi^2/df = 1.45$ ; CFI = .999; TLI = .999; SRMR = .028; RMSEA = .027 [.001 - .067], and an internal consistency reliability of  $\omega = .944$  95% CI [.934 - .955], indicating high reliability.

### Procedure

After obtaining the necessary institutional and personal permissions from the potential sample to start this study, data collection was conducted virtually using Google Forms link. Participants completed the requested information in the online

questionnaires, which took approximately 15 minutes. The evaluation was carried out during the second semester of 2023. Upon completion of the evaluation, the collected data was cleaned and systematised into electronic databases for data management and analysis.

Regarding ethical considerations, this study adheres to the guidelines and policies of the Helsinki Declaration concerning research involving human subjects. Additionally, the project from which this study derives also complies with institutional ethics and research regulations and was approved by the Institutional Review Board of the Pontificia Universidad Católica del Ecuador Sede Ambato with resolution CD-RES-098-2024. Finally, due to the anonymity of the research, no at-risk cases can be identified. As part of the project, contact information is provided for the Centre for Applied Psychology at the Pontifical Catholic University of Ecuador, which offers both in-person and virtual psychological support and assistance services for cases within and outside the institution.

### Data analysis

Data management was conducted based on two blocks of analysis. The first block comprises a descriptive analysis of the variables of interest (perceived loneliness, life satisfaction, and SI) to assess its current state among the students. Measures of central tendency as the arithmetic mean (M), dispersion as standard deviation (SD), and distribution measures including skewness (g1) and kurtosis (g2) were used. Additionally, univariate and multivariate normality assumptions were analysed to determinate the use of classic or robust estimators in structural analyses. For univariate normality, g1 and g2 values within the range of  $\sim 1.5$  were considered normal (Ferrando & Anguiano-Carrasco, 2010). For multivariate normality, Mardia's test results needed to show no statistical significance ( $p > .05$ ) in g1 and g2 respectively (Mardia, 1970).

The second block of analysis involved designing fit models using SEM techniques to identify, firstly, the latent interaction of the variables in terms of covariation through a fit model (see Figure 1), and secondly, the latent predictors (perceived loneliness and life satisfaction as exogenous variables) of SI (as an endogenous variable) to understand the degree of variance explanation through a multiple structural regression model (see Figure 2). In SEM analyses, the robust estimation of Diagonally Weighted Least Squares (DWLS) was employed due to the ordinal nature of the items and the absence of multivariate normality among the variables (Li, 2016). Model fit evaluation was conducted using absolute fit indices, including the chi-square ( $\chi^2$ ), normed chi-square ( $\chi^2/df$ ), and Standardized Root Mean Square Residual (SRMR); relative fit indices as the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI); and non-centrality-based indices like the Root Mean Square Error of Approximation (RMSEA). For adequate fit,  $\chi^2$  should be  $> .05$  or  $\chi^2/df < 4$ ; CFI and TLI  $> .95$ ; and SRMR and RMSEA  $< .06$  (Brown, 2015;

McNeish & Wolf, 2023; Moreta-Herrera et al., 2021; Wolf et al., 2013). The coefficient of determination ( $R^2$ ) was interpreted with an expected effect size magnitude of  $R^2 > .25$  to be considered moderate (Ferguson, 2016).

Statistical management of this work was carried out using R programming language version 4.01 (R Core Team, 2019) with the packages *foreign*, *MVN*, *lavaan*, and *MBESS* for descriptive, normality, CFA, and SEM analyses.

## Results

### Descriptive analyses

Table 1 shows the current state of the participants regarding the presence of perceived loneliness, life satisfaction, and SI. Results reveal a moderate presence of perceived loneliness, with approximately 24.9% ( $n = 154$ ) of participants reporting high-risk scores. Regarding life satisfaction, approximately 12% ( $n = 74$ ) reported high levels of dissatisfaction. For SI, the overall presence is low, although around 10% ( $n = 2$ ) are at risk.

**Table 1**

*Descriptive analyses of the perception of loneliness, life satisfaction and suicidal ideation*

Variables	M	SD	Risk	$g_1$	$g_2$	Mardia $g_1, g_2$
Suicidal ideation	4.11	4.88	10.5%	1.36	1.39	1768.71***; 64.97***
Perception of loneliness	15.46	9.25	24.9%	-0.29	0.30	1615.73***; 61.41***
Life satisfaction	22.16	8.09	12.9%	-0.76	-0.42	739.37***; 8.02***

Note: \*\*\*  $p < .001$ ; M: arithmetic mean; SD: standard deviation;  $g_1$ : symmetry;  $g_2$ : kurtosis.

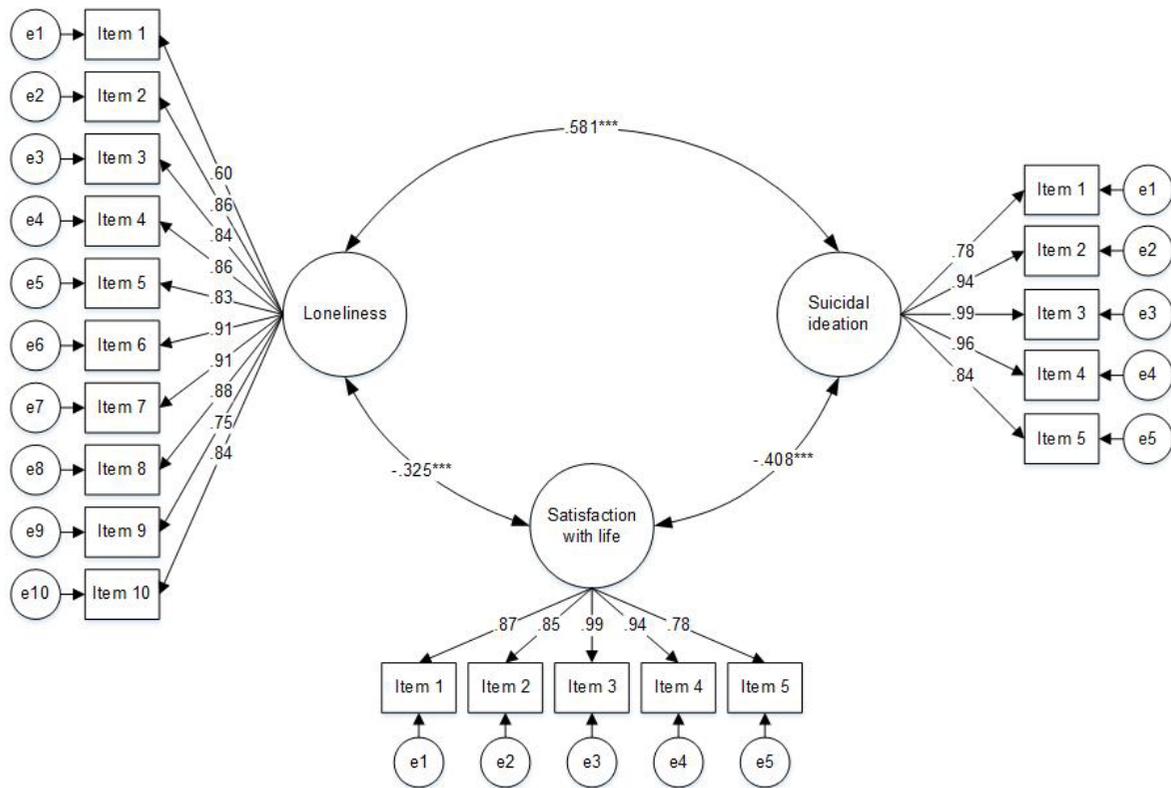
Regarding the verification of normality assumptions, the values of  $g_1$  and  $g_2$  are within tolerance parameters ( $\sim 1.5$ ), indicating univariate normality. However, Mardia's test results show significance ( $p < .05$ ), indicating the absence of multivariate normality.

### General Fit Model

Figure 1 illustrates the interactions among the variables using SEM. In this analytical framework,

positive and moderate latent correlations between perceived loneliness and SI are observed ( $r = .581$ ;  $p < .05$ ), while there is a negative and slight covariance between perceived loneliness and life satisfaction ( $r = -.325$ ;  $p < .05$ ), and a moderate and negative covariance between life satisfaction and SI ( $r = -.408$ ;  $p < .05$ ).

**Figure 1.** General adjustment model to identify latent relationships with loneliness, life satisfaction, and suicidal ideation.



$\chi^2 = 456.29$ ;  $p < .05$ ;  $df = 167$ ;  $\chi^2/df = 2.73$ ;  $CFI = .973$ ;  $TLI = .969$ ;  $SRMR = .013$ ;  $RMSEA = .035$  [.053 - .047]

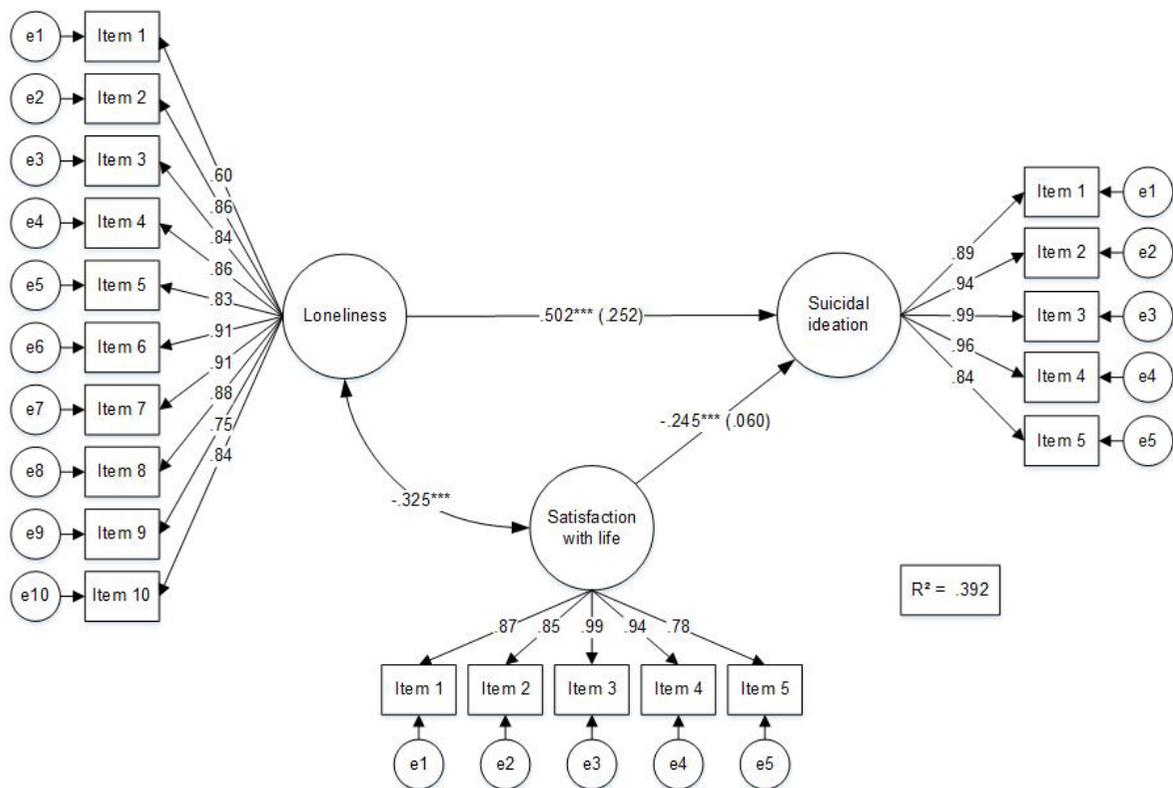
Note: \*\*\*  $p < .001$ ;  $\chi^2$ : chi-square;  $df$ : degree-free;  $\chi^2/df$ : normed chi-square;  $CFI$ : Comparative Fit Index;  $TLI$ : Tucker-Lewis Index;  $SRMR$ : Standardized Root Mean Square Residual;  $RMSEA$ : Root Mean Square Error of Approximation.

Regarding the fit of the latent relationship model, it presents adequate fit indicators and is therefore valid for interpretation among university students in Ecuador.

### Structural Regression Model

Figure 2 presents the multiple structural regression model of SI using SEM. As observed, perceived loneliness explains 25.2% ( $R^2 = .252$ ;  $p < .05$ ) of the variance in SI, while life satisfaction

explains approximately 6% ( $R^2 = .06$ ;  $p < .05$ ). This indicates that independently, perceived loneliness is a stronger predictor of SI than life satisfaction. However, together, perceived loneliness and life satisfaction explain 39.2% of the variance, interpreted as moderate and enhancing the predictive condition of SI. Thus, these exogenous variables are considered important predictors of SI among young university students in Ecuador.

**Figure 2.** Multiple structural regression analysis of loneliness and life satisfaction on suicidal ideation.

$\chi^2 = 456.29$ ;  $p < .05$ ;  $df = 167$ ;  $\chi^2/df = 2.73$ ; CFI = .973; TLI = .969; SRMR = .013; RMSEA = .035 [.053 - .047]

Note: \*\*\*  $p < .001$ ;  $\chi^2$ : chi-square;  $df$ : degree-free;  $\chi^2/df$ : normed chi-square; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; SRMR: Standardized Root Mean Square Residual; RMSEA: Root Mean Square Error of Approximation.

Regarding the structural model and its interpretation for the university population in Ecuador, the reported fit indices are within acceptance criteria ( $\chi^2 = 456.29$ ;  $p < .05$ ;  $df = 167$ ;  $\chi^2/df = 2.73$ ; CFI = .973; TLI = .969; SRMR = .013; RMSEA = .035 [.053 - .047]), indicating that the proposed model presents an adequate fit.

### Discussion

The objectives of this study were to assess the current state of perceived loneliness, life satisfaction, and SI, explore their mutual interactions, and estimate the specific predictors of SI in a sample of medical and nursing university students in Ecuador.

Regarding the state of the variables of interest, SI levels are generally low, but there is a subset of participants at high risk, accounting for approximately 10.5% of the cases. This indicates a segment of participants susceptible to worsening SI, potentially progressing to more critical stages. These findings align with similar studies conducted in university populations (Mortier et al., 2018). However, among medical students, the values differ as a higher percentage is reported (Torres et al., 2018), suggesting that SI has indeed increased in this demographic in recent years (Woodward et al., 2022). In Ecuador, the present values are lower than previously reported (Rosero-Ordóñez, 2023), but those values reflect the overall suicide risk rather than specific SI, thus providing more

precise information about this reality in the country and the dynamics that exist between different population groups, which apparently vary from one another.

Regarding perceived loneliness, it is concluded that the presence of this condition is at a moderate level, with 24.9% of medical and nursing students reporting moderate to intense loneliness. These findings differ from similar studies, indicating a greater prevalence of loneliness than reported in the general adult population (Beutel et al., 2017), but lower than in the general university population (Diehl et al., 2018). Specifically, among medical students, the presence of loneliness is higher (Keiner et al., 2023). This establishes a trend of increasing loneliness and social isolation conditions at similar levels to those of the university population.

For life satisfaction, the satisfaction levels among students are high, yet approximately 13% report low life satisfaction, indicating a substantial proportion of individual with low perceived life satisfaction. These findings are consistent with similar studies on university students (Moreta-Herrera et al., 2023) and medical students (Xiao et al., 2022). This underscores the necessity for follow-up, especially through longitudinal studies.

Regarding the relationships between the variables, it was found that SI is moderately and positively associated with perceived loneliness, as reported in previous studies (Bennardi et al., 2019). In contrast, life satisfaction is moderately and negatively associated with SI, which is consistent with similar findings (Naseem & Munaf, 2017; Yao et al., 2014). Additionally, perceived loneliness has a weak and negative relationship with life satisfaction (Hamermesh, 2020; Liu et al., 2022; Marttila et al., 2021; Turan et al., 2020). This confirms the latent interaction among these elements within the university population, which had not been previously analysed.

In structural multiple regression analysis, perceived loneliness and life satisfaction are predictors of SI, with loneliness having a stronger predictive

value. However, their combined explanatory potential significantly increases to 39.2% of the variance in SI, making the predictive model moderately strong (Ferguson, 2016). This reveals two key aspects: a) independently, perceived loneliness is a predictor of SI, aligning with previous studies (Helm et al., 2020; Klonsky et al., 2016; McClelland et al., 2020), and similarly, life satisfaction is also a predictor of SI (Morales-Vives & Dueñas, 2018; O'Brien et al., 2023; Yang et al., 2021); and b) together, perceived loneliness and life satisfaction enhance the predictive power of SI, a finding not previously addressed in other studies, making this study a novel contribution to the understanding of SI from a cognitive perspective. The methodology employed through SEM provides more precise and accurate results and achieves a closer and more objective explanation to the phenomenon of suicidal ideation.

Lastly, regarding the implications of the study, from a theoretical perspective, it proposes an explanatory model of SI through cognitive processes associated with perceived loneliness and life satisfaction. This is particularly relevant because, while the mechanisms of these predictors were known independently, their combined effect had not been explored, representing an innovation. This broadens the understanding of the joint interaction of various elements in explaining the variance of SI and can aid in the early identification of suicidal behaviours. Practically, these results contribute to generating mechanisms for both psychosocial prevention and intervention on suicidal thoughts and behaviours in the university population, specifically among medical students. This may suggest using a cognitive-behavioural intervention model with cognitive restructuring techniques for the perception and assessment of loneliness, life satisfaction, and ideation. In this regard, the use of therapeutic models that strengthen bonds with others and can prevent suicidal behaviours, as Compassion-focused therapy (CFT) (Daneshvar et al., 2021) or Acceptance and Commitment Therapy (ACT) (Barnes et al.,

2021), as well as community intervention models focused on social and family support, as the Zero Suicide Model (Ahmedani et al., 2025), can be considered to mitigate future high-risk behaviours among students. In addition, professional training at university centres should be enhanced to include aspect as coping strategies, well-being and personal care in mental health and seeking psychological assistance and support.

### Limitations

The findings of this study reveal several limitations that should be considered. The first limitation is the specificity of the sample, as it consists of young adults and university students enrolled in medical and nursing programmes. Therefore, it is not advisable to generalise the explanatory model to other segments, such as the general population or adolescents. Based on this, it is recommended to conduct further studies to verify the model in these particular groups and extend it to other populations.

One other limitation relates to the methodology used. Observational studies with a predictive nature do not establish causality between exogenous and endogenous variables. Although a probable consideration of causality is suggested, it remains a hypothetical conjecture. Therefore, these findings should be interpreted with caution. Future studies with precise methodologies that verify causality, as experimental designs or longitudinal structural analyses with at least three time points, are recommended to corroborate these results. And although they cannot be fully generalized, they are an adequate starting point for identifying relevant psychological attributes in the configuration of SI in emerging youth.

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# Dissimilar Mechanisms Underlie Perceived Happiness of the Introverts and Extraverts: A Thematic Analysis\*

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

The study explored the mechanisms behind differences in the perceived happiness of introverts and extraverts. Using a qualitative research design, 22 introverts and 27 extraverts were chosen through their scores on the revised Eysenck personality questionnaire. The data were collected through a semi-structured interview that included questions on the meaning, causes and sources of happiness. The verbatim transcriptions were analysed through the thematic analysis method. Five themes were identified: dissimilar conceptualizations of happiness, differences in the inclination towards happiness, dissimilar loci of happiness, differences in the temporal quality, and the sources of happiness. The extraverts were more inclined towards short-lived and dynamic nature of happiness whereas permanency, meaningfulness, and stability pervaded in the meaning of happiness of the introverts. The introverts value internal and achieved sources whereas external and ascribed sources of happiness find expressions in extraverts. For introverts, happiness originated from individual activities whereas interpersonal activities caused happiness in extraverts. These differences may be due to their dissimilar conceptualizations and sources of happiness.

*Keywords:* extraversion, happiness, introversion, thematic analysis method, personality.

### **Mecanismos Diferentes Subyacen a la Felicidad Percibida por los Introvertidos y los Extrovertidos: Un Análisis Temático**

#### **Resumen**

El estudio exploró los mecanismos detrás de las diferencias en la felicidad percibida de los introvertidos y extrovertidos. Utilizando un diseño de investigación cualitativo, se eligieron 22 introvertidos y 27 extrovertidos a través de sus puntajes en el cuestionario de personalidad de Eysenck revisado. Los datos fueron recolectados a través de una entrevista semiestructurada que incluyó preguntas sobre el significado, las causas y las fuentes de la felicidad. Las transcripciones textuales fueron analizadas a través del método de análisis temático. Se identificaron cinco temas: disímiles conceptualizaciones de la felicidad, diferencias en la inclinación hacia la felicidad, lugares diferentes de la felicidad, diferencias en la calidad temporal y las fuentes de la felicidad. Los extrovertidos estaban más inclinados hacia la naturaleza dinámica y de corta duración de la felicidad, mientras que la permanencia, el significado y la estabilidad impregnaban el significado de la felicidad de los introvertidos. Los introvertidos valoran las fuentes internas y logradas, mientras que las fuentes externas y atribuidas de felicidad encuentran expresión en los extrovertidos. Para los introvertidos, la felicidad se originaba en actividades individuales, mientras que las actividades interpersonales causaban felicidad en los extrovertidos. Estas diferencias pueden deberse a sus diferentes conceptualizaciones y fuentes de felicidad.

*Palabras clave:* extraversión, felicidad, introversión, método de análisis temático, personalidad.

## Introduction

Happiness refers to satisfaction with life coupled with a higher frequency of positive affect with a relatively low occurrence of negative affect over a period (Fors Connolly & Gärling, 2024; Furnham & Petrides, 2003; Singh et al., 2023). Three major sources of happiness have been suggested: life circumstances and demographic, traits and dispositions, and intentional behaviours (Kerstetter et al., 2022; Lyubomirsky et al., 2005). Out of these, personality denotes an important source of happiness (Diener & Seligman, 2002). Personality refers to a coherent patterning of affect, behaviour, cognition, and desires over time and space which has been reported to be associated significantly with individual differences in affective level and environmental responsiveness (Corr, 2008). The traits of extraversion and introversion nurture different cognitive and affective behaviours that, in turn, create differences in the experiences of positive and negative emotions of individuals (Cloninger, 2013; Costa & McCrae, 1980; Tohver, 2020; Walker, 2020). Extraversion and neuroticism have been popular personality traits that have been reported to be stable over time and observable across different cultures (Lu et al., 1997; Walker, 2020). Individuals with high extraversion are talkative, dominant, and gregarious while the opposite is true about an individual with low on this personality trait (McCrae & Costa, 1987; Petric, 2022). Research suggests that personality traits have high predictive validity on many life outcomes including emotional experience. Besides, extraverts have been suggested to be inclined to experience more positive emotions, happiness, and lower level of depression than those who score lower on this measure (Cloninger, 2013; Harris et al., 2017; Margolis & Lyubomirsky, 2020).

In their meta-analysis, DeNeve and Cooper (1998) have concluded that emotional stability, conscientiousness, extraversion, and agreeableness predispose individuals to experience the happiness of a particular level. Some researchers have argued that extraversion appears to mediate happiness

through assertiveness and social behaviours rather than any inherent bias towards happiness (Argyle et al., 1989; DeNeve & Cooper, 1998). Emotional stability and extraversion are linked with temperamental differences in positive and negative affect that are rooted in the biological basis of happiness (Chamorro-Premuzic et al., 2007). It has been posited that different personality traits predispose individuals to choose the situations that fulfil specific personality trait needs (Furnham, 1981). In essence, different personality traits have been reported to be linked closely with varying degree of happiness. It led to conclude that happiness is a thing called stable extraversion (Eysenck & Kelly, 1983; Lucas & Diener, 2001). Thus, the majority of these studies have reported extraversion to be closely linked with happiness than introversion (Card & Skakoon-Sparling, 2023; Lucas, 2007; Steel et al., 2008).

If people with two personality traits carry dissimilar inclination, then it may be argued that they may be different in their conceptualizations of happiness as personality traits have been suggested to shape cognitions, environmental orientations and affective attributes (Corr, 2008). This conclusion seems empirically wrong. Is it possible that all extraverts are happier than introverts? We argue that the question raised by the previous researchers studying the personality differences in happiness was itself wrong. The real research question should have been as “What are the basic differences in the meaning, nature and sources of happiness of introverts and extraverts?”

Studies that suggest that extraverts are happier than introverts define happiness through subjective well-being (SWB) that include frequent positive affect, infrequent negative affect and high life satisfaction (Lucas, 2007; Lucas & Diener, 2001). They often evaluate happiness based on self-report scales as the Positive and Negative Affect Scale (PANAS) for the affective well-being and Satisfaction with Life Scale (SWLS) for cognitive well-being. Findings indicate that extraverts experience greater happiness due to higher reward sensitivity, increased social engagement, and stronger positive affect

reactivity, reinforcing the role of personality traits in shaping subjective well-being. The majority of the research work used the happiness measure developed by Lyubomirsky and Lepper (1999), which conceptualized happiness as a global and subjective assessment of well-being, independent of objective life circumstances. It measures individuals' overall perception of their happiness relative to others and their own standards. Happiness was measured through self-comparisons and implicit judgments rather than relying solely on momentary affect.

The measurement of happiness in previous studies may reflect a narrower concept of happiness, or there may be an alternative construct that better captures the enjoyment introverts derive from various activities. For instance, while extraverts may indeed experience higher levels of happiness, introverts might instead experience greater "satisfaction" or "calmness". These experiences could, in turn, contribute to positive outcomes as improved physical and psychological well-being for introverts. This suggests that "happiness" may not be as beneficial for introverts as it is for extraverts, rather than implying that happiness holds different meanings for the two groups.

Hills and Argyle (2001) have suggested that extraversion and introversion personality traits may be differently linked with happiness due to the differences in their sociability and social relationships but there are certain tendencies as empathy and affiliation which are common to both and they are linked with happiness. These researchers also argued that both introverts and extraverts exhibited a similar preference for privacy, social relations and reflective activities which are essential ingredients of experiencing happiness. Besides, they also suggested that introverts and extraverts may differ in their mechanisms mediating their nature and extent of happiness and the relationship between introversion and extraversion personality traits need a fresh look to understand the nature and mechanisms of happiness of introverts and extraverts (Hills & Argyle, 2001).

In essence, these findings act as a reasonable ground to speculate that the differences in the happiness of introverts and extraverts reported in the previous studies may be due to the overlooking the differences in the conceptualization of nature, sources, processes and mechanisms of happiness in introverts and extraverts. It may be argued that dissimilar nature, mechanisms and sources of happiness along with contrasting emotional, cognitive, interpersonal and social goals of introverts and extraverts may underlie their experiences of dissimilar happiness. We argue that the happiness of introverts and extraverts are guided by their dissimilar meanings and sources of happiness. Dynamic systems theory has suggested combining state and trait dimensions by reflecting upon the study of short-term and live experiences of individuals that may be an essential source of deeper understanding personality processes and outcomes (Fleeson & Jayawickreme, 2015; Sosnowska et al., 2020). Accordingly, we chose a thematic analysis approach, a form of qualitative research design, to explore the real causes behind differences in the happiness of introverts and extraverts based on their momentary and live experiences. A qualitative method has been suggested to be useful where the nature and attributes of the construct/s are not explicit or there is no guiding framework (Creswell, 2004). In this background, the study aimed to explore the meaning, nature and sources of happiness of introverts and extraverts.

## Methods and procedure

### Research Design

A qualitative research design was used to come up with a deeper understanding of the various aspects of happiness of the introverts and extraverts. The study used a constructivist approach which refers to a dialogical exchange between the interviewers and interviewees to the experiences and meanings held by them (Levitt et al., 2018).

### Participants

The extreme scorers were screened from a pool of 225 participants who were initially administered Eysenck Personality Questionnaire (Tiwari et al., 2009) to identify introverts and extraverts ( $N = 49$ ,  $Age\ Range = 18\ to\ 25\ years$ ,  $Mean\ Age = 21.76$ ,  $SD = 2.16$ ). Out of these, 22 were introverts ( $Mean\ Age = 21.57$ ,  $SD = 2.62$ ) and the rest 27 were extraverts ( $Mean\ Age = 21.93$ ,  $SD = 1.70$ ). The participants were

students who were pursuing their undergraduate and postgraduate programmes from the various departments of Dr. Harisingh Gour University, Sagar, Madhya Pradesh, India who belonged predominantly to the lower-middle-class of the various Indian states. More details of their biographic attributes are given in Table 1.

**Table 1**

*Demographic Features of the Introverts (n = 22) and the Extraverts (n = 27)*

Demographic Features	Frequency	Percentage
Age (Years)		
18-20	15	30.61%
21-23	27	55.10%
24-26	7	14.29%
Personality		
Introverts	22	44.90%
Extraverts	27	55.10%
Gender		
Males	20	40.82%
Females	29	59.18%
Religion		
Hindu	39	79.59%
Muslim	3	6.12%
Jain	7	14.29%
Domicile		
Rural	19	38.78%
Urban	30	61.22%
Educational Levels		
Graduation	15	30.61%
Postgraduation	34	69.39%

### Research Team

There were nine researchers in the team who had a good knowledge of the qualitative research. Authors placed from third to ninth numbers contributed in collecting, processing and analysing the data, and preparing the first draft while the first two authors conceptualized, monitored, and prepared the final draft of the manuscript. All the authors were well-practised in qualitative studies. The differences in their age, experiences and academic background were minimized by a regular discussion.

### Recruitment of the Participants

The study was conducted during July 2019 and March 2020. No compensation was paid to the participants for their participation in the study. The study was approved by the Ethics Committee of the Department of Psychology, Dr. Harisingh Gour University, Sagar, Madhya Pradesh, India. The inclusion criteria for the introverts and extraverts were their scores above 75 percentile and below 25 percentile on the personality measure (Tiwari et al., 2009), respectively. The participants were debriefed about the basic goals of the study and gave written consent. The participants were chosen

through a purposive sampling method which has been suggested to be useful when the goal of the research is to explore about the experiences more relevant to the phenomenon of interest (Creswell, 2014). Only the adults were chosen as they were easily available and represented an information-rich group and were able to describe and reflect upon the experiences of happiness (Patton, 2015). The sample size was sufficient as it was beyond the recommended size of 12 for qualitative study using purposive sampling (Guest et al., 2012).

### Data Collection

The participants gave their written consent to participate in the study before the actual data collection was started. They were debriefed about the study goals. A semi-structured interview protocol was used to collect the data. The structure of the interview protocol was developed as per the study goals which were identified in the beginning. The interviews were conducted thoroughly focusing on the goals of the study which took 63 to 81 minutes (*Mean Length* = 72.16 min.). The questions were based on the meaning of happiness, causes, and sources of happiness of the introverts and extraverts. Devices available in mobile phones were used to record the contents of the interviews which were later transcribed verbatim. Initially, some consensus meetings and a pilot study on 5 participants (2 introverts and 3 extraverts) were conducted to develop a preliminary interview protocol. These data were not included in the final analysis. These initial efforts helped to make decisions and to understand the ability of the participants that they will be able to report their experiences of happiness.

In this study, the participants were prompted through open-ended questions in semi-structured interviews. Open-ended questions as “Can you describe a recent experience that made you feel truly happy?” and “How do social interactions influence your happiness?” encouraged rich and detailed responses. Questions encouraged introspection on their happiness experiences, social

interactions, and coping strategies. Probes ensured depth and clarity. Rigour was maintained through reflexivity (journaling biases), data triangulation (multiple sources), and member checking (participant validation) to enhance credibility. A systematic coding process, audit trails, and thematic saturation ensured reliability and dependability. Rich and thick descriptions enhanced transferability. Additionally, inter-coder reliability was ensured through independent coding and discussion among researchers, enhancing credibility and consistency in thematic analysis. These measures strengthened the study’s validity and trustworthiness of the findings, ensuring that findings accurately captured participants’ lived experiences and provided meaningful insights into the happiness perceptions of introverts and extraverts. The saturation was indicated when no new themes and codes emerged from additional interviews consistent with the research questions (Saunders et al., 2018). The saturation was reached after the completion of 41 data and 8 more interviews were conducted to confirm it.

### Data Analysis

The thematic analysis method was used in this study. It consists of organizing and preparing, obtaining a general sense, coding, generating categories or themes and interpreting the data (Braun & Clarke, 2006). Confidentiality was maintained by assigning codes to each participant whereas multiple scrutiny of the data and codes determined the reliability. The data were read again and again to enhance the acquaintance of the contents and inherent meaning in the interview contents and to develop insights (Barbour, 2001). According to the suggestions of Guest et al. (2012), these generated codes were organized, merged and re-categorized to identify relevant codes. The analysis of the data was completed with the help of inductive and deductive thematic analysis method (Braun & Clarke, 2006).

A codebook was maintained to keep a vigil on the incorporations and deletions of the codes.

After generating codes, they were assessed and reviewed for the sake of appropriate modifications and revisions. The assessments and reviews helped to find out codes and refrain from irrelevant ones. An iterative approach was employed until the analysis was completed to enhance the quality of coding. A gap of one week was observed to reduce the distortion due to over-involvement in the data (Braun & Clarke, 2016; Guest et al., 2012). These efforts facilitated to come up with the final codes and relevant themes. Methodological integrity was achieved with the help of regular discussions, evaluation, focus, dependable analysis, and managing a codebook.

Audio-recorded interviews were transcribed verbatim, followed by familiarization with the data. Initial codes were generated inductively, capturing meaningful segments related to happiness. Codes were then collated into potential themes through iterative comparison, ensuring alignment with participant narratives. Themes were refined through discussions, maintaining coherence and distinctiveness. A reflexive approach was used to minimize distortions. The final themes covered psychological and social mechanisms that influence happiness in introverts and extraverts and provide an insight into individual differences in happiness. The following steps were involved in the data analysis process (Braun & Clarke, 2006):

1. Familiarization: Researchers transcribed and repeatedly read the data to gain a deeper familiarity.
2. Initial coding: Data that captured key patterns related to happiness were systematically coded.
3. Theme Generation: Codes were clustered into potential themes that reflected the meaning, sources, and mechanisms behind perceived happiness differences in introverts and extraverts.
4. Reviewing themes: Themes were refined that ensured coherence and relevance.
5. Defining and naming: Clear definitions and names were assigned to each theme.

6. Reporting: Themes were structured to illustrate key findings with supporting quotes.

## Results

The analyses resulted in five major themes: dissimilarities in the conceptualizations of happiness, inclination towards happiness, loci of happiness, the temporal quality of happiness and the sources of happiness. A summary of the major findings is presented in Table 2. (Note: M = Male Participant, F = Female Participant, I = Introvert, E = Extravert and the numerals = Serial number of the participants).

### Theme 1: Dissimilar conceptualizations of happiness

Introverts and extraverts reported significant differences in their meanings and conceptualizations of happiness. Introverts reported durability, permanency, calmness and meaningfulness as the core of their happiness (For me, happiness emanates from involving oneself in the logical and realistic activities leading to satisfaction and security). Calmness, meaningfulness, self-sufficiency, systematicity and orderliness, rational end, quality, intrapersonal logical acts, self-reflective actions, emotion suppression, less-adherence to the social norm and less cheerfulness were the core features of the perceived happiness of the introverts.

Introverts reported that a smaller number of friends makes life easier to manage well while a larger number of friends always make disturbance and place demands which make it difficult to carry out important tasks of life.

I feel happy about making a lesser number of friends. It helps me to avoid unnecessary interpersonal conflicts and negative competitions. (M\_I\_9)

The larger number of friends place multiple demands that directly disturb my routine and activities. (F\_I\_5)

Instead of making too many relationships, I find satisfaction and happiness in limited and close relationships. (F\_I\_8)

The introverts reported happiness in activities which were comparatively solitary and required a small number of persons.

I enjoy reading books as it helps to understand the meanings of various aspects of life. (F\_I\_2)

I enjoy a movie alone with a rational and meaningful end. (M\_I\_5)

I never wait for much anyone for gossip or anything for help or games. (M\_I\_1)

The lifestyle of the introverts is more systematic and orderly. They liked to place things in a systematic manner which gave satisfaction and happiness.

I keep my things in a systematic manner that gives me satisfaction and ease. (M\_I\_12)

When I get free time, I devote it to arrange the things around me. I help my family to keep things a good and approachable order. (M\_I\_5)

I like to think and imagine things about my life which satisfy me a lot. (F\_I\_5)

The introverts reported that they liked to maintain closeness and durable relationships that gave them security and dependability.

I like informality in relationships. True and inner nature is important for a good relationship. (M\_I\_3)

I enjoy solving problems that demand challenge and grey matter. (M\_I\_11)

The emotional expressions of the introverts were reported to be comparatively restricted and controlled.

I do not like laughing openly. I usually like to remain serious. (F\_I\_7)

I like to say jokes and laugh with my close friends and family members. (M\_I\_12)

I hesitate to laugh in front of strangers. (M\_I\_11)

I usually remain serious and sometimes get depressed as and when less familiar persons visit my home. (F\_I\_1)

The introverts reported that they logically assessed their part and did not care about others when they thought they were right. Thus, they showed lower social conformity.

I do not care much about other people and society if I am doing right in my views. (M\_I\_7)

I do enjoy things when I think they are logically correct and does not infringe on others rights.

(M\_I\_3)

On the other hand, the meaning inherent in the perceived happiness of the extraverts involved novelty, excitement, and immediacy (I find the greatest happiness in thinking of the realities that are novel, creative and enjoying. I do like to involve myself deeply in things that give me satisfaction, security and new ways of life problems). Thus, the happiness of extraverts comprised of interpersonal dependence, working relationship, high arousal, positive end, tangible life goals, interpersonal orientations, strong-adherence to the social norm, high cheerfulness, less emotional control and happy-go-lucky inclination.

I usually enjoy playing with my friends and even I like to let new persons join my play. (M\_E\_1)

I make friends for particular purposes and remain dependent on many for various purposes. (F\_E\_3)

I gossip with my friends. It gives me happiness and laughter. I read books on jokes. (M\_E\_9)

I become very sad when I have to watch a movie in which the hero gets dead at the end. (F\_E\_7)

I have many types of friends. Some are studious and good players while others are businessmen. (M\_E\_18)

I even do not enjoy a tasty food dish alone. I share the Tiffin with my friends. (F\_E\_9)

I do not want to disregard my friends. (M\_E\_6)

I usually laugh loudly after listening to jokes. (F\_E\_2)

I mostly cannot control my laughter. (M\_E\_13)

I do not put my things in order. It's all right. Others are there to care for me and my things. (M\_E\_4)

## Theme 2: Differences in the inclination towards happiness

Introverts and extraverts differ in their inclination towards happiness. Thus, permanency (I do regularly enjoy in a task that is well-defined and satisfying), meaningfulness (I am attracted towards useful and logical activities), and stable attributes (I enjoy doing things that are predictable

and logical) pervaded in the meaning of happiness of the introverts. Introverts were more orientated towards faithful relationships, logical aspect, long-term emotional aspects of an event, peacefulness, controlled, cold and engaging tasks with past and future orientations.

I am attracted to useful and logical activities. (F\_I\_3)

I enjoy doing things that are predictable and logical. (M\_I\_2)

I usually play games at my home with my neighbouring friends to get enjoyment and satisfaction for long as they are always available for me. (F\_I\_5)

I do regularly enjoy in a task that is well-defined and satisfying. (M\_I\_10)

I usually avoid watching games in the playground as there is very noise and audience often makes hooting and disruption. (M\_I\_4)

I do not play cricket as it consumes much time and energy. (M\_I\_7)

I usually think of the past and take a lesson from there for future goals. (F\_I\_4)

Contrarily, the extraverts showed more preference for short-lived (I enjoy to meet many people regularly even for a very brief period) and dynamic nature of happiness (I enjoy participating in multiple activities that are arousing, thrilling and involve interactions). The extraverts were directed more towards exciting, action-orientation, working relationships, arousal and excitability aspects, short-term emotional aspects of an event, less-controlled, over-engagement, and present-orientation.

I enjoy meeting many new people regularly. (M\_E\_2)

I enjoy participating in multiple activities that are arousing, thrilling and involve interactions. (F\_E\_1)

I do not much care about others for their inconvenience. (M\_E\_3)

I enjoy and like activities which are thrilling and action-oriented. (M\_E\_7)

I do not much involve myself in activities that give pain for long. (M\_E\_14)

I generally do not take it seriously of others' criticism. (M\_E\_16)

I frequently visit my friends' home because their parents care about me. (M\_E\_17)

I like to enjoy moments of life and get satisfaction in the activities that do not bore me. (F\_E\_8)

### Theme 3: Dissimilar loci of happiness

Introverts and extraverts exhibited dissimilar loci of their happiness. For example, the introverts emphasized internal sources (I do enjoy frequent imaginations, sometimes in day-dreaming) and achieved sources (I do not want to share things to new people and I also do not like to use others). The happiness of introverts lends the genesis of their happiness from self or close groups, solitary place, passive and inward stimulations.

I like to meet my close and reliable friends and relatives. (M\_I\_6)

I do not want to share things with new people and I do not like to use others also. (F\_I\_4)

I don't play with new persons and like to remain to lie on the bed in holidays. (M\_I\_8)

I do enjoy frequent imaginations, sometimes in day-dreaming. (F\_I\_6)

Conversely, external (I regularly take lunch of my friends. I regularly want to watch movies and enjoy happenings around me) and ascribed sources (My friends purchase books and other study materials which are also useful for me) find expressions in the happiness of the extraverts. Extraverts' happiness lies in the activities of larger groups, interpersonal, social and team interactions, open place, action and outward stimulations.

I regularly take the lunch of my friends. I regularly want to watch movies and enjoy happenings around me. (M\_E\_4)

My friends purchase books and other study materials which are also useful for me. (M\_E\_5)

I cannot remain aloof during my long holidays. (F\_E\_2)

I get pleasure in places where they are many people in a large space. (M\_E\_8)

I like to play or watch cricket or football as it provided me with the opportunities to remain engaged and active. (M\_E\_11)

I get pleasure in thinking people who love play and travel. (F\_E\_4)

#### **Theme 4: Differences in the temporal quality of happiness**

Introverts and extraverts differ significantly in their temporal quality of happiness. For example, the introverts reported happiness as significant when the sources of happiness are permanent and stable (My friendships are very limited as making many friends may result in interpersonal conflicts and negative competitions). The happiness of the introverts was of gradual nature and long-term.

I believe that regular efforts on any task give much pleasure and satisfaction. (M\_I\_6)

My friendships are very limited as making many friends may result in interpersonal conflicts and negative competitions. (F\_I\_8)

We have limited talks with others. I remain angry for long when something does not happen according to my wish. (M\_I\_8)

My lifestyle is well-organized. (M\_I\_12)

I have very fixed choices for my food. (F\_I\_2)

The extraverts reported short-lived and changing sources of happiness (I have many friends. Sometimes, we get involved in interpersonal quarrels and tease one another. We never stop talking. We settle the issues within a day or two). The happiness of extraverts was of fast and speedy, moving and immediate nature.

I have many friends. Sometimes, we get involved in interpersonal quarrels and tease one another. We never stop talking. (M\_E\_10)

We settle the issues within a day or two. (F\_E\_5)

I do not enjoy a disciplined lifestyle. It bores me. (M\_E\_12)

I enjoy taking food dishes that are very tasty and spicy. (F\_E\_6)

#### **Theme 5: Differences in the sources of happiness**

Introverts and extraverts differ in their sources of happiness. For example, the happiness of the introverts had its origin from individual activities (study, indoor games, reading, gardening, crafting, writing, watching movies), close relationships and rational incidents. The introverts reported that they get their happiness in individual activities (I enjoy chess or such games that involve a lesser number of well-familiar participants. I always want to win. I avoid conflicts).

I like games that involve a lesser number of players.

I always want to win. (M\_I\_1)

I avoid conflicts. (F\_I\_5)

I like to write poems. I enjoy emotional stories. (M\_I\_3)

I enjoy chess or such games that involve a lesser number of close and well-familiar participants as there is no chance of cheating. (M\_I\_10)

I do not enjoy things that are useless. I do invest my efforts for my career development. (F\_I\_2)

Conversely, the extraverts reported their happiness mostly occurring in interpersonal contexts (I do not enjoy watching a movie alone. I like to play games that involve teams. I do not take it seriously either to lose or win a game). The extraverts' happiness had its genesis from other people, outdoor activities, large groups, jokes and thrilling activities.

I do not enjoy watching a movie alone. (M\_E\_1)

I like to play games that involve teams. I do not take it seriously either to lose or win a game. (M\_E\_4)

I get most enjoyment and happiness in activities that provide me with an opportunity to meet new places and people. (F\_E\_3)

I have close relationships with all my classmates. (M\_E\_11)

I like jokes. I too frequently tell jokes to my friends. (F\_E\_9)

I like movies which involve action and thrill. (M\_E\_12)

A summary of the major descriptions of the meaning, conceptualizations, sources and mechanisms of the perceived happiness of the introverts and extraverts have been presented in Table 2.

**Table 2***Summary of the Perceived Happiness of the Introverts (n = 22) and the Extraverts (n = 27)*

Personality Dimensions	Major attributes of happiness	Conceptualizations of Happiness	Inclinations in Happiness	Loci of Happiness	Temporal Features of Happiness	Sources of Happiness
Introverts	Durability Permanency Calmness Meaningfulness	Self-sufficiency, systematic environment, rational end, quality, intrapersonal, logical acts, self-reflection actions, orderly, Emotion suppression, less-adherence to the social norm, less cheerful	faithful relationships, logical aspect, long-term emotional aspects of an event, peaceful, controlled, cold, less engagement, past and future orientation	Self or close groups, solitary place, passive, inward stimulation	Gradual nature, long-term,	Study, indoor games, close relationships, rational incidents, reading, gardening, crafting, writing, gaming, watching movies
Extraverts	Novelty Excitation	Interpersonal dependence, working, arousing, happy and go, positive end, quantity, interpersonal, emotional appraisal, strong-adherence to the social norm, high cheerful	Exciting, action-orientation, working relationships, arousal aspect, short-term emotional aspects of an event, excitability, less-controlled, warmth, over- engagement, present-orientation	Larger groups, interpersonal, social and team orientation, open place, action, outward stimulation	Fast and moving nature, immediate	Other people, outdoor activities, large groups, enjoy jokes, thrilling incidents,

### Discussion

The findings proved the contention that introverts and extraverts significantly differed in their meaning, nature, sources and mechanisms of happiness and their personality traits significantly shaped the nature of happiness. The introverts reported endurance, serenity, and sense to be important for happiness whereas newness, meaningfulness and propinquity were relevant in the meaning of happiness of the extraverts. These conceptualizations of happiness may be linked with the basic features of introverts and extraverts. For example, introverts are shy, imaginative, and tend to solitude whereas extraverts are talkative, sociable, and cheerful (Card & Skakoon-Sparling, 2023; Costa & McCrae, 1980; Costa & McCrae, 1998; Hills & Argyle, 2001; McCrae & Costa, 1987; Tohver, 2020). It has also been argued that these personality traits significantly shape the cognitive and affective structuring of people (Costa & McCrae, 1998; Hills & Argyle, 2001).

It was observed that introverts showed meaningfulness and endurance as important ingredients of happiness while extraverts reported transient and exciting attributes relevant for happiness. Introverts are more rational and imaginative and confined to smaller relationships as compared to the extraverts (Costa & McCrae, 1980; Hills & Argyle, 2001; Walker, 2020). This might be the possible reasons behind dissimilar inclinations towards happiness. The two groups also differed in the predisposition of their nature of happiness. The introverts reported happiness to be originating from within and accomplished things whereas extraverts referred to external and given sources for their happiness. Their different orientations to receive happiness and satisfaction may be argued to be originating from their different preference for arousability, liking, and neurological makeup (Abdullahi et al., 2020; Fishman et al., 2011; Walker, 2020). Most importantly, introverts showed their interest in personal sources of happiness

whereas extraverts recognized the importance of interpersonal sources for their happiness. In earlier studies, it has been argued that introverts and extraverts exhibit their sensitivity to different social stimulations and reward sensitivity (Ashton et al., 2002; Fishman et al., 2011; Tohver, 2020; Walker, 2020). The happiness of the two groups also reflected dissimilar temporal attributes. This may be due to their dissimilar emotionality and temperaments (Schmidt, 2016). The findings explicitly suggest that both introverts and extraverts experience happiness but their happiness is guided by dissimilar conceptualizations, sources, and mechanisms.

There is a lack of studies in this line of research. We could find only a single study that can be said to be a bit close to the arguments of the present study and support our findings to some extent. It was Hills and Argyle (2001) who argued that introverts and extraverts are similar in their preference for solitude, relations with friends and participating in reflective activities. Both introverts and extraverts experience happiness but they may differ in their meanings, sources, and mechanisms of happiness. It has been argued that the relationship of a particular personality trait with the happiness may be mediated by some social skills and interpersonal interaction styles, social conditions and environmental attributes, verbal and non-verbal cues of extraverts and introverts. Some cultural values associated with happiness may also be important (Kirkpatrick, 2015). For example, children in India who were social, active and less shy were happier. Besides, personality differences in happiness may be associated with social affiliation, partying and clubbing, mental control, instrumental goal pursuit, passive leisure, active leisure, religion, and direct attempts (Kirkpatrick, 2015).

The differences in happiness experiences of introverts and extraverts in previous studies may be due to their different conceptualizations of happiness that may lead to potential biases in traditional happiness measures. Previous research

suggests that extraverts often derive happiness from social interactions and external high-arousal activities, which are typically emphasized in standard traditional assessments of happiness (Card & Skakoon-Sparling, 2023; Smillie et al., 2015). In contrast, introverts may find contentment in solitary activities or low-stimulation activities and internal experiences as reading or deep reflection (Abdullahi et al., 2020; Cabello & Fernandez-Berrocal, 2015), which may not be adequately captured by standard happiness measures. These forms of happiness are less frequently captured by conventional measures, which may potentially underestimate happiness of introverts. Therefore, it is crucial to develop more inclusive measures beyond hedonic happiness that account for diverse sources of happiness across personality types. Future research should include alternative constructs as eudaimonic well-being and psychological richness to improve measurement validity (Oishi & Westgate, 2022). In short, the findings of the present study prove the contention that introverts and extraverts differ in their conceptualizations, processes, sources, and mechanisms of happiness not as reported by earlier studies which were exclusively based on the quantitative measurements of objective happiness through happiness questionnaires.

Small sample, use of only student sample and use of only qualitative method were some of the limitations of the study. These findings may be generalized with cautions as they are based on only a small student sample drawn from the Indian population. These findings provide initial clues to understand personality differences in happiness in a novel way. It requires further exploration of the relationship between personality and happiness in cross-cultural settings. The study may represent a unique contribution to the field of personality and happiness with significant theoretical and practical implications. The future researchers may consider age, gender, socio-cultural, and socialization differences while studying the relationship between personality and happiness.

Besides, conceptualizing personality in terms of a dynamic system that combines stable and dynamic aspects of personality, traits and states levels of analysis and regulatory mechanisms, dynamic interactions between the elements and temporal dimensions may be more insightful (Sosnowska et al., 2020). Future researchers may contribute to this field by understanding the dynamics of personality differences in other areas of human performance and functioning adopting qualitative or mixed methods. Practitioners may develop unique invention plans for enhancing positive life outcomes keeping the findings of this study in their minds. Future researchers may find these findings useful while planning to devise new measures of happiness.

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# Predictive Effects of Reasoning and Metalinguistic Skills for Reading Comprehension

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

**Background:** The aim of this study was to investigate the direct and indirect predictive effects of metalinguistic skills (metatextual, morphological, and phonological awareness) for reading comprehension, adding intelligence to prediction models (verbal/numerical reasoning), school year and age. **Method:** Participants were 222 Brazilian students from public schools (Elementary School). The instruments were applied in person in pencil and paper format. **Results:** The results indicated that reading comprehension was predicted directly by the three metalinguistic skills and indirectly by the metatextual (mediated by verbal reasoning) and phonological (mediated by numerical reasoning) awareness. Findings also showed the direct predictive contribution of most metalinguistic skills and school year to only one of the reading comprehension measures (Cloze 1). **Conclusions:** Further studies are suggested to deepen the investigation of the predictive relationships existing between metalinguistic skills, reading comprehension, intelligence, and aspects inherent to formal instruction and maturation in basic education.

*Keywords:* metatextual awareness, morphological awareness, phonological awareness, reading comprehension, formal instruction.

### **Efectos Predictivos del Razonamiento y las Habilidades Metalingüísticas en la Comprensión Lectora**

#### **Resumen**

**Antecedentes:** El objetivo de este estudio fue investigar los efectos predictivos directos e indirectos de las habilidades metalingüísticas (conciencia metatextual, morfológica y fonológica) en la comprensión lectora, añadiendo inteligencia a los modelos de predicción (razonamiento verbal/numérico), el año escolar y la edad. **Método:** Los participantes fueron 222 estudiantes brasileños de escuelas públicas (escuela primaria). Los instrumentos se aplicaron en persona en formato papel y lápiz. **Resultados:** Los resultados indicaron que la comprensión lectora se predecía directamente por las tres habilidades metalingüísticas e indirectamente por la conciencia metatextual (mediada por el razonamiento verbal) y fonológica (mediada por el razonamiento numérico). Los resultados también mostraron la contribución predictiva directa de la mayoría de las habilidades metalingüísticas y el año escolar a solo una de las medidas de comprensión lectora (Cloze 1). **Conclusiones:** Se sugieren más estudios para profundizar en la investigación de las relaciones predictivas existentes entre las habilidades metalingüísticas, la comprensión lectora, la inteligencia y los aspectos inherentes a la instrucción formal y la maduración en la educación básica.

*Palabras clave:* conciencia metatextual, conciencia morfológica, conciencia fonológica, comprensión lectora, instrucción formal.

Metalinguistic skills have been shown to be relevant in the school context due to their contribution to the literacy process and to the development of reading comprehension (Santos et al., 2018). They can be defined as the students' intentional reflection on their own language (Oliveira et al., 2020; Spinillo & Simões, 2003), and, are developed in daily life and in formal education (Santos et al., 2018). Metalinguistic skills are divided according to the focus used in language, so that the reflection and analysis of morphemes, phonemes, syntax, text and context are named, respectively, as morphological, phonological, syntactic, metatextual, and pragmatic awareness (Gombert, 1992). In the present study, the role of phonological, morphological and metatextual awareness in reading comprehension performance was emphasized.

Intentional reflection on the sounds that make up speech is beneficial for the development of reading comprehension in Portuguese (Korad & Lorandi, 2019). This intentional reflection is called phonological awareness (Freitas Junior & Mota, 2015). When reflecting on the sounds of speech, students would find it easier to make associations between sounds and letters and, with that, acquire alphabetic principles, which is an important skill in literacy (Mota & Santos, 2009). Empirical findings in elementary school show that students with reading comprehension proficiency are also those who score the most in phonological awareness, revealing that the two skills share characteristics in common (Mota & Santos, 2009; Suehiro & Santos, 2015).

Awareness of morphemes is also a relevant skill for reading comprehension (Coelho et al., 2024). Morphemes are the smallest meaningful linguistic units that make up words, and morphological awareness is the student's ability to consciously reflect on these units (Gombert, 1992). Developing morphological awareness in early literacy enables readers to understand complex words and improve reading comprehension (Liu et al., 2024). However, the contribution of morphological

awareness to reading comprehension sometimes appears in research with different results when morphemes are assuming an inflectional function (adapt words to the requirements of gender, number and degree) or derivational (word formation) (Freitas Junior & Mota, 2015; Guimarães & Mota, 2016). At other times, similar results are obtained in the two functions (Ferraz & Santos, 2019; Santos et al., 2018).

Another aspect to be highlighted is that the text can also be more easily understood if the student is aware of the textual genre (Cunha & Santos, 2019). The intentional reflection about the text and the elements that compose it is conceptualized as metatextual consciousness (Gombert, 1992). Among the ways to assess and develop this metalinguistic skill is the identification of textual genres (Cunha & Santos, 2014). Awareness of the textual genre, in which the text is inserted, helps in the reading comprehension process, considering that depending on the textual genre, the reader will deal with different classes of inferences (Spinillo & Simões, 2003). In research carried out by Cunha and Santos (2014; 2019) and Santos and Cunha (2012), evidence was identified that reading comprehension performance is associated with metatextual awareness.

Despite the contribution of metalinguistic skills to reading comprehension, it is important that other variables are considered in this relationship, as intelligence, age, and school year. In studies carried out by Lima and Santos (2017) and Trassi et al. (2019) the correlations between the constructs were evaluated, as well as the effects of verbal reasoning on reading comprehension. In the results of the studies by Lima and Santos (2017) and Trassi et al. (2019), a positive correlation of moderate magnitude was obtained between verbal reasoning and reading comprehension. The results obtained in the cited studies show that the higher the verbal coefficient, the greater the reading comprehension.

Investigations carried out by Freitas Júnior and Mota (2015), Guimarães and Mota (2016)

and Oliveira et al. (2020) the results were similar. Morphological awareness (derivational and inflectional) and phonological awareness in correlation analysis showed positive and significant correlations with reading comprehension. However, when performing regression analyzes and placing new variables in the models, morphological awareness failed to independently explain reading comprehension in the three studies. In the research of Freitas Junior and Mota (2015), the control variables were non-verbal intelligence and phonological awareness. However, in the studies by Guimarães and Mota (2016) and Oliveira et al. (2020) the age variable was added, along with phonological awareness and non-verbal intelligence.

Regarding the school year variable, in the study carried out by Oliveira and Justi (2017), the contribution of morphological and phonological awareness to reading comprehension was different in the school years. In regression analyses, having intelligence and age as control variables, morphological awareness independently contributed to reading comprehension only for 4<sup>th</sup> and 5<sup>th</sup> grade students. Regarding the contribution of phonological awareness, it was significantly associated with reading comprehension for students from 2<sup>nd</sup> to 5<sup>th</sup> grade. A similar result was found in the study by Coelho et al. (2024) with 2<sup>nd</sup> to 4<sup>th</sup> grade students with morphological awareness and significant differences in morphological awareness throughout schooling. In Liu et al. (2024) study, morphological awareness contributed to reading comprehension across a wide age range, from 6 years old to 16 years old.

These results reinforce the importance of stimulating metalinguistic skills in the literacy process, highlighting their strong association with formal instruction and the need to consider them when investigating these skills. This study brings relevant scientific and educational contributions since the inclusion of intelligence (verbal/numerical reasoning), school year, and age in the models allows for a more precise understanding of the factors that influence reading. In addition, it

provides evidence on which metalinguistic skills are most decisive for reading comprehension, helping to develop more effective teaching methods. By expanding knowledge about the mechanisms involved in learning to read, the research also contributes to theories on cognitive and linguistic development. By investigating the contribution of metalinguistic skills to reading comprehension, more effective pedagogical interventions can be developed, positively affecting the literacy process.

In view of the research findings presented, the present study aimed to investigate the associations between metalinguistic skills (phonological awareness, derivational and inflectional morphological awareness, and metatextual awareness) for performance in reading comprehension when controlling intelligence through verbal and numerical reasoning skills, as well as school year and age. The specific objectives are: (a) to analyze the direct and indirect predictive effects of the metalinguistic skills for reading comprehension, considering verbal and numerical reasoning; and (b) to investigate the interference of school year and age on the predictive effects of metalinguistic skills for reading comprehension. It is expected that the results will contribute to the understanding of metalinguistic and cognitive processes present in reading comprehension.

## Method

### Participants

The sample consisted of 222 Brazilian elementary school students from public schools in the countryside of Sao Paulo, with  $n = 79$  for 3<sup>rd</sup> grade,  $n = 57$  for 4<sup>th</sup> grade, and  $n = 86$  for 5<sup>th</sup> grade. The minimum age was eight, and the maximum age was 11 ( $M_{idade} = 9.53$ ;  $DP = 1.06$  years). In the distribution of students by sex, 113 girls and 109 boys participated in the survey.

### Instruments

*Cloze test* (Santos, 2005).

The Cloze Tests “The Princess and the Ghost” and “An Unhappy Revenge” have a total of 204 words, being of equivalent size and difficulty, elaborated by Cloze standards by fixed ratio, and chosen specially to assess reading comprehension in students from 2<sup>nd</sup> to 5<sup>th</sup> grade of elementary school. In each text, the fifth words are omitted, replaced by a dash the size of the omitted word. During the application, the student is asked to initially read the text in a low voice and then fill in the gaps with the appropriate word to make sense of the text. The correction is literal, so that only words identical to those omitted are considered correct. The possible score on each text is 15 points. About their psychometric properties, it was found in the study by Mota and Santos (2014), evidence of criterion validity for the two texts in elementary school. Also, Cunha and Santos (2009) identified evidence of validity by response process.

*Phonological Awareness Assessment Guide – RACF* (Santos, 1996)

The purpose of the RACF is to assess the identification of the initial, final and middle phonemes of words. The instrument consists of three sets of items, each with five items and two examples. E.g., of item with initial sound: *Copo* (glass): *cobra* (snake) – *sapo* (frog) – *lata* (tin). For each correct answer, the student receives one point and can reach up to 15 points. This test has evidence of criterion validity (Mota et al., 2014; Suehiro & Santos, 2011).

*Morphological Awareness Assessment Task – TCM* (Guimarães & Mota, 2016).

TCM has two sets of tasks, namely the derivational analogy (TCMd) and the inflectional analogy (TCMf). The TCMd has 17 items, and in each of them, the student is instructed to form a morphologically complex word from a target word (e.g.: *banana-bananada* [banana – banana candy]; *goiaba* – \_\_\_\_\_? [*guava jam*]). The TCMf has 19 items referring to verb agreement, number inflection, and gender inflection (e.g. *anda* (walk) – *andou* (walked); *olha* (look) – \_\_\_\_\_? [*olhou*; looked]). The total score is the sum of correct

answers for each of the tasks: TCMd, maximum of 17 points; and TCMf, maximum 19 points. Both tasks presented reliability estimates in the study by Ferraz and Santos (2019), TCMd,  $\alpha = .77$ ; TCMf,  $\alpha = .86$ .

*Metatextual Awareness Assessment Questionnaire – QACM* (Santos & Cunha, 2012).

The instrument was built to assess the levels of metatextual awareness of elementary school students. It is composed of fifteen excerpts of different textual genres in which the student must mark one of the four available options indicating the corresponding genre. For each correct answer the student receives a point. The instrument has a maximum score of 15 points. About its psychometric properties, the QACM obtained an estimate of reliability, with an alpha value of .80, considered satisfactory. The QACM also presents evidence of validity based on the relationship with other variables, verified by Cunha and Santos (2014).

*Battery for evaluating high abilities/giftedness: Verbal and numerical reasoning tests* (Nakano & Primi, 2012).

Verbal Reasoning Test (PRV): Having in its composition 12 questions, the test presents sentences with four related words, one of which is omitted. The student must fill in the gap with the missing word, considering the relationship between the first two words. The specific ability assessed in this test is vocabulary extension and the ability to establish abstract relationships between verbal concepts. For each correct answer, the student receives 1 point, and the maximum score in the test is 12 points.

Numerical Reasoning Test (PRN): Composed of 12 questions, presented in different numerical sequences. The student must fill in the missing numbers taking into account the order presented above. The specific ability evaluated in this test is to reason inductively and deductively about mathematical symbols in quantitative problems, as well as knowledge of basic arithmetic operations. For each correct answer, the student receives 1 point. The maximum score in the test is 12 points. Verbal

reasoning and numerical reasoning tests present precision estimates ( $\alpha = .78$ ).

Initially, the psychometric properties of the measuring instruments were investigated using the sample from the current study. All presented evidence of validity based on internal structure and reliability estimates. This statement is supported by the results of the confirmatory factor analysis and the composite reliability shown in Table 1.

### Data Collection Procedure

First, the research was submitted and approved by the Ethics Committee of São Francisco University (Brazil) (Approval nº 1.245.116). At the beginning of the collection, the schools that accepted the invitation to participate received the Free and Informed Commitment Term for signing. After students were authorized to participate, data collection began. The assessment measures were administered in printed format. The Cloze Test, QACM, and the Verbal and Numerical Reasoning

**Table 1**

**Internal Structure** Indexes and Composite Reliability of Instruments

Instrument	$\chi^2/gl$	RMSEA (IC 90%)	CFI	TLI	cc
Cloze 1	3.24	.10 (.09 – .11)	.77	.73	.90
Cloze 2	1.22	.03 (.01 – .05)	.95	.95	.84
RACF	1.34	.04 (.02 – .06)	.70	.65	.64
TCMd	1.27	.03 (.01 – .05)	.97	.96	.87
TCMf	1.44	.04 (.03 – .06)	.87	.87	.87
QACM	1.27	.03 (.01 – .05)	.94	.92	.86
PRV	1.26	.03 (.01 – .06)	.84	.81	.59
PRN	1.92	.06 (.05 – .08)	.97	.97	.96

Tests were applied collectively with an average duration of 40 minutes. RACF and TCM were applied individually, with an average duration of 15 minutes. The data collection was conducted in 2017 and lasted for one month. It was carried out by two graduate students and two students from the Scientific Initiation program.

### Data Analysis Procedure

Analyzes were performed using the *Statistical Package for Social Sciences software* (SPSS; V. 22.0), MPlus (version 8.8; Muthén & Muthén, 2017) and the composite reliability calculator (*cc*) *online* (available at [http://www.thestatisticalmind.com/calculators/comprel/composite\\_reliability.htm](http://www.thestatisticalmind.com/calculators/comprel/composite_reliability.htm)).

Firstly, we analyzed the psychometric quality of the assessment measures used in the research. To verify the evidence of validity based on the internal structure, we applied the confirmatory factor analysis (CFA). These were the fit indices of the models generated by the CFA: Ratio of  $\chi^2$

divided by degrees of freedom ( $gl$ )  $< .05$ ; Root Mean Square Error of Approximation (RMSEA)  $< .10$ , Confirmatory Fit Index (CFI) e Tucker-Lewis Index (TLI)  $\geq .90$  (Marôco, 2014). The reliability estimates of the instruments were analyzed using composite reliability (*cc*), with a value equal to or greater than  $.70$  being considered adequate (Dunn et al., 2014).

Next, descriptive statistics were used to characterize the sample and determine the minimum, maximum, mean, and standard deviation scores of the instruments. The average score variation was obtained by percentage values, considering the total number of items in each test.

Relationships between reasoning, metalinguistic, and reading comprehension skills were examined using Pearson's bivariate product-moment correlation analysis. Partial correlations were applied to control the variables verbal and numerical reasoning, school year and age. The interpretation of the magnitudes of the correlation

coefficients was based on these cut-off points:  $r$  between .1 to .39, weak magnitude;  $r$  between .40 to .69, moderate magnitude;  $r$  between .70 to .99, strong magnitude (Dancey & Reidy, 2013).

To investigated objective “a” of this study, we applied test the regression models with direct and indirect effects through the *path analyzes* technique, with *Robust Maximum Likelihood estimator* (MLR; Hu & Bentler, 1999). The following presents the structure of the tested models (restricted and saturated), and the parameters for interpreting their fit. Composition of the saturated model containing verbal and numerical reasoning: direct regression effects - Cloze 1 and Cloze 2 (dependent variables [VDs]), RACF, TCMd, TCMf, QACM, PRN, and PRV (independent variables [VIs]); PRN and PRV (VDs), RACF, TCMd, TCMf, and QACM (VIs); indirect regression effects - Cloze 1 and Cloze 2 (VDs), RACF, TCMd, TCMf, and QACM (VIs To compose the restricted model, the VIs of the saturated model were excluded, whose standardized regression coefficients ( $\beta$ ) showed  $p > .05$  for the respective VDs. The plausibility of both models was assessed by the value of  $p > .05$  of  $\chi^2$  and the same fit index values referenced in the AFC (Marôco, 2014).

To investigated objective “a” of this study, we used multiple linear regression analysis (enter method) to assess the regression effects of VIs metalinguistic skills, school year, and age on reading comprehension. Structuring of the two models, one with VD Cloze 1 and the other with VD Cloze

2: VIs block 1, RACF, TCMd, TCMf, QACM; VI block 2, school year; VI block 3, age. The value of  $R^2$  was considered for the explained variance of the final model and the  $\Delta R^2$  for the variables of each block of the model. The Durbin-Watson residual statistics were applied to evaluate the autocorrelation of the residues of each tested model, with acceptable values between 1.5 e 2.5 (Field, 2013).

**Results**

To assess the students’ performance in each of the linguistic and metalinguistic skills evaluated in the research, Table 2 presents the results. The sample of students demonstrated lower reading comprehension skills in the Cloze 2 text. The text “An Unhappy Revenge” emphasizes action and consequence, requiring verbs and terms that structure the progression of events. In contrast, the text “The Princess and the Ghost” (Cloze 1) focuses on referential cohesion, requiring the retrieval of pronouns and connectors that provide fluidity to the narrative.

The students had mean scores above the midpoint of the instruments that assessed phonological awareness (RACF), morphological awareness (inflectional - TCMf and derivational - TCMd), and metatextual awareness (QACM). The opposite was observed for verbal and numerical reasoning skills, whose mean scores were below the midpoint of the instruments (PRV and PRN). Students’ performance in numerical reasoning was lower compared to verbal reasoning.

**Table 2**  
*Instrument Descriptive Statistics*

	Min.	Max.	M	DP
Cloze 1	0	14	8.84	2.94
Cloze 2	0	13	6.34	2.06
RACF	5	5	9.59	2.16
TCMd	3	25	10.46	3.60
TCMf	2	18	11.60	3.46
QACM	0	15	9.78	2.93
PRV	0	10	4.50	1.81
PRN	0	11	3.70	2.53

Legend. Min. = Minimum; Max. = Maximum; *M* = average; *DP* = standard deviation; Cloze 1 and Cloze 2 = reading comprehension measures; RACF = phonological awareness measure; TCMd = derivational morphological awareness measure; TCMf = inflectional morphological awareness measures; QACM = metatextual awareness measure; PRV = verbal reasoning measure; PRN = numerical reasoning measure.

In line with the objectives of this study, Table 3 shows the incidence of statistically significant, positive, and weak bivariate correlations between reading comprehension (Cloze texts 1 and 2) and phonological awareness, as well as moderate

correlations between reading comprehension and derivational, inflectional, and metatextual awareness. The results of the bivariate correlations indicate that even when controlling for verbal and numerical reasoning, as well as school grade and age, the correlations between reading comprehension and linguistic skills remain statistically significant, with a reduction in coefficient values but maintaining their magnitude. The lowest correlation values were observed between reading comprehension and phonological awareness, while the highest were found between reading comprehension and metatextual awareness.

**Table 3**

**Bivariate and Partial Correlations between Reading Comprehension and Language Skills and Verbal and Numerical Reasoning (N = 222)**

	Bivariate correlation			
	RACF	TCMd	TCMf	QACM
Cloze 1	.40***	.54***	.58***	.63***
Cloze 2	.39***	.53***	.50***	.65***
Partial correlation – verbal and numerical reasoning control				
	RACF	TCMd	TCMf	QACM
Cloze 1	.20**	.41***	.42***	.50***
Cloze 2	.21**	.41***	.31***	.51***
Partial correlation – school year and age control				
	RACF	TCMd	TCMf	QACM
Cloze 1	.23***	.42***	.50***	.50***
Cloze 2	.26***	.43***	.42***	.55***

Legend. Cloze 1 and Cloze 2 = reading comprehension measures; RACF = phonological awareness measure; TCMd = derivational morphological awareness measure; TCMf = inflectional morphological awareness measure; QACM = metatextual awareness measure.

Note. Statistically significant correlations \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Continuing the investigation of the first objective of this study, the predictive effect of metalinguistic skills and verbal and numerical reasoning on reading comprehension was analyzed. The saturated model 1 proved to be plausible, with values of  $\chi^2 = 1.870$ ,  $gl = 1$ ,  $p < .17$  and adjustment indices RMSEA = .06 (IC .01 – .20), CFI = 1, TLI = .94. To compose the restricted model, the independent variables were excluded (VIs) with  $p > .05$ , namely, phonological awareness, inflectional morphological awareness and numerical

reasoning, with the dependent variable (VD) the Cloze test 1; the VIs inflectional morphological awareness and verbal reasoning were excluded from the VD Cloze test 2; derivational and inflectional morphological awareness of VD verbal reasoning; phonological awareness, derivational and inflectional morphological awareness of VD numerical reasoning.

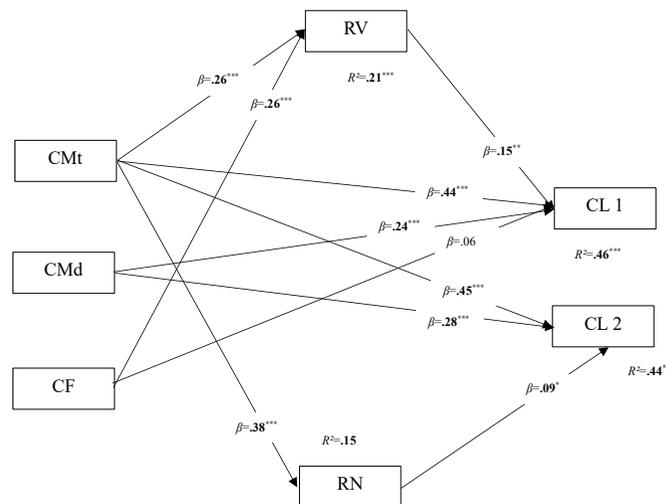
The restricted model presented a  $\chi^2$  value and adequate adjustment indices, which guarantees the plausibility of the tested structure:  $\chi^2 = 11.024$ ,

$g^l = 7, p < .14$  and RMSEA adjustment indices = .05 (IC .01 – .11), CFI = .99, TLI = .97. As shown in Figure 1.46% of the reading comprehension variance in the Cloze test 1 (CL1) is explained by metatextual awareness, derivational morphological awareness and verbal reasoning. A one-point increase in metatextual awareness predicts a .42-point increase in reading comprehension. Good performance in derivational morphological awareness represented a .24-point increase in reading comprehension and a .15-point increase in verbal reasoning ability. Phonological awareness did not directly predict reading comprehension but had an indirect predictive effect considering verbal reasoning for the CL1:  $\beta = .04, p = .02$  (standard error = .02). Metatextual awareness indirectly predicted reading comprehension with verbal reasoning:  $\beta = .04, p = .01$  (standard error = .02). Phonological awareness and metatextual awareness explained 21% of verbal reasoning variance. A one-point increase in metatextual awareness

increased verbal reasoning by .29 points, and phonological awareness predicted an increase in this skill by .26 points.

Still in Figure 1, reading comprehension assessed by the Cloze test 2 (CL2) had 44% of its variance explained by derivational morphological awareness, metatextual awareness, and numerical reasoning. These skills directly predicted reading comprehension. The domain of metatextual awareness assumed an increase in reading comprehension by .45 points, in derivational morphological awareness by .28 points and in numerical reasoning by .09 points. The indirect prediction path of metatextual awareness and numerical reasoning was not statistically significant ( $\beta = .03, p = .08$ , standard error = .02). Metatextual awareness accounted for 15% of the explained variance of numerical reasoning, and the development of this metalinguistic ability presupposed an increase of .38 points in this measure of intelligence.

**Figure 1.** Direct and Indirect Predictive Effects of Metalinguistic Skills for Reading Comprehension with Verbal and Numerical Reasoning Control Variables.



β = .06

*Legend.* CL1 and CL2 = reading comprehension; CF = phonological awareness; CMd = derivational morphological awareness; CMt = metatextual awareness; β = standardized regression coefficient.

*Note.* Statistically significant indices in bold \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

To meet the second objective of this research, the predictive effects of the three metalinguistic skills (phonological awareness, morphological awareness, and metatextual awareness) and the

variables of school year and age for reading comprehension were investigated. Table 4 reports the indices derived from this analysis.

**Table 4**

*Metalinguistic Skills, School Year and Age as Predictors of Reading Comprehension*

VD: Reading Comprehension (Cloze test 1)		
VIs Predictors	$\beta$	<i>t</i>
(Constant)	-	.275
Metatextual Awareness	.34***	5.294
Phonological Awareness	.06	1.021
Inflectional Morphological Awareness	.24***	3.777
Derivational Morphological Awareness	.15*	2.359
School Year	.20*	2.089
Age	-.07	-.847
VD: Reading Comprehension (Cloze test 2)		
VIs Predictors	$\beta$	<i>t</i>
(Constant)	-	-1.786
Metatextual Awareness	.43***	6.551
Phonological Awareness	.08	1.463
Inflectional Morphological Awareness	.09	1.371
Derivational Morphological Awareness	.22***	3.359
School Year	.06	.637
Age	.01	.095

Legend. VD = Dependent Variable; VIs = Independent Variables;  $\beta$  = Standardized regression coefficient.

Note. Values in bold indicate  $\beta$  statistically significant \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

Metatextual awareness, derivational and inflectional morphological awareness, and school year represented approximately 51% of the explained variance of reading comprehension assessed by the Cloze test 1 ( $F [6, 208] = 38.169$ ;  $p < .001$ ), Durbin-Watson test = 1.98. Among the metalinguistic skills, the increase in metatextual awareness contributes .34 points in reading comprehension. In inflectional morphological awareness, this contribution was .24 points and in derivational morphological awareness .15 points. The contribution of metalinguistic skills to the explained variance of reading comprehension was 50%, according to  $\Delta pR^2$ . The advance of the school years in elementary school (3<sup>rd</sup> to 5<sup>th</sup> grade) reflected in an improvement in reading comprehension of .20 points, however, it represented only 1% of the explained variance of the performance

of this linguistic cognitive skill. Phonological awareness and age did not show an explanatory contribution to Cloze test 1, also considering their  $\beta$  with  $p > .05$ .

Reading comprehension assessed by the Cloze 2 test had 48% of its explained variance by metatextual awareness and derivational morphological awareness ( $F [6, 209] = 34.009$ ;  $p < .001$ ), Durbin-Watson test = 1.82. In the model tested, the development of metatextual awareness impacted reading comprehension skills by .43 points and derivational morphological awareness by .22 points. The metalinguistic skills phonological awareness and inflectional morphological awareness and the variables school year and age did not add explained variance to reading comprehension in the Cloze 2 test, as well as their  $\beta$  were not statistically significant.

### Discussion

Initially, about the scores obtained by the students in the researched sample, it was verified that they showed greater difficulty in the tests of verbal and numerical reasoning and in reading comprehension, so that they did not reach 50% in the average score in the instruments that evaluated these skills. It would be expected that there would be an appropriation of reading comprehension beyond the initial process of decoding, as this allows for greater depth and criticality in the content read, greatly contributing to the development of school subjects, given that reading with effective understanding of the content precedes all of them (Santos et al., 2018).

The results of the correlations between the investigated skills converge with the literature (Cunha & Santos, 2019; Mota et al., 2014; Santos et al., 2018) and fulfill the prerequisite for the application of regression analyses provided for care of the objectives of this research (Dancey & Reidy, 2013). Studies indicate the contribution of metalinguistic skills throughout the literacy process and for the development of reading comprehension (Santos et al., 2018). Controlling intelligence measures as verbal and numerical reasoning and learning context variables as school year and age, showed changes in partial correlation coefficients involving metalinguistic skills and reading comprehension. To some extent, this result is in line with the findings of Freitas Junior and Mota (2015), Guimarães and Mota (2016), and Oliveira et al., (2020). In these, the inclusion of new variables, as intelligence, age and school year, meant that morphological awareness no longer independently explained reading comprehension. In the research in question, the correlations of moderate magnitude between reading comprehension with phonological awareness and inflectional morphological awareness became weak magnitude after controlling for verbal and numerical reasoning measures. The same occurred after controlling for school year and age in the partial correlations, so that the correlation of moderate magnitude

between reading comprehension and phonological awareness became of weak magnitude, which did not occur in the other partial correlations. This result is an indication of the need to consider age and school year when proposing to investigate the relationships between reading comprehension and metalinguistic skills, since they can also be configured as strange or even confounding variables (Dancey & Reidy, 2013).

In the investigation of the direct and indirect predictive effects of metalinguistic skills for reading comprehension, also considering measures of verbal and numerical reasoning, which is the main objective of this research, the contribution of metatextual awareness, derivational morphological awareness, and verbal reasoning was initially verified for reading comprehension with the Cloze test 1, explaining 46% of the variance. When performing the Cloze Test 2 analyses, the explained variance of metatextual awareness, derivational morphological awareness, and verbal reasoning was 44%. The result in question brings important reinforcements to scientific literature, given that the contribution of these variables is more often presented individually (see Coelho et al., 2024; Cunha & Santos, 2019; Ferraz & Santos, 2019; Liu et al., 2024).

Furthermore, it was possible to observe the indirect predictive effect of phonological awareness considering verbal reasoning in reading comprehension. Something similar occurred with metatextual awareness, having an indirect predictive effect on reading comprehension, considering verbal reasoning. Phonological awareness and metatextual awareness explained 21% of verbal reasoning variance. The findings demonstrate the interference of vocabulary extension, and the ability to establish abstract relationships between verbal concepts in the mediation of phonological and metatextual awareness variables for reading comprehension. Verbal reasoning is an important resource at the time of reading, as it facilitates access to previously stored content, which will help in understanding the text, as well as in solving

problems related to the processing of verbal information with the use of prior knowledge (Lima & Santos, 2017; Trassi et al., 2019). In this way, it is hypothesized that verbal reasoning mediates between phonological and metatextual awareness for reading comprehension, by facilitating not only access to knowledge derived from these skills, but also, in the acquisition of proficiency in manipulating them appropriately, contributing to the understanding of the text.

Regarding the interference of age and school year in the predictive effects of metalinguistic skills on reading comprehension, only the school year variable significantly contributed to the explained variance of metalinguistic skills for reading comprehension. In the Cloze test 1, metalinguistic skills (metatextual awareness, inflectional and derivational morphological awareness) explained 50% of the variance in reading comprehension, and with the addition of the school year, the explained variance increased to 51%. This result points to the importance of developing metalinguistic skills during schooling, through formal instruction (Oliveira & Justi, 2017; Santos et al., 2018; Mota et al., 2013). Considering the absence of a statistically significant interference of the age variable, and the results obtained with the school year and with metalinguistic skills, the inclusion of activities that stimulate them in school curriculum may have important implications in the development of reading comprehension in students from elementary school.

Metalinguistic skills have been widely recognized as essential factors for reading comprehension, as they involve the ability to reflect on language, manipulate it consciously and understand its underlying structures. Recent research indicates that skills as phonological, morphological, and syntactic awareness play a fundamental role in decoding and textual interpretation, especially in transparent and opaque languages. Furthermore, reasoning has been identified as a predictive factor of reading comprehension, contributing to the inference and integration of information

at the discourse level. Contemporary studies indicate that the relationship between reasoning, metalinguistic skills and reading is not linear, but mediated by factors as vocabulary, working memory, and reading experience. However, gaps in literature still persist, especially regarding the interaction between these components in different age groups and linguistic contexts. Therefore, understanding how these variables relate can contribute to the development of more effective educational interventions, aimed at improving reading comprehension in populations with learning difficulties and strengthening the teaching of reading in different educational contexts (Coelho et al, 2024; Liu et al., 2024).

Still on this topic, another point that should be considered is the presence of out-of-age students in the classes of the school years investigated here. This is a limitation of the research, as this data was not collected. For future research, it is pointed out the need to consider this aspect, reiterating the deepening of investigations on the role of age and school year as variables that alone contribute to the development of linguistic and metalinguistic skills or if they are characterized as strange variables (Dancey & Reidy, 2013).

In view of the conjectures presented in this study, it is necessary to mention some limitations that result in recommendations for proposing future research involving this theme. The use of only one measure to assess each of the metalinguistic skills stands out. Therefore, it is suggested to add other measures that have stimuli different from those presented in the instruments applied in this research to expand the evaluation of these skills. About the sample, it is important to consider the inclusion of students from private schools and from other Brazilian states, allowing comparisons to be made between students from different educational institutions and Brazilian regions. This indication aims to expand the investigation of aspects related to formal education, inherent to the knowledge acquired with the progression of the school years, in particular the level of mastery

of metalinguistic skills and verbal and numerical reasoning, considering their consequences in reading comprehension. In this perspective, it will also be possible to verify if the results obtained with the models tested here are sustained in contexts in which students will present better performance in the skills identified as falling short of expectations in this study (e.g. verbal and numerical reasoning and reading comprehension [Cloze 2]). Moreover, it is expected that there will be progression of essential learning throughout Basic Education and that the student, over the school years, will acquire proficiency in the ability to understand the content read. However, the result shown in the descriptive statistics involving intelligence measures should be viewed with caution, as elementary school students are in the process of developing through literacy and are still learning disciplines that require, among other skills, verbal reasoning and numerical.

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# Quality of Life and Covid-19 Pandemic Among Brazilian Older Gay Men: An Analysis of Psychosocial Aspects

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### **Abstract**

This study aims to understand the social representations on the quality of life and the COVID-19 pandemic among Brazilian older gay men. The research has the participation of 21 Brazilian men, at an average age of 64 years old. Two instruments were used to the research: a sociodemographic questionnaire and a structured interview; those were analyzed through the software SPSS and IRAMUTEQ, respectively. A total of 4 classes of words were collected: Older Gay: Double Difficulty; COVID-19: Necessary Care; COVID-19: Implications of the Pandemic; Quality of Life: Definition and Reality in the Old Age. The SR showed a positive view and adherence to the protective measures against COVID-19, and the impacts of the pandemic in the lives of the participants and their quality of life, concerning the measures of social distancing. The participants also demonstrated the perception that the old age becomes a more difficult phase among gay men. The group present a positive understanding of their own quality of life.

*Keywords:* old age, gay, quality of life, COVID-19.

### **Calidad de Vida y Pandemia COVID-19 entre Hombres Mayores Homosexuales Brasileños: Un Análisis de los Aspectos Psicosociales**

#### **Resumen**

Este estudio tiene como objetivo comprender las representaciones sociales sobre la calidad de vida y la pandemia de COVID-19 entre los hombres mayores homosexuales brasileños. En la investigación participaron 21 hombres brasileños, con una edad media de 64 años. Se utilizaron dos instrumentos para la investigación: un cuestionario sociodemográfico y una entrevista estructurada, que se analizaron mediante los programas informáticos SPSS e IRAMUTEQ, respectivamente. Se recopilaron un total de cuatro clases de palabras: «Homosexuales mayores: doble dificultad»; «COVID-19: cuidados necesarios»; «COVID-19: implicaciones de la pandemia»; «Calidad de vida: definición y realidad en la vejez». La RS mostró una visión positiva y la adhesión a las medidas de protección contra la COVID-19, así como los impactos de la pandemia en la vida de los participantes y su calidad de vida, en relación con las medidas de distanciamiento social. Los participantes también demostraron la percepción de que la vejez se convierte en una etapa más difícil entre los hombres gays. El grupo presenta una comprensión positiva de su propia calidad de vida.

*Palabras clave:* vejez, gay, calidad de vida, COVID-19.

## Introduction

The old age is typically defined at around 60 years in less developed countries and 65 years in developed ones (Fonseca et al., 2020). The older people, individuals who are part of that age group, constitute the group that expands the most. Thereby, we have fewer children and more older people, which causes the modification of the age pyramid, at national and international level. This fact is connected to lower birth and death rates, as well as advances in political, social, and health care assistance areas (Borba Filho, 2022; Castellanos et al., 2022; Coutinho & Tomasi, 2020).

This way, according to the Brazilian Inter-Union Department of Statistics and Socio-Economic Studies (DIESE, 2021), the number of older people in Brazil is close to 38 million, which corresponds to around 18% of the country's total population. This amount may increase in the next decades and until 2070 correspond to circa 35% of the total, according to the Brazilian Institute for Geography and Statistics (IBGE, 2016). However, all that population dynamics reverberates in modifications at different social levels, evidencing that aging is an important issue to be discussed and studied in academic and scientific fields (Silva & Araújo, 2020). Moreover, the aging occurs in different ways among different populations, being affected by contextual differences on all the life cycle (Araújo et al., 2018).

Thus, biological, social, and psychological factors along the whole life are implicated in the process of human aging. Because of that, this phenomenon occurs in a heterogeneous and unique way to each subject, as Gomes et al., 2020 point out. Nevertheless, for a long time was aging seen solely thorough a biologizing bias; which focused on the physical losses and declines. This factor caused the maintenance of prejudice and discrimination related to the age, situation called ageism nowadays (Burnes et al., 2019; Nogueira & Boris, 2019). One of the most common stigmas in the old age is the idea of asexuality, i.e., the comprehension that elder people do not keep

an active sexuality (Fernandes-Eloi et al., 2020). That is a wrong perception, once that sexuality lasts all life, going beyond the intercourse, and being an indicator of higher levels of Quality of Life (QoL) (Jesus et al., 2019; Silva & Araújo, 2020). Sexuality in old age can be considered a complex phenomenon of a bio-psycho-socio-cultural nature, related not only to sexual activity but also to affective and romantic relationships (Araújo et al., 2023). Prejudice surrounding this contributes to the erasure of the subject and the feeling of shame in talking about sex (Fernandes-Eloi et al., 2020).

The stigma of the asexual old age corroborates even more to the social invisibility and erasure of beings who do not fit the heteronormative standard, i.e., the older LGBT people (lesbians, gays, bisexuals, cross-dressers, and transsexuals). Those individuals, during their life, are crossed by a double stigma. The first one is related to their age; the second, refers to their sexuality or gender identity. Those factors are related to the levels of QoL, welfare, and mental and physical health of that population (Fernandes-Eloi et al., 2020; Santos et al., 2018; Santos et al., 2020).

It is worth mentioning that only recently have scientific studies started to understand the specificities of older LGBT people; the interest in that issue has increased in the last years (Araújo, 2022; Henning, 2017). In that regard, those individuals have difficulties to access public and private health services, worsening the the state of physical and mental health of this population. Furthermore, they are the subjects most affected by mental disorders as anxiety and depression, and present higher rates of suicidal ideation, especially the trans people (Alves & Araújo, 2020; Kabir & Brinsworth, 2021; Slatch et al., 2018). In addition, the discrimination of older LGBT people happens even in the community itself, as the case of gay men. (Souza et. al., 2020).

In the gay community there is a physical standard, often impossible to have in the old age; that corroborates to the perpetuation of the internalized prejudice (Leal & Mendes, 2017). Research

points out that the internalized violence is related to body dissatisfaction, shame, depression, and eating disorders (Thepsourinthone et al., 2020). However, elder gay men cherish being in gay environments, considering the importance of friendship to keeping their mental and social health among those subjects. Due to homophobia, most of them live alone, with a restricted supporting network, which rarely includes their biological family (Oswald & Roulston, 2020).

On a recent study, Santos and Araújo (2020) highlight the relation among the aging of gay men, their sexual orientation, and homophobia. The authors show that there is a lower number of gay men in the old age, as a result of violent deaths because of the prejudice and suicide. Besides that, the authors also point out the development of risky sexual behaviors as precipitating causes of the invisibility of those subjects.

In this sense, the homoaffective old age is an invisible topic, and its discussion becomes sensitive; that fact can be related to the social-historic processes through which the topic crosses. It should be noted the inclusion of homosexuality as a pathology in the diagnostic manuals, or also the oppressive situation experienced in the context of the military dictatorship in Brazil (Gomes et al., 2020). Remains of a culture of fear are evidenced; they still have been lingering in the current cohort, even though some advances can be noticed in relation to the homosexual people rights.

This way, it can be noticed that older gay people do not age in the same way as heterosexual and cisgender people do. Although older heterosexual people face barriers, those difficulties are attenuated among individuals who are not part of minority groups (Alves & Araújo, 2020; Gomes et al., 2020; Oswald & Roulston, 2020). In the meantime, it is necessary to adopt an intersectional perspective in the production and in the investigation of this study, as previously pointed out by Araújo (2022). The intersectionality theories start from the understanding that the different factors related to the maintenance of power and

oppression structures are intertwined. Thus, the factors often add to each other, as older gay, which can be inserted in other socially vulnerable groups (Buchanan & Wiklund, 2021).

The intersectional discussion on that topic becomes even more pertinent considering the current context of the pandemic, caused by COVID-19. The abrupt changes caused by the pandemic affect the older population directly, especially because it presents more risks for aggravating psychoaffective and psychosocial demands (Castro et al., 2020). Among the various harms caused by the COVID-19 pandemic in the older population, the exacerbation of negative emotions, as loneliness, insomnia, anxiety, and depression, stand out. The restriction of social interactions, imposed as a preventive measure, is closely linked to these effects (Moraes et al., 2020; Silva et al., 2021). Additionally, the widespread notion that only older adults were vulnerable to severe outcomes from the virus contributed to heightened, as they were classified as a high-risk group (Hammerschmidt & Santana, et al., 2020).

Moreover, the older people, mainly the ones who are part of social minority groups, are subjected to a policy of death. Thereby sometimes older people are seen as being insignificant and possible to be sacrificed, even from the perspective of the State (Henning, 2020; Swift & Chasteen, 2021). COVID-19 is an infectious disease, caused by the new coronavirus, SARS-Cov-2, the virus responsible for the pandemic officially announced by the World Health Organization (WHO) in March of 2020 (Nandasena et al., 2022). Nowadays, the world witnesses the reduction of death rates and infections, mainly due to the vaccines against COVID-19. However, it is important to evaluate the impacts of the pandemic, in the medium and in the long terms, indicating higher rates of psychiatric sickening and reduction of the welfare and of the QoL (Bourmistrova et al., 2022; Hansel et al., 2022).

The concept of the QoL is associated with the physical and mental health state, as well as the

independence level and the social relationships of each individual. Other aspects related to QoL are economic factors and life style, as the consumption of alcohol and other drugs, diet, and practice of physical activities (Ferreira et al., 2018). The older people's QoL is characterized as a core factor for intervention, once that it embraces aspects like the relation with themselves, with their context, and with the society (Castro et al., 2021).

In that aspect, the theory of the Social Representations (SRT) is pertinent to understand QoL and COVID-19 pandemic. The SRT is based on the knowledge shared in the common sense, in a process of individual-collective communication to make known something new, and to interpret the social reality (Jodelet, 2018; Moscovici, 2007). Likewise, the SR are divided in different approaches. Procedural approach: based on qualitative processes; and structural approach: which seeks to identify the structure of the SR (González et al., 2018). Moreover, SR are constituted from two basic processes. The first is the primary process in which newly arrived knowledge is linked to previous elements, endowed with values. Secondly, objectification occurs, a process in which the representation is concretized and externalized, becoming part of reality (Phillips & Cassidy, 2023).

This way, this pioneering study's scope is identifying and understanding the comprehension that Brazilian older gay men have of the COVID-19 pandemic and QoL. To this end, it is based from an intersectional view, based on the theory of social representations. So as to contribute to the development of news studies from an intersectional perspective, as well as the visibility of these individuals in the field of public policies.

## Method

### Investigation type

This is a qualitative, exploratory, descriptive study, with transversal data. The sampling is non-probabilistic by convenience, once the participants agreed to participate voluntarily.

### Participants

A total of 21 older Brazilian gay men participated of the study. The sample size was based on a study carried out by Santos and Araújo (2021) on the SR among older gay men, which used a similar data analysis. See table 1 in results for more details. It should be noted that the results obtained are specific to sample and the context of this study and, therefore, cannot be generalized.

### Instruments

To collect the data, two instruments were used: a sociodemographic questionnaire, to characterize the participants' profile (it has data on gender, age, marital status, schooling, monthly income, religiosity, sexual orientation, health, transportation, and dwelling conditions, as well as aspects related to the infection by COVID-19). The second instrument was a structured interview, consisting of questions about the perception of the old age of gay men in Brazil, and about the COVID-19 pandemic and its implications to the QoL of older gay men.

### Ethical procedures

The study was approved by the Research Ethics Committee (CEP) of Universidade Federal do Piauí, under opinion document n° 942097. The Free and Informed Consent Form was presented to the participants before the research began, assuring them the confidentiality and the safety in their participation. In addition, the nature of the study and the possible risks of their participation were explained. Thus, the ethical criteria for research involving human beings were followed in accordance with resolutions 510/16 and 466/12, and, in particular, circular 01/2021 of the National Health Council, which addresses research involving human beings conducted in the virtual environment.

### Data collection

The data collection was carried out online by means of a virtual form and video calls. The

participants were contacted via social networks, as Instagram and Facebook and the application Grindr. In addition, posts announcing the research were published so that those interested in participating in the study could contact the researchers and answer the questionnaires. In the case of the Grindr app, the researchers created an official profile for the study, in which the profile continued information about the research and the promotional post was used as the profile photo. In this way, the app was filtered by age +60, displaying and contacting only those aged 60 or over. The “snow ball” technique was also used, when a participant suggested other possible participants. After the initial talk to present the study and to invite the person to participate, the Free and Informed Consent Term was explained. After the participants agreed upon it, the sociodemographic questionnaire was applied, followed by the structured interview. The total application time was, in average, 10 minutes for them to answer the online form, and 25 minutes for the interviews via video-calls.

It is also worth to mention that all the study, including its instruments and the participants' responses, was carried out in Brazilian Portuguese. When the study report was completely finished, it was translated into English language.

### Data analysis

To analyze the interviews they were grouped into a textual database saved in txt. UTF-8 format. This database is organized using command lines that characterize each participant. Furthermore, the responses were separated into thematic lines; each interview question corresponds to a research topic to be categorized in the database. The data of the sociodemographic data were analyzed through the software SPSS for Windows, version 21.0; it provides descriptive statistics to characterize the population of participants. The data from the structured interview were analyzed by the software Iramuteq version 0.7, from the Descending Hierarchical Classification (DHC). The software Iramuteq is use-free; it was created in 2013, and can be used for various analysis approaches of text data, by means of quantitative data, similar to content analysis (Sousa, 2021).

### Results and discussion

The participants had an average age of 64 years; most of them are white (76%); catholic (52%); single (62%); do not have children (71%); live alone (47%); are retired (62%); still work (66%); have an average income above six minimal wages (57%); and live in the Brazilian State of São Paulo (52%), see table 1.

**Table 1**

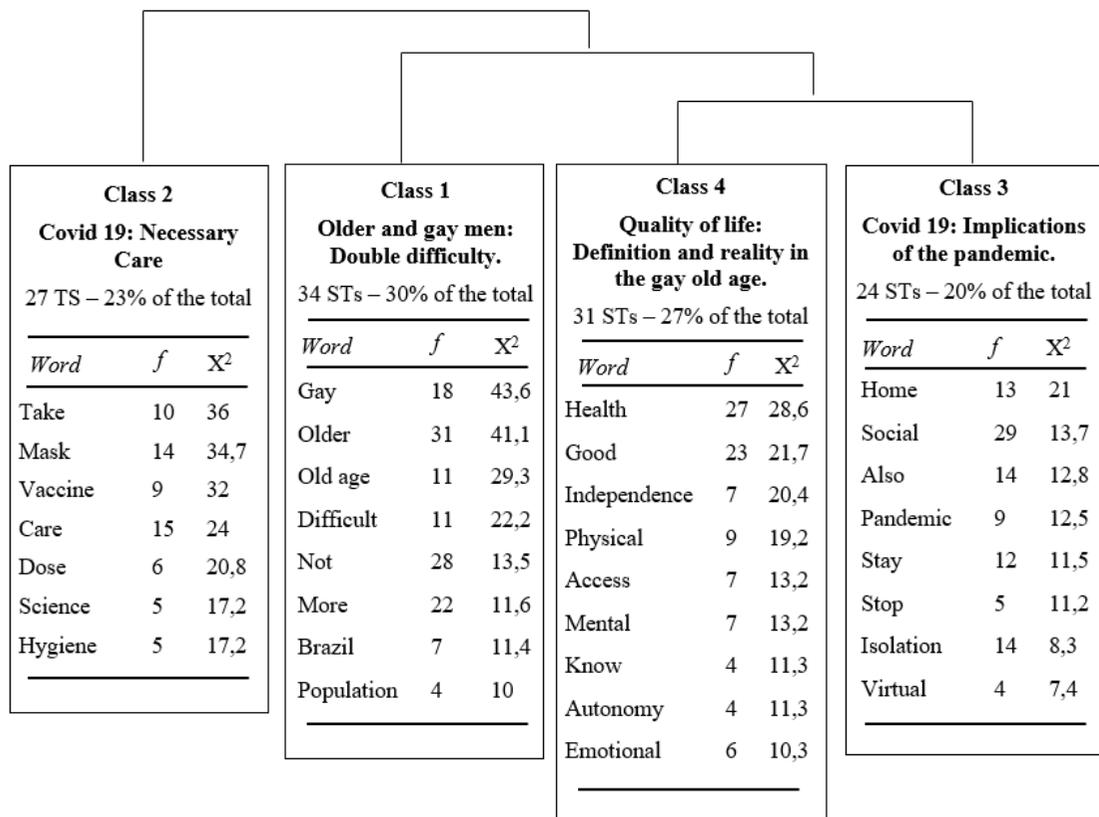
*Sociodemographic data of older gay men*

Sociodemographic data	
Religion	Monthly income
Catholic: 52,4%	Up to 1 minimal wage: 4,8%
Kardecist: 14,3%	Among 2 and 4 minimum wages: 28,6%
Spiritualist: 4,8%	Among 4 and 5 minimum wages: 9,5%
None: 28,5%	Above 6 minimum wages: 57,1%
Schooling	Professional Status
Secondary School: 14,3%	Do not work: 33,3%
Higher Education: 47,6%	Formal job: 61,9%
Specialization: 38,1%	Informal job: 4,8%
Lives with	Retired
Alone: 47,6%	Yes: 62%
Spouse: 23,8%	No: 38%
Relatives: 23,8%	
Friends: 4,8%	
Marital Status	Quantity of children
Single: 61,9%	None: 71,5%
Married: 4,8%	1 child: 19%
Common-law marriage: 19%	Between 2 and 5 children: 9,5%
Divorced: 4,8%	
Widow: 9,5%	

The data from the structured interview were grouped in a data bank that constitutes the text corpus, composed of 21 texts (interviews). From the analysis employed, the material was grouped in 116 text segments (TS), which compose 4 distinct word classes: Class 1 – 34 TS (30%); Class 2 – 27 TS (23%); Class 3 – 24 TS (20%); Class 4 – 31 TS

(27%). Below a dendrogram is presented. That is an illustrative figure containing data of the composition and organization of each class (see Figure 1). After that, the classes presented are described and discussed, considering the order of the classes participation in the subcorpus, the frequency of the words (*F*) and the chi-square test ( $X^2$ ).

**Figure 1.** Illustrative Dendrogram: QoL and COVID-19 pandemic among older gay men.



*Class 2: COVID-19 – Necessary care.*

This class is composed of 27 TS, which corresponds to 23% of the total. Among the words that belong to the class, the following ones can be highlighted: Take (*F*: 10;  $X^2$ : 36); Mask (*F*:14;  $X^2$ : 34.7); Vaccine (*F*: 9;  $X^2$ : 32); Care (*F*: 15;  $X^2$ : 24); Dose (*F*: 6;  $X^2$ : 20.8); Science (*F*: 5;  $X^2$ : 17.2); Hygiene (*F*: 5;  $X^2$ : 17.2). The set of words collected in this class demonstrate the representation shared

by the group in relation of the importance of the care to avoid getting infected by COVID-19. Among the measures pointed out as important and necessary, vaccination, wearing face masks, and hygienizing the hands using alcohol gel sanitizers are highlighted.

*“It is important to take precautions, wear a mask and get all the vaccines”.*

*(Jaime, 64 Years old)*

Within the pandemic context, a higher risk of having COVID-19-related complications is evidenced among older people, including a higher risk of deadly cases. Thus, the prevention measures became especially necessary to that population. This way, literature data point out that older people with comorbidities, i.e., other diseases, tend to be more open to follow prevention measures (Filho et al., 2021; Batista et al., 2020). That can be related to the data presented in this paper, once that the biggest part of the participants had comorbidities as hypertension (14%); HIV (33%); asthma (10%).

Likewise, the higher level of adherence to the preventive measures would possibly be related to the fear of infection and its serious damage to their health (Filho et al., 2021). Furthermore, the international literature indicates that older people are more exposed to negative emotions and psychological distress due to the pandemic (Santini et al., 2020). That fact also evidences two important aspects: the lack of a proper structure of the health service system and the structural ageism. Thus, all around the world, with the imminence of lack of resources, the older people were seen as disposable lives, an explicit death policy that can be related to the fear they have developed (Henning, 2020; Swift & Chasteen, 2021). In addition, the image of older people was associated with the stereotype of death in relation to the categorization of that population as a group of risk (Hammerschmidt & Santana, 2020).

*Class 1: Older and gay: double difficulty.*

This class is formed of 34 TS (30% of the total), characterizing itself as the most expressive of the study. The main elements that compose it are: Gay ( $F: 18; X^2: 43.6$ ); Older ( $F: 31; X^2: 41.1$ ); Old age ( $F: 11; X^2: 29.3$ ); Difficult ( $F: 11; X^2: 22.3$ ); Not ( $F: 28; X^2: 13.5$ ), More ( $F: 22; X^2: 11.6$ ); Brazil ( $F: 7; X^2: 11.4$ ); Population ( $F: 4; X^2: 10$ ). This class presents a dual view of the old age in a general way and of the gay men's old age. The old age is conceived as something difficult to every person, especially due to the lack of assistance in the Brazilian context.

However, specificities that affect the gay population are evidenced, as prejudice and loneliness, because they are surrounded by a double stigmatization.

*"I think that old gay people are more despised by their families and by the society. They are not respected, because there is prejudice and rejection against gays".*

*(Francisco, 61 Years old)*

According to the literature, with the intense growth of the older population worldwide, the old age belatedly became the focus of discussions, aiming at assuring the rights of that population. However, until nowadays, stereotyped views of that life stage still remain in our society. This way, older people are still victims of discrimination and invisibility, once that they tend to be seen as useless. In this sense, the older people need more attention and care from the State (Minayo et al., 2021; Nogueira & Boris, 2019). When the discussion is specifically on the lives of the older LGBT people, more difficulties can be noticed (Gomes et al., 2020).

The ageism, i.e., the discrimination due to the age, has become even more intense and explicit in the pandemic context, as evidenced previously (Burnes et al., 2019; Swift & Chasteen, 2021). The ageism and the death policies are more intense among who are part of minority groups, as older gay men. It evidences the weight of the double stigmatization on the lives of those individuals in the COVID-19 pandemic (Henning, 2020).

Furthermore, Rabelo and Diogo (2024) point out that public policies, despite their limitations, should ensure a dignified aging process, considering specificities of those who are aging, as social vulnerabilities or health conditions like HIV. According to the authors despite the increasing rates of older adults infected with HIV, these individuals are rarely included in campaigns or policies addressing this issue. In this sense, it is clear that the implementation of policies regarding comprehensive health care of the older adults has not kept pace with the growing number of older population in Brazil (Ferreira et al., 2024).

*Class 4: Quality of life: definition and reality in the gay old age.*

Class 4 was composed of 31 TS (27% of the total). The main elements of this class are: Health ( $F: 27; X^2: 28.6$ ); Good ( $F: 23; X^2: 21.7$ ); Independence ( $F: 7; X^2: 20.4$ ); Physical ( $F: 9; X^2: 19.2$ ); Access ( $F: 7; X^2: 13.2$ ); Mental ( $F: 7; X^2: 13.2$ ); Know ( $F: 4; X^2: 11.3$ ); Autonomy ( $F: 4; X^2: 11.3$ ); Emotional ( $F: 6; X^2: 10.3$ ). This class is based on the topic “quality of life”, comprising how the participants understand that topic. This way, evidence the independence, autonomy, and integral health as the main elements to define QoL. Moreover, the class demonstrates the comprehension of their own QoL in comparison with other older people, in a way that the participants affirm having a good QoL.

“It is being able to enjoy life with health and physical, social, emotional and spiritual well-being, with autonomy and financial independence”.

(Carlos, 61 Years old)

Concerning that, what has been learned from other scientific studies can be corroborated. That QoL is a broad concept, embracing conceptions of physical, mental and social health, as well as life style (Ferreira et al., 2018). In the old age, the QoL is a concept related to independence, or the capacity of being the protagonist of one’s own aging process. Those concepts can be intensively noticed in the representations shared by the participants of the study.

Regarding the QoL of older LGBT people, the economic aspect is fundamental, as Wang et al. (2021) point out. Considering the positive perception of the QoL, it is possible to relate it to economic features. It is highlighted that once that 57% of the participants have a monthly income above 6 minimal wages. Nevertheless, it is common that older LGBT people are unemployed or have a low income, mainly when they live multiple vulnerabilized roles. Those older people are subjected to different risk situations, as difficulties to assure their health and socioeconomic resources (Kim et al. 2017; Wang et al. 2021).

*Class 3: COVID-19: Implications of the pandemic.*

Finally, Class 3 is composed of TS, corresponding to 20% of the total. Among its elements, the following ones are highlighted: Home ( $F: 13; X^2: 21$ ); Social ( $F: 29; X^2: 13.7$ ); Also ( $F: 14; X^2: 12.8$ ); Pandemic ( $F: 9; X^2: 12.5$ ); Stay ( $F: 12; X^2: 11.5$ ); Stop ( $F: 5; X^2: 11.2$ ); Isolation ( $F: 14; X^2: 8.3$ ); Virtual ( $F: 4; X^2: 7.4$ ). In this section, the understanding of the COVID-19 pandemic is evidenced, especially in relation to the implications to the daily routine and to the QoL of the participants. The participants’ answers converge into a common aspect: the social distancing measures employed to contain the virus dissemination.

“The pandemic restricted my ability to travel, which was very important to me. I also couldn’t visit my family; I was struck at home due to the social isolation that was necessary”.

(Inácio, 63 Years old)

Within the pandemic context, Brazil started to follow sanitary measures as social distancing and interruption of collective activities (Hammer-schmidt & Santana, 2020). According to Castro et al. (2020), the changes caused by the pandemic affect directly the older population; this way, those individuals are at a higher risk of having aggravations of psychoaffective and psychosocial demands in the current pandemic context.

Measures as social distancing may be related to feelings of loneliness, insomnia, anxiety, loss of appetite, and depression (Moraes et al., 2020). Additionally, sanitary measures imposed by the pandemic impact more strongly on socialization. This is an aspect that affects all the generational groups, but mainly the older people, because they tend more to live alone, having more difficulty to communicate remotely/on-line (Silva et al., 2021).

The social support is thus characterized as the most worrying aspect among gay men, especially in the pandemic context. This population is more likely to live without a spouse, and without their biological family support. This way, gay men have a kind of chosen family in their friendship

relations (Oswald & Roulston, 2020). It is worth to highlight that around 47% of the participants live alone, 60% are single, and 70% do not have any children.

In this regard, the importance of including the discussion of intersectionality in the creation and implementation of public policies emerges. In the Brazilian context, policies aimed at the LGBT population began to rise in the 2000s. However, there are still few that establish a dialogue between these population and topics as aging and old age (Sousa & Araújo, 2024). The role of healthcare professionals is especially important from this perspective, considering not only the creation but also effectiveness of these regulations, particularly in the post-pandemic context (Rabelo & Diogo, 2024).

Representations related to the gay old age can be noticed, including the difficulties that they face and the reality of the population studied. The participants present a positive comprehension of their own QoL, fact which is possibly justified by their schooling level and high monthly income. Moreover, the comprehension also addresses aspects related to the COVID-19 pandemic. In this case, was evidenced the adhesion of that population to the prevention measures and the implications of distancing measures in their QoL.

### **Final remarks**

The present study has discussed the COVID-19 pandemic and the QoL among older gay men. It aimed to understand the SR shared by this group, considering the invisibility and the stigmatization that tend to affect their lives, particularly in the pandemic context. Thus, by directly listening to older gay men, this research amplified the voices of a group often overlooked in scientific literature, especially in non-English-speaking countries like Brazil.

The representations identified focused on three main themes: 1. COVID-19, with the necessary care and its implications on the daily lives and on the QoL; 2. QoL, evidencing the reality of

the population studied and the comprehension shared on the topic; 3. Old age and gay old age, comprising the representations shared about the common aspects and the specificities of the gay men. The study population shares SR in favor of the measures against the COVID-19; like hygiene methods, use of face mask, and vaccination. In this sense, one can highlight the influence of the ageism to the perpetuation of negative feelings, as fear. It can also be observed that the implications of social distancing should be a warning to that population. These measures led to greater isolation, especially considering that most participants live alone and are single.

Likewise, the representations suggest that old age is perceived as a difficult stage. This view seems to be related to the perception of a lack of state assistance, mainly among older gay men, who are affected by multiple stigmas. Moreover, the group studied sees their own QoL as good, in comparison with other older people. This is possibly related to their economic conditions, for the participants have a high education level and a high income.

Because of the study's characteristics, which is solely qualitative, with non-probabilistic convenience sampling, it is limited in relation to the data presented. One limitation of the study is the impossibility of generalizing the findings. Furthermore, the data collection was exclusively virtual, which on the one hand allows for a broader data collection across different regions of the country, but on the other hand exposes the risk of excluding individuals with less access to the internet, especially when considering older population. In this sense, participants' specificities can be highlighted, as high education and income levels, as well as the prevalence of older white men can be highlighted. This way, in future studies, the use of mixed collection (virtual and in-person), would allow for variability in the samples, which, in turn, could end up in different results, allowing the perception of different realities and the possibility to notice more intersected experiences.

Finally, this study may contribute to the development of other investigations about the older gay men's QoL and the implications of the COVID-19 pandemics on their QoL. Besides that, the study contributes to the establishment of public policies that can support advances in care for the implications of the COVID-19 pandemic and the QoL of that population. Therefore, it indicates the need to, above all, consider intersectional factors when creating public policies, but also to develop comprehensive health care actions, encouraging professional improvement and the life-long development, as well as socialization spaces; also approximating that population to the virtual spaces by means of incentive and betterment of the use of communication technologies.

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# Social Network Addiction and Personality: The Moderating Role of Fear of Missing Out

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

Social Network Addiction (SNA) in university students has aroused interest among researchers in the field to understand the possible association with individual differences. The objective of the investigation is to contribute to the knowledge about the relationship between Social Network Addiction, personality traits, and Fear of Missing Out (FOMO) in university students. A sample of 524 university students participated in this investigation. The instruments used were a Sociodemographic and Social Network Usage Questionnaire, the Social Network Addition Scale, the NEO Five Factor Inventory Personality Questionnaire (NEO FFI-20), and the Fear of Missing Out Scale. The main results indicated the existence of negative associations between SNA and the personality characteristics Conscientiousness and Extraversion and positive correlations with Neuroticism. Regression analyses suggested that SNA, Neuroticism, Agreeableness, and Extraversion predicted FOMO. It was also verified the mediating role of FOMO in the association between personality and SNA. The practical implications of the research, limitations and suggestions for future studies are also discussed.

*Keywords:* social network addiction, personality, fear of missing out, university students.

### **Adicción a las Redes Sociales y Personalidad: El Papel Moderador del Miedo a Perderse Algo**

#### **Resumen**

La Adicción a las Redes Sociales (ARS) en estudiantes universitarios ha despertado el interés de los investigadores en este campo para comprender la asociación con las diferencias individuales. El objetivo de la investigación es contribuir al conocimiento sobre la relación entre ARS, personalidad y miedo a perderse algo (FOMO) en estudiantes universitarios. Una muestra de 524 estudiantes universitarios participó en esta investigación. Los instrumentos utilizados fueron un Cuestionario Sociodemográfico y de Uso de Redes Sociales, la Escala de Adicción a las Redes Sociales, el Inventario de Cinco Factores de Personalidad (NEO FFI-20) y la Escala de FOMO. Los resultados indicaron asociaciones negativas entre ARS y las características de personalidad Conciencia y Extraversión y positivas con Neuroticismo. Los análisis de regresión sugirieron que ARS, el Neuroticismo, la Amabilidad y la Extraversión predecían el FOMO. También se verificó el papel mediador de FOMO en la asociación entre personalidad y la ARS. Discuten se implicaciones de la investigación, limitaciones y sugerencias para futuros estudios.

*Palabras clave:* adicción a las redes sociales, personalidad, miedo a perderse algo, estudiantes universitarios.

## Introduction

The use of the internet and social networks is transversal, continuous, and growing at a global level. The technological infrastructure underlying such digital platforms enables the dissemination of a substantial volume of information to an audience that is both vast and diverse. It is possible to access it through different electronic devices, as computers, tablets, and mobile phones, thus enabling a quick way of communication and interaction between people, obtaining information, expressing opinions and beliefs, and making decisions on certain subjects (Hernández et al., 2021; Ross et al., 2009).

Despite the variety of potentialities arising from the use of the Internet, there can also be negative consequences related to its excessive use (Lin et al., 2018; Pontes et al., 2016; Puerta-Cortés & Carbonell, 2013), for example, the inability to control the time of use and the neglect of daily activities for the use of social networks (Puerta-Cortés & Carbonell, 2013).

One of the groups most likely to develop problematic use of the Internet is university students. It is a tool that is present in their daily lives and routines (e.g. academic research) without parental control, both in terms of socialising and leisure, which means that they spend more and more hours online (e.g., Al-Gamal et al., 2016; Rayan et al., 2017). In addition, university students can find it difficult to make new friends and live away from their families, which can result in feelings of anxiety and stress, and can lead to excessive use of the internet (Romero-Rodríguez et al., 2019). Thus, the influence that the internet and, in turn, social networks have on each user can result in negative consequences that must be explored (Kircaburun & Griffiths, 2018; Kuss et al., 2013).

According to Andreassen and Pallesen (2014), social network addiction consists of the uncontrollable use of social media and the fact that the subject spends so much time on it that it interferes with normal social activities, as well as health and psychological well-being. Although the term,

social networks addiction is extensively used in the scientific literature, it has not yet been recognized in the DSM-5 as a dependence disorder, but some authors consider that they can be included in the scope of behavioural dependencies (e.g. Andreassen & Pallesen, 2014; Griffiths, 2005).

One of the fields that has caused the most interest and that has been explored in recent years, associated with the use of social networks, is the personality characteristics of individuals contemplated in the five-factor model (Fagundes et al., 2020; Kosinski et al., 2013; Ross et al., 2009; Sindermann et al., 2020; Stead & Bibby, 2017). Research indicates that more extroverted individuals use social networks as a mechanism to improve social connections, maintain existing relationships and manage tasks (e.g., Bunz, 2021; Horzum, 2016; Kircaburun et al., 2018; Kuss & Griffiths, 2011). Other studies have not found that Extraversion has an influence on Social Network Addiction (Marengo et al., 2019; Whaitea et al., 2017). In turn, individuals with high scores on the Neuroticism trait may have low frustration tolerance, and be attracted to using these online platforms, with the aim of changing their emotional state and avoiding loneliness (Hawi & Samaha, 2019; Miceli et al., 2022; Ross et al., 2009; Tang et al., 2016) and prefer to communicate through a screen rather than in person (Coiro et al., 2017; Monteiro et al., 2020). Regarding the Conscientiousness dimension, less conscientious individuals tend to be less responsible, do not follow rules, avoid academic obligations, have greater difficulty controlling the time they use social networks, and spend more time online. On the contrary, individuals with high levels have a greater capacity to control the amount of time spent on social networks, as they realize that its use can negatively influence their productivity (Kayaş et al., 2016; Rajesh & Rangaiah, 2020; Randler et al., 2014; Ross et al., 2009). Thus, individuals with more emotionally stable personality traits are less likely to develop dependence on social networks, while others who demonstrate greater emotional instability

are more susceptible to developing this problem (Hawi & Samaha, 2019; Rajesh & Rangaiyah, 2020; Sindermann et al. 2020; Wegmann et al., 2017).

In a study conducted by Ross et al. (2009), in which the five personality traits were related to the use of the social network Facebook, the following conclusions were obtained: individuals who scored higher in Extraversion use this network as a social tool, but do not do so as an alternative to social activities or as a way to replace interactions with the real world. Individuals who scored higher on Neuroticism demonstrated greater control in the information shared on Facebook. Regarding individuals with high scores on Agreeableness, it was expected that they would be more involved in interpersonal relationships and have more online contacts, translating into a greater number of friends on Facebook, however this was not the case. The data also revealed that individuals with high levels of Openness to Experience revealed a greater tendency to be sociable online, through Facebook. It was also expected that conscientious individuals would not use Facebook recurrently, as they considered it to be a means of procrastination or distraction from daily tasks, however, the opposite was verified.

Zúñiga et al. (2017) in a study carried out in 20 countries, aiming to understand the relationship between the use of social networks and the five personality traits, concluded that the factors Extraversion, Agreeableness, Conscientiousness, and Openness to Experience are positive predictors of the use of social networks, while Neuroticism proved to be a negative predictor. Studies carried out, relating personality traits and the use of the social network Instagram (Fagundes et al., 2020; Kircaburun & Griffiths, 2018), describe positive correlations with Neuroticism, observing that emotionally unstable individuals tend to use this social network more intensely to hide their characteristics considered undesirable and show on their profiles only what they consider positive.

Lately, Fear of Missing Out (FoMO) was highlighted as a driver of engagement and Social

Network Addiction (SNA) (Moore & Craciun, 2021). FoMO is defined as social anxiety and is characterized by an intense concern or apprehension that others may have more rewarding experiences without the individual being present. (Przybylski et al., 2013; Soriano-Sánchez, 2022). In this sense, the individual has the need to be constantly online so as not to miss any publication related to his social sphere (Budnick et al., 2020; Elhai et al., 2020; Reer et al., 2019). Fear of missing out has been related with more social isolation, anxiety, depression, lower quality of sleep, and feelings of inferiority in relation to others having a more exciting reality than one's own (Baker et al., 2016; Rajan et al., 2022).

Several studies show that some personality traits are associated with FoMO (e.g., Rozgonjuk et al., 2021; Savitri et al., 2021). Research has shown that Neuroticism is positively associated with FoMO (Alt & Boniel-Nissim, 2018; Blackwell et al., 2017; Rozgonjuk et al., 2021). Individuals with a neurotic personality, individuals who experience Fear of Missing Out also show anxiety because they consider themselves to be missing out on experiences considered rewarding (Przybylski et al., 2013). Research indicate that FoMO has a positive relationship with Agreeableness (Hamutoglu et al., 2020; Marshall et al., 2015) and no association with Extraversion and Openness to Experience (Rozgonjuk et al., 2021; Stead & Bibby, 2017). Concerning Conscientiousness, Wegmann et al. (2017) found a negative relationship with FoMO, the authors have report that individuals with less self-discipline and difficulty focusing on tasks, spend more time online (Wegmann et al., 2017).

Some research suggests that the associations between personality and SNA may be mediated by the FoMO (e.g., Alshakhsi et al., 2023; Ruyandy & Kartasasmita; 2021; Sindermann et al., 2021). In the study carried out by Ruyandy and Kartasasmita (2021) with emerging adults, the mediating effect of Fear of Missing Out in the relationship between personality traits and problematic internet use was analyzed, with the authors verifying

that Extraversion affects the use problems of the internet, with the FoMO variable not having a mediating effect. Regarding the Agreeableness and Conscientiousness dimensions, FoMO had a negative mediating effect. And in the Neuroticism dimension, FoMO had a positive effect as a mediating variable (Ruyandy & Kartasmita, 2021).

Considering the literature review and the fact that there is still little research that focuses on the variables under study (Social Networks Addiction, personality traits and FoMO), particularly in a Portuguese context. Addiction to social networks is a growing phenomenon with an impact on mental health, productivity and personal relationships (Andreassen & Pallesen, 2014). Therefore, studying social media addiction, FoMO and the five personality factors is fundamental to understanding how individual characteristics influence digital behaviour given the impact it has on mental health, interpersonal relationships and general well-being (Reer et al., 2019; Ruyandy & Kartasmita, 2021; Soriano-Sánchez, 2022). The present study aimed to: (i) study the relationship between SNA, personality and FoMO; (ii) investigate the predictive effect of personality traits on SNA; (iii) determine the predictive effect of personality and SNA on FoMO; (iv) study the mediating effect of FoMO in the relationship between personality and SNA.

## Materials and Methods

### Participants

In this study, 524 individuals (441 female and 83 male) aged between 18 and 56 years old ( $M=22.32$ ,  $SD=5.65$ ) were randomly recruited from Portuguese universities. A total of 332 (63.4%) individuals reported attended a degree, 182 (34.7%) a master's and 10 (1.9%) a PhD. Regarding the time dedicated to Social Networks per day, excluding academic and/or professional tasks, 52 (9.9%) reported spending up to one hour, 142 (27.1%) up to two hours, 209 (39.9%) up to four hours and 121 (23.1%) more than four hours. As for the

perception of time spent on Social Networks, 381 (72.7%) said they had this perception and 143 (27.3%) said they did not. Of the total number of participants, 334 (63.7%) claimed to have control over the time they spend online. As for the social network, students preferentially use Instagram (67.9%), followed by Facebook (14.5%), Twitter (5.7%), WhatsApp (4.4%), and Youtube (3.4%). Regarding the most used device, 472 (90.1%) individuals indicated the cell phone.

### Instruments

To carry out the present investigation, a sociodemographic questionnaire was used to collect information related to the participants' personal data (sex, age and level of education). In addition, participants were asked to answer a series of questions concerning their utilisation of social networking websites, including the duration of their online leisure activity, the social networking platform most frequently employed, their perception and control of the time spent online, and the device most commonly used.

Regarding to addiction to social network was assessed using the Social Network Addiction Scale (Al-Menayes, 2015), adapted for the Portuguese population by Lira (2016). This scale built on the basis of Young's scale (1998) assesses internet addiction and symptoms of social network addiction. The original version consists of 13 items divided into three factors: Social Consequences, Inappropriate Use of Time, and Compulsive Feelings. The Portuguese version of the Social Network Addiction Scale (Lira, 2016) consists of 11 items, evaluated on a 5-point Likert-type scale, from 1 (totally disagree) to 5 (totally agree), divided into two factors: Social Consequences and Compulsive Feelings. With regard to internal consistency, the Cronbach's alpha values found are adequate, having been obtained .82 in the original scale (Al-Menayes, 2015) and .85 in the scale adapted by Lira (2016), regarding the sub-scales, it was obtained in the social consequences .83 and .73 in compulsive feelings (Lira, 2016). The Cronbach's alpha values

of the instrument in this study are .77 for the total scale, .63 for the Social Consequences dimension and .69 for the Compulsive Feelings dimension.

The two-factor model of the Social Network Addiction Scale in the present study revealed an acceptable goodness of fit ( $\chi^2/df = 4.37$ , CFI=.86, GFI=.93, RMSEA=.09 and  $P[rmsea \leq .05] < .001$ ) (Marôco, 2014).

Fear of Missing Out Scale (FoMOs) is a 10-item instrument that assesses the fear of "being left out. The response scale used is a 5-point Likert-type scale ranging from 1 (does not apply to me) to 5 (applies to me very much). The score ranges from 10 to 50 points. The higher the total score, the greater the present concern or apprehension (Przybylski et al., 2013). Regarding the internal consistency, the Cronbach's alpha value was .87 (Przybylski et al., 2013). Since the present instrument was not translated and validated for the Portuguese population, it was previously translated. In the present sample, the internal consistency analysis of this instrument revealed Cronbach's alpha values of .78. Taking into account the criteria of Kaplan and Saccuzzo (2017), we can say that Fear of Missing Out presents an appropriate reliability. A confirmatory factor analysis, was carried out to verify the adequacy of FoMO scale. The following fit indices were used:  $\chi^2/df$  (chi-square and degree of freedom ratio), CFI (comparative fit index), GFI (goodness of fit index) and RMSEA (root mean square error of approximation) and  $P[rmsea \leq .05]$ . The model fit was considered suitable for  $\chi^2/df$  values below 5, CFI and GFI above .9 and RMSEA below .10 (Marôco, 2014). The confirmatory factor analysis revealed a poor fit ( $\chi^2/df=8.44$ , CFI=.85, GFI=.89, RMSEA=.12, and  $P[rmsea \leq .05] < .001$ ).

The NEO Five Factor Inventory (NEO-FFI-20) (Costa & McCrae, 1992) is a 20-item scale that assesses the personality traits: Neuroticism, Extroversion, Openness to Experience, Agreeableness, and Conscientiousness. Items are answered on a Likert scale with five options ranging from 1 (strongly disagree) to 5 (strongly agree). The adaptation for the Portuguese population of this

scale carried out by Bertoquini and Ribeiro (2006) presents satisfactory psychometric characteristics. The confirmatory factor analysis performed in the study supports the instrument's five factor structure, and this model demonstrates an acceptable fit to the data. The internal consistency of the NEO-FFI-20 can be considered satisfactory, with all scales showing Cronbach's alpha equal to or greater than .70 (Bertoquini & Ribeiro, 2006).

With regard to the reliability of the instrument for the dimensions Neuroticism, Extroversion, Openness to Experience, Agreeableness, and Conscientiousness, Cronbach's alpha is .67, .67, .77, .70 and .77 respectively. The goodness-of-fit indices produced through the CFA indicated that the NEO-FFI-20 model showed an adequate fit to the data ( $\chi^2/df=3.09$ , CFI=.88, GFI=.91, RMSEA=.06,  $P[rmsea \leq .05] < .001$ ) and almost all items showed factorial weights greater than .50.

### Procedure

The sample was collected through the dissemination of the questionnaires on social networks and in classrooms of a Portuguese university. Participation was voluntary and anonymity and confidentiality of responses were ensured. These ethical procedures were guaranteed through an Informed Consent statement completed by the participants at the beginning of the investigation. This study was approved by the Ethics Committee of the University of Trás-os-Montes and Alto Douro.

### Data Analysis

Statistical analysis included the descriptive analysis of the sample and the variables under study. The normality of the variables was assessed using the skewness (Sk) and kurtosis (Ku), with criteria values ranging from -1 to 1 (Marôco, 2007). The study of the psychometric characteristics of the instruments used was based on the methodology of structural equation modeling (SEM) and significance of the regression coefficients was assessed using the maximum likelihood method. The models were evaluated using the following fit

indexes: chi square/degrees of freedom ( $\chi^2/df$ ), Comparative fit index (CFI), Parsimony Goodness of fit index (PGFI), Root mean square error of approximation (RMSEA) and P [rmsea  $\leq .05$ ] (Arbuckle, 2005; Marôco, 2014; McDonald & Ho, 2002). Cronbach's alpha was used to estimate the reliability of each of the scales.

To study the association between SNA and its dimensions Social Consequences and Compulsive Feelings, Fear of Missing Out, and the personality traits of the five-factor model, we used Pearson's correlation coefficient. To determine the most parsimonious models for predicting SNA as a function of the personality traits and FoMO as a function of personality traits and Social Network Addiction, multiple linear regression analyzes were carried, after verifying the assumptions of normality and homoscedasticity.

Subsequently, a Path analysis was carried out to obtain a causal model of personality traits on SNA mediated by FoMO. The method used to estimate the parameters was the maximum likelihood method. The significance of direct and indirect effects was assessed using the Bootstrap resampling method. For the statistical treatment of the data, the Statistical Package for the Social Sciences (SPSS, v.27) and AMOS (v.22) were used. In all statistical analysis a significance level of .05 was considered.

## Results

Table 1 gives descriptive statistics, as mean (M), standard deviation (SD), skewness, and kurtosis for the variables under study. Regarding normality, the values of skewness and kurtosis are in an interval associated with a normal distribution.

**Table 1**

*Descriptive statistics and univariate normality.*

Variables	Min.	Máx.	M	SD	Sk	Ku
Social Network Addiction	11	47	27.85	6.21	-.03	.01
Social Consequences	4	16	7.54	2.52	.59	-.07
Compulsive Feelings	7	33	20.31	4.46	-.20	.12
Fear of Missing Out	10	47	22.75	6.66	.55	.08
Neuroticism	4	20	12.64	3.00	-.10	-.35
Extraversion	4	20	12.10	2.77	-.33	-.01
Openness to Experience	4	20	13.30	3.56	-.06	-.72
Agreeableness	5	20	13.52	3.15	-.21	-.46
Conscientiousness	5	20	15.17	2.50	-.59	.88

### *Correlation and regression analysis*

Regarding the association between Social Network Addiction and personality traits, the results obtained (Table 2) indicate negative and significant correlations between Conscientiousness ( $r = -.35, p < .001$ ) and Extroversion ( $r = -.22, p < .001$ ), and positive and significant with Neuroticism ( $r = .31, p < .001$ ). As for the dimensions of the Social Network Addiction the results show that Social Consequences are negatively associated with Conscientiousness ( $r = -.41, p < .001$ ), Extraversion ( $r = -.21, p < .001$ ) and Agreeableness ( $r = -.11, p < .001$ ),

and positive with Neuroticism ( $r = .30, p < .001$ ). The Compulsive Feelings dimension is negatively associated with the personality traits Conscientiousness ( $r = -.25, p < .001$ ) and Extraversion ( $r = -.19, p < .001$ ), and positively with Neuroticism ( $r = .27, p < .001$ ). The data suggests that more neurotic, less conscientious and less extroverted individuals tend to be more addicted to social networks. Regarding the dimensions of the Social Network Addiction, more neurotic, less conscientious, less extroverted and less agreeable individuals have higher scores in the Social Consequences dimension and more

neurotic, less conscientious and less extroverted individuals tend to have more scores in the dimension Compulsive Feelings. As for Fear of Missing Out, the results indicate negative and significant

correlations with Extraversion ( $r = -.10, p < .05$ ) and Conscientiousness ( $r = -.14, p < .001$ ), and positive and significant correlations with Neuroticism ( $r = .32, p < .001$ ) and Agreeableness ( $r = .26, p < .001$ ).

**Table 2** Association between Social Network Addiction, Fear of Missing Out and Personality traits

	SNA	SC	CF	FoMO	Neuro.	Extra	OpExp	Agree.	Consc.
SNA	1	.80**	.94**	.43**	.31**	-.22**	-.05	-.07	-.35**
SC		1	.55**	.30**	.30**	-.21**	-.01	-.11*	-.41**
CF			1	.43**	.27**	-.19**	-.07	-.04	-.25**
FoMO				1	.32**	-.10*	.004	.26**	-.14**
Neuro.					1	-.46	.09*	-.04	-.30**
Extra.						1	-.01	.13*	.42**
OpExp.							1	.12**	.03
Agree.								1	.10*
Consc.									1

\*\*  $p < .001$ , \*  $p < .05$  SC- Social Consequences; CF- Compulsive Feelings; Neuro- Neuroticism; Extra- Extraversion; OpExp- Openness to Experience; Agree- Agreeableness; Consc- Conscientiousness.

#### *Prediction of Social Network Addiction according to personality traits*

To determine the model that would allow predicting the SNA as a function of the personality traits a multiple linear regression was performed with selection of variables using the Stepwise method. The variables that integrated the predictive equation were: Conscientiousness ( $\beta = -.687$ ;  $p < .001$ ) and Neuroticism ( $\beta = .470$ ;  $p < .001$ ). The final adjusted model is  $SNA = 32.329 - .687$  Conscientiousness +  $.470$  Neuroticism and explains 16.6% of the total data variability ( $F(2, 521) = 51.945$ ,  $p < .001$ ,  $R^2 = .166$ ).

#### *Prediction of Fear of Missing Out Addiction as a function of Personality traits and Social Network Addiction*

To determine the most parsimonious model that would allow predicting Fear of Missing Out as a function of personality traits and Social Network Addiction, a multiple linear regression analysis was performed with selection of variables using the Stepwise method. This analysis selected the variables SNA ( $\beta = .40$ ;  $p < .001$ ), Neuroticism

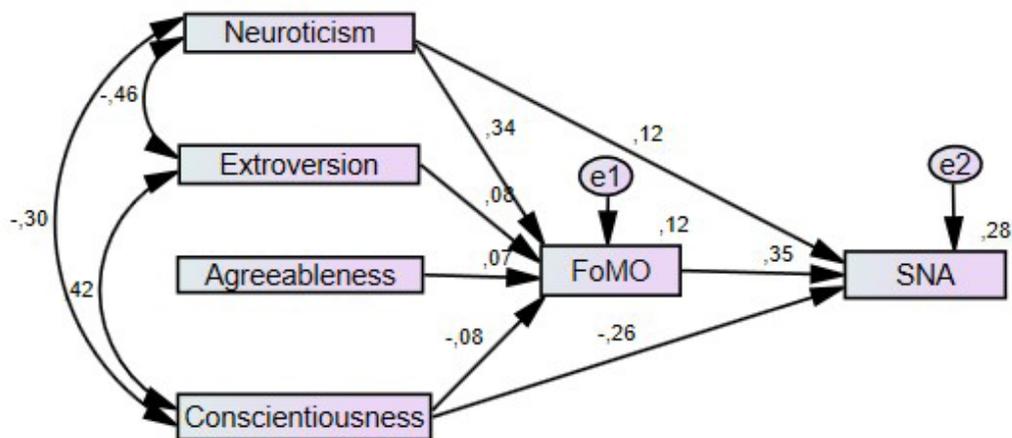
( $\beta = .55$ ;  $p < .001$ ), Agreeableness ( $\beta = .18$ ;  $p = .03$ ), and Extraversion ( $\beta = .21$ ;  $p = .05$ ), as significant predictors of Fear of Missing Out. The variables that most contribute to the explanation of FoMO are the SNA and Neuroticism. The final adjusted model is  $FoMO = -.55 + .40$  SNA +  $.55$  Neuroticism +  $.18$  Agreeableness +  $.21$  Extroversion. This model is significant and explains 23.7% of the variability of FoMO ( $F(4, 519) = 40.38$ ;  $p < .001$ ;  $R^2 = .237$ ). Based on the results, it is expected that individuals with high scores in SNA, Neuroticism, Amiability and Extroversion will have high FoMO scores.

#### *Fear of Missing Out Mediation Model on Social Network Addiction*

To study the structural relationships (direct and indirect effects) between personality traits, FoMO and SNA, Path analysis was used. Figure 1 presents the causal model of personality traits on Social Network Addiction mediated by Fear of Missing Out.

The fitted model explains 28% of the total variability in SNA. The Openness to Experience personality trait was not considered as their trajectory

Figure 1. Fear of Missing Out Mediation Model on Social Network Addiction.



did not show significant results. The personality traits Agreeableness and Extroversion had an indirect effect of .02 and .03 on SNA mediated by FoMO. Conscientiousness had a total effect of -.29 on SNA with a direct effect of -.26 and an indirect effect mediated by FoMO of -.07. As for Neuroticism, the total effect is .24 on SNA with a direct effect of .12 and an indirect effect mediated by FoMO of .12. The fit indexes revealed an adequate fit of the model to the data ( $\chi^2/df=2.74$ , CFI=.98, GFI=.99, RMSEA=.06) (Marôco, 2014) (Figure 1).

### Discussion

The main goal of this study was to contribute to the knowledge about the relationship between Social Network Addiction, the personality traits defined in the five-factor model and Fear of Missing Out in university students. It was also intended to study the relationship between Social Network Addiction, personality and *Fear of Missing Out*; investigate the predictive effect of personality traits on Social Network Addiction and the predictive effect of personality and Social Network Addiction on the Fear of Missing Out. Finally, we studied the mediating effect of FoMO in the relationship between personality traits and Social Network Addiction.

With regard to the relationship between SNA and personality traits, the results indicated that more neurotic, less conscientious and less

extroverted individuals reveal a higher degree of SNA. With regard to Neuroticism, the results obtained in this study can be understood from the characteristics inherent to the factor, given that neurotic individuals due to lack of interpersonal skills, reduced resources in their social life and due to fear of loneliness, may present more anxiety and feelings of rejection in social contact (Hawi & Samaha, 2019; Rajesh & Rangaiah, 2020; Ross et al., 2009; Tang et al., 2016; Wegmann et al., 2017), thus feeling more comfortable in the interaction online, demonstrating less control over the use of Social Networks (Coiro et al., 2017; Miceli et al., 2021; Monteiro et al., 2020). In this sense, Neuroticism may represent a risk factor in the development of behaviors related to the problematic use of these platforms.

Regarding the Conscientiousness dimension, as previously mentioned, less conscientious students showed higher levels of SNA. Given that conscientiousness is described in the literature as the tendency to be organized, persistent, and responsible (Costa & McCrae, 1992), this explains why less conscientious individuals have higher SNA values. These results are in line with studies by Rajesh and Rangaiah (2020) and Randler et al. (2014) who state that less conscientious individuals tend to have less responsibility, do not follow rules, avoid academic obligations, have greater

difficulty in controlling the time of use of social networks, and spend more time online. On the contrary, more conscientious individuals have greater impulse control, reducing the amount of time spent on social networks, as they realize that its excessive use can have a negative influence on their productivity (Sindermann et al., 2020; Ross et al., 2009). It should be noted that higher Neuroticism and lower Conscientiousness also play an important role in predicting internet addiction (Monteiro et al., 2020) and problematic smartphone use (Marengo et al., 2020).

With regard to the Extroversion dimension, less extroverted students showed higher SNA. These results that are not reported in the literature (e.g., Horzum, 2016; Kircaburun et al., 2018; Kuss & Griffiths, 2011), indicate that individuals with high levels of Extraversion use this type of platforms more to improve their social connections, maintain existing relationships and manage tasks. However, these findings can be explained by the fact that introverts can use social networks to communicate and thus satisfy their social needs without the risks and negative feelings associated with face-to-face interactions, which they fear may occur in these relationships (Servidio, 2014).

As for the relationship between FoMO and personality traits, there were positive associations with Agreeableness and Neuroticism, and negative associations with Extroversion and Conscientiousness. Regarding the study between the variable FoMO and Agreeableness, the results are in line with other studies that refer that Agreeableness is positively associated with FoMO, thus demonstrating greater socialization online than face to face (Hamutoglu et al., 2020; Marshall et al., 2015). It should be noted that, in the investigation by Rozgonjuk et al. (2021), the personality trait Agreeableness did not correlate with FoMO. With regard to the relationship between the FoMO variable and Neuroticism, the results are in line with other investigations (Alt & Boniel-Nissim, 2018; Blackwell et al., 2017; Rozgonjuk et al., 2021), which refer that neurotic individuals show less affection

and more anxiety, just as individuals who experience FoMO feel anxiety about losing experiences that they consider important to them. Our results confirmed that FoMO plays an important role as a mediating variable. It is driven by the personality factor, which subsequently leads to the results obtained regarding Extroversion are not corroborated in some research studies, which states that there is no relationship between this personality trait and FoMO (Rozgonjuk et al., 2021; Stead & Bibby, 2017). It can be conjectured that these findings result from the fact that extroverted individuals are less inclined to engage in negative social comparisons on social networks, thereby mitigating the anxiety commonly associated with FoMO. As for the relationship with Conscientiousness, as in our study, other investigations (e.g., Rozgonjuk et al., 2021; Stead & Bibby, 2017) indicated a negative relationship between the two variables, which may demonstrate lower self-discipline (not stay focused on the task and react to interruptions) (Wegmann et al., 2017). This tendency could make individuals more susceptible to FoMO under the impact of social networks.

The predictive analyzes also indicated Conscientiousness and Neuroticism as predictive variables. In studies by Kircaburun and Griffiths (2018), Ross et al. (2009), and Zúñiga et al. (2017), the Conscientiousness trait is a negative predictor of the use of Social Networks, results that are in line with those found in this study. As for Neuroticism, it has been shown to be associated with the use of social networks, and people with high scores on this personality trait may be attracted to using these online platforms (Fagundes et al., 2020; Hawi & Samaha, 2019; Kircaburun & Griffiths, 2018; Tang et al., 2016).

Our results reflect what would be expected in that conscious individuals are more protected with regard to SNA, in turn, Neuroticism seems to constitute a risk factor in the development of behaviors related to the problematic use of social networks. Therefore, the results allow us to infer that personality characteristics that reflect

emotional instability make individuals with these traits more vulnerable to the problematic use of social media (Hawi & Samaha, 2019; Rajesh & Rangaiah, 2020; Wegmann et al., 2017). Thus, promoting self-regulation skills and increasing individual responsibility can contribute to reducing FoMO and its consequences.

The results also showed that SNA and the personality traits Neuroticism, Agreeableness, and Extroversion positively predict FoMO. In this sense, Pontes et al. (2016) and Pornsakulvanich (2017) report that moderate use of social network and adequate psychosocial adjustment contribute to lower levels of FoMO.

Regarding the mediating role of FoMO in the relationship between personality traits and SNA, the factors Neuroticism, Extroversion, Agreeableness, and Conscientiousness were found, highlighting the results referring to Conscientiousness and Neuroticism. Thus, we can state that when the Neuroticism, Extroversion, and Agreeableness traits influence the FoMO experience, the greater the level of SNA. Regarding Conscientiousness, this had a direct and indirect negative effect on SNA.

The results obtained are similar to those found in the study by Alt and Boniel-Nissim (2018), in which the Extroversion dimension was related to the problematic use of the internet, having FoMO as a mediating variable, and with the study by Ruyandy and Kartasasmita (2021) who report that in the Conscientiousness trait, a significantly negative effect of FoMO as a mediating variable was obtained. In turn, data referring to Neuroticism can be understood by the fact that the neurotic personality shows less affection and great anxiety, just as FoMO also incorporates states of anxiety due to the loss of rewarding experiences (Alshakhsi et al., 2023; Savitri et al., 2021). Our results confirmed that FoMO plays an important role as a mediating variable. It is driven by the personality factors, which subsequently leads to Social Network Addiction.

## Conclusions

It is expected that the results of this investigation can somehow contribute to a greater understanding of the association between SNA, FoMO and personality. Also highlight that certain personality traits have a greater predisposition to SNA and FoMO. It is therefore considered that knowing the risk factors associated with Social Network Addiction and Fear of Missing Out is a necessary step to develop prevention and awareness actions among the university population, to promote a healthy use of social network and reflection on its main risks and benefits.

The present study has some limitations that may, however, pave the way for future investigations. We begin by emphasizing that this is a cross-sectional study, which therefore does not allow an assessment of the cause and effect relationship between the variables presented. Another limitation refers to the fact that some of the questionnaires were answered online, which may have led to some lack of attention on the part of the participants, due to possible distracting stimuli, although it is a widely used data collection method because it is more economical and reaches a greater number of participants in various parts of the country. Another limitation refers to the fact that the instruments are self-reported, which can lead to some bias in the responses, corresponding not to the truth of the facts, but to the participant's perception, in addition to the fact that the social desirability dimension may also have had an effect on said responses. It should also be noted that FoMOs was used for the first time in a Portuguese context, which may represent a limitation of this study. It is therefore important to continue using the FoMOs in larger and more diverse samples and to study its psychometric characteristics.

Another aspect to consider is the size and representativeness of the sample. Although the number of participants is considerable and sufficient for the type of analyses carried out and the research objectives, it is not a representative sample

of the university population, so the results should be replicated with larger samples.

Given that studies that related to Social Network Addiction, Fear of Missing Out and personality traits are still scarce, it is important to continue to develop this line of investigation. It would also be interesting in future investigations to study the impact of the excessive use of social networks in the daily life of students, particularly in the family and social context. Likewise, its SNA and FoMO, given that it is a variable where inconsistent results have been found in the literature (e.g., Horzum, 2016; Kuss & Griffiths, 2011). Qualitative studies of FoMO should be carried out for a better understanding of the behaviors and feelings of individuals resulting from the persistent desire to stay connected with people in their social network(s).

Taking into account the characterization of the participants, in the habits of using social networks, we realized that university students use of Instagram more frequently and that the mobile phone is the device that they use the most to access these platforms, so future studies can investigate the variables addition to the smartphone and addition to the social network Instagram.

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# Parenting, Sexuality and Psychological Well-Being

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

This study examined the relationship between the perception of the quality of the parent-child relationship and the acceptance of one's sexual identity and psychological well-being in young people with different sexual orientations. A quantitative study was conducted with a cross-sectional, mediational, explanatory design. The sample consisted of 246 young adults aged 18 to 25, self-identified as men or women, and with different sexual orientations. Descriptive, correlational, and linear regression analyses, including mediation analyses, were conducted. The results indicated that in all groups, the quality of the parent-child relationship was significantly and positively related to the acceptance of one's sexual identity and psychological well-being, but only in the group of men with sexual orientations other than heterosexual was identity acceptance related to psychological well-being; in this group, sexual identity acceptance acted as a mediator between the quality of the parental relationship and well-being. The results can be considered in future studies, with emphasis in men with diverse sexual orientations, to formulate programs promoting health in young adults, in which sexuality factors are considered.

*Keywords:* sexuality, well-being, parenting, family.

### **Crianza, sexualidad y bienestar psicológico**

#### **Resumen**

Este estudio examinó la relación entre la calidad de la relación parento-filial, y la aceptación de la propia identidad sexual y el bienestar psicológico en jóvenes con diferentes orientaciones sexuales. Se realizó un estudio cuantitativo, mediacional, explicativo, y transversal. Participaron 246 jóvenes con edades entre los 18 y 25 años, identificados como hombres o mujeres, y con diferentes orientaciones sexuales. Se realizaron análisis descriptivos, correlaciones y de regresiones lineales, incluyendo análisis de mediación. Los resultados indicaron que la calidad de la relación parento-filial se relaciona significativa y positivamente con la aceptación de la identidad sexual y el bienestar psicológico, pero únicamente en jóvenes hombres con orientaciones sexuales diferentes de la heterosexual, la aceptación de la identidad sexual se relacionó con el bienestar psicológico; en quienes esta aceptación media la relación entre la calidad de la relación parento-filial y el bienestar. Los resultados se pueden considerar en futuros estudios con énfasis en hombres con orientaciones sexuales diversas, para formular de programas de promoción de la salud en jóvenes, que incluyan la sexualidad.

*Palabras Clave:* sexualidad, bienestar, parentalidad, familia.

## Introduction

Family dynamics, particularly the quality of relationships with parents, influence children's psychological well-being. Positive relationships with caregivers improve affective bonds (Granja & Pinheiro, 2017) and mental health (Neumann & Rohmann, 2023). The evidence shows that, in young people, the perception of the quality of the relationship with their parents influences the construction of their sexual identity and their psychological well-being. However, it is unknown how this association is modified by the union of gender and sexual orientation (Hubachek et al., 2023). Considering these unaddressed topics, the present study proposes that, from the perspective of young persons with different sexual orientations, sexual identity may mediate the association between the perceived quality of their relationship with their parents and their well-being.

Sexuality as a facet of identity (Vargas-Trujillo, 2013) has been examined mainly in people with sexual identities that differ from normative models, mainly in those who self-identify as lesbian, gay, or bisexual (LGB). This prior work has sought to explain these sexual orientations (Brady & Busse, 1994; Cass, 1984; Herek, 2003), mainly as part of an interest in understanding the development of identity in these minorities and their families (Savin-Williams & Ream, 2003; Simon & Farr, 2022). Additionally, the approach used by these groups emphasizes the difficulties with relationships within and without the family when facing homophobia or biphobia, which often takes the form of harassment, with a negative impact on sexual and mental health (Devis-Devis et al., 2022; Marzetti et al., 2022; McIntosh et al., 2022). The majority of studies have followed an ease-centered approach, aiming to determine the influence of family dynamics on the mental health of children using exclusively indicators of anxiety, depression, or stress (Gardner & Zimmer-Gembeck, 2018). On the other hand, from a positive perspective, there have been studies focusing on the benefits of self-acceptance of sexual identity

on the well-being of young adults with diverse minority sexual orientations, which have shown improvements in autonomy and positive relationships (Castro, 2007; Rincón, 2004; Steever et al., 2014; Vargas-Trujillo et al., 2003).

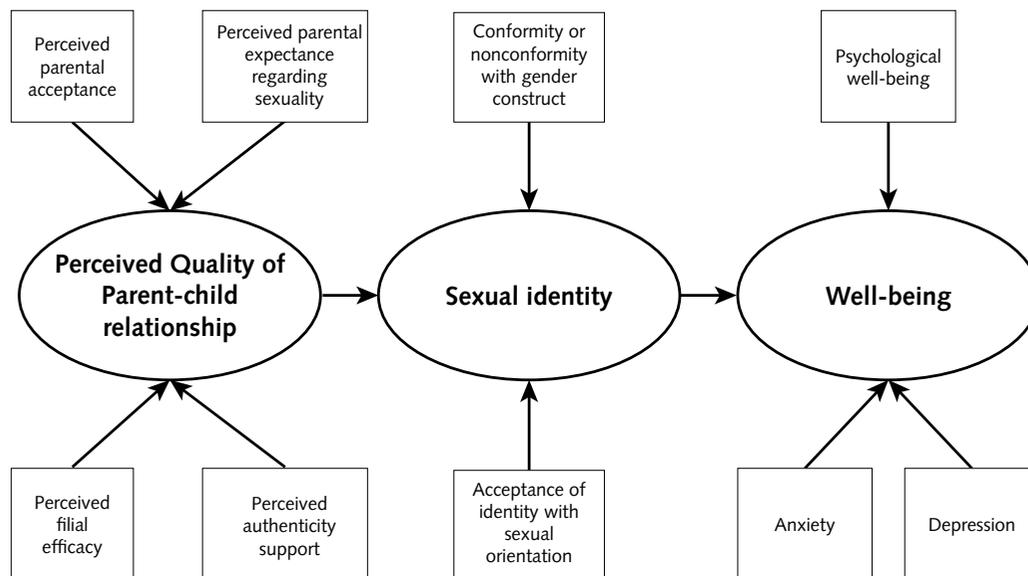
Research in young adults suggests that aspects of parenting, as attachment, parenting styles, the perception of parental acceptance, and the perception of parental efficacy, favor well-being (Hubachek et al., 2023; Rincón, 2004). However, the lack of identification of the sexual orientation in the samples of some of the studies, and other dimensions as gender identity, has limited examinations of the role that sexual identity may have in mediating the association between family dynamics and son's well-being (Granja & Mota, 2018; Granja & Pinheiro, 2018; Holtzen et al., 1995; Neumann & Rohmann, 2023). Few studies focusing on heterosexual subjects suggest that their sexual identity is favorable for that relationship. In contrast, in youngsters with diverse minority sexual orientations, relationships are negatively affected by stigmatization, inconsistency with conventional parental expectations, and finally by a scarcity of parental support (Marzetti et al., 2022; Newman et al., 1993; Willoughby et al., 2006). Regarding this last aspect, Harter (2014) proposes that identity consolidation in young adults fosters mental health. This author also proposes that authentic identity (that in which subjects express themselves according to their preferences) favors improved well-being. Authentic identity requires the acceptance of self-identity and the willingness to express it in social settings. The closer that identity approximates the positively valued social imaginary, the greater the disposition for its acceptance and expression (Savin-Williams & Ream, 2003).

The above suggests that sexual identity in both heterosexual and sexually minority diverse persons mediate the relationship between family dynamics and well-being. Thus, the purpose of this study was to estimate the association between the perceived quality of the Parent-child relationship

and psychological well-being and to evaluate the role of sexual identity as a mediating variable in a group including subjects who were heterosexual and of other sexual orientations (homosexual and bisexuals), we will now specify the variables included in this study, followed by definitions and a presentation of recent evidence associated with the research problem. These variables were the perceived quality of Parent-Child relationships from an acceptance-rejection perspective, perceived parents-filial efficacy, perceived support of authenticity, and perceived parental expectations

regarding the sexual expectations for children (paternal and maternal). As possible mediators, we included two dimensions of sexual identity: sexual orientation acceptance and the degree of conformity with conventional social gender imaginaries. Finally, well-being was explored using the components of psychological well-being and authenticity, and an approximation to the absence of well-being was made from anxiety and depression. Figure 1 shows the relationship model proposed for this study.

**Figure 1.** Proposed mediational model.



### Perceived Quality of the Parent-Child Relationship

This construct was evaluated using the following three variables:

#### Perceived parental acceptance-rejection.

This variable represents the idea youngsters develop regarding whether or not their parents accept them as they are (Vargas & Barrera, 2002). Perceived acceptance comes from the need to receive a supportive and caring affective response

from parental figures (Rohner, 2004). The evidence has reported that youngsters who perceive greater acceptance are more psychologically well-adjusted because they develop a positive self-image. Some studies have shown that this is associated with enhanced mental health in young adults, but in those with minority sexual orientations, there is an increased risk of perceiving rejection from their parents, negatively affecting mental health (Davis & Anderson, 2021; Fuller & Rutter, 2018).

### **Perceived filial efficacy**

This variable corresponds to youngsters' beliefs regarding their ability to openly discuss personal issues with their parents (Caprara et al., 2004). This belief may influence authenticity because it implies a willingness to express oneself from one's identity openly. According to recent systematic reviews, authenticity is associated with perceived parental efficacy in adolescents (Alchin et al., 2023) and emerging adults (Son & Updegraff, 2023).

### **Perceived authenticity support**

Harter (2005) defined this variable as the perceived level of support that youngsters feel from their parents or caregivers. Studies that have evaluated perceived support of authenticity in youngsters have found that it promotes well-being by enhancing autonomy (Assor, 2017). According to Alchin et al. (2023), this perceived support is inferior in youngsters with diverse minority sexual orientations.

### **Perceived parental expectations regarding sexuality**

These expectations correspond to the perception that youngsters have regarding the expectations that their parents have concerning their sexuality (Baumrind, 1995; Maccoby & Andrade, 1966). An expectation is a mental representation (Bandura, 1997) regarding the probability that a given event will occur (Feather, 1982). Perceived "anti-minority" parental expectations in youngsters with diverse minority sexual orientations increase mental health risk, while they favor it in heterosexual youngsters (Hubachek et al., 2023).

### **Sexual identity**

#### ***Sexual orientation acceptance***

Acceptance of sexual orientation corresponds to the degree of acceptance of the sex of the people a person is affective (Savin-Williams & Ream, 2003) or sexually attracted to (Goggin, 1993). This

acceptance is influenced by the degree of stigmatization of diverse minority sexual orientations in social settings, including the family subsystem (Konik & Stewart, 2004), which influences psychological well-being (Rincón, 2004).

### ***Conformity or nonconformity with social gender constructs***

This variable corresponds to the constructs of masculinity and femininity, transmitted implicitly and including behaviors typified by the sex with which a person identifies (Addis et al., 2003; Denmark et al., 2000). Greater acceptance of one's constructs of gender identity promotes psychological well-being (Bejakovich et al., 2018).

### **Well-being**

#### ***Psychological well-being***

The concept of psychological well-being comes from the eudaimonic perspective. Following Ryan & Deci (2001), it privileges the satisfaction of the needs for relatedness, competence, and autonomy. Ryff (1989, 1995, 2018) conceives well-being as a multidimensional construct that includes six dimensions: autonomy, self-acceptance, purpose in life, personal growth, positive relationships, and environmental mastery. Studies have shown that psychological well-being varies as a function of sexual identity and the quality of the parent/caregiver-child relationship (Becker et al., 2014; Rieger & Savin-Williams, 2012).

#### ***Authenticity***

Authenticity is the disposition to interact with others from the constitutive personal characteristics of one's identity (Harter, 2014). Persons with high levels of authenticity are self-assured, owing to the high degree of self-knowledge, self-acceptance, and self-worth. This variable is positively associated with psychological well-being (Kim et al., 2022; Murphy et al., 2020) and negatively with anxiety or depression (Ito & Kodama, 2005).

### *Anxiety and depression*

Zung (1972) defines *anxiety* as a mood disequilibrium without an apparent explicit reason that generates restlessness and feelings of anguish, and depression as the constant presence of a negative mood regardless of life's circumstances (Zung, 1986). Evidence from some studies shows that limited interaction with parents when disapproval is inferred increases feelings of discomfort (Sheeber et al., 2007), as it happens when sons perceive themselves as belonging to the negative imaginaries of the variations of social gender constructs or to non-normative sexual orientations (Herek & Garnets, 2007; Hubachek, 2023).

### **Aim of the study**

To assess the association between the perceived quality of parent-child relationship, sexuality, and psychological well-being of young adults with different sexual orientations.

### **Specific objectives**

To examine the association between acceptance of sexual orientation and gender conformity with authenticity, and psychological well-being.

To determine if there are differences between the study variables that are attributable to sex and sexual orientation.

To establish the differences in the magnitude and direction of the associations between the study variables depending on the participants' sex and sexual orientation.

To analyze whether the relationship between the quality of the Parent-Child relationship and psychological well-being can be explained by the mediation of the degree of sexual orientation acceptance and gender conformity.

### **Method**

This study used a quantitative, mediational, explanatory design. The statistical method of analysis of this study was the mediational analysis.

### **Participants**

The sample consisted of young adults between 18 a 25, regardless of prior education or socioeconomic status. Subjects were contacted over a 5-month period using through interest groups of young people with diverse sexual orientations. The study gathered a non-random sample of 246 subjects, 127 men and 119 women between 18 and 25 years ( $m=20.73$ ,  $SD=2.28$ ), who resided in the city of Bogotá, Colombia and voluntarily answered the study questionnaires. Table 1 shows the characteristics of the sample by sex and sexual orientation with which participants identified themselves.

**Table 1**  
*Sample characteristics by sex and sexual orientation*

Sex	Sexual orientation		Total	
Male	Heterosexual	66	127	
	Diverse minority sexual orientation	Homosexual		45
		Bisexual		16
Female	Heterosexual	64	119	
	Diverse minority sexual orientation	Homosexual		20
		Bisexual		35
Total			246	

## Instruments

To evaluate the variables related to the study variables we used of the following instruments. The authors who designed the original version of these instruments reported high levels of construct validity in their psychometric studies. In the adapted versions to Spanish used in the present study, only the reliability index (Cronbach's Alpha) was reported.

### Perceived acceptance rejection

The abridged version of the *Parental Acceptance and Rejection Questionnaire* was developed by Rohner et al. (1991) and reviewed by Rohner and Ali (2020). In this study we used the Spanish version of this instrument validated in Colombia by Ripoll-Nuñez & Alvarez (2008). This scale comprised 48 items that evaluated the perceived paternal and maternal acceptance-rejection. Higher scores represent high levels of perceived parental acceptance, in terms of their satisfaction and positive evaluation. The items are answered with a 4-point Likert scale (1 "Almost never true", 4 "almost always true"). Cronbach's alpha for perceived maternal and paternal acceptance was 0.91.

### Perceived filial efficacy

We used a translated version (by the authors) of *The Parental filial – efficacy Questionnaire* developed by Caprara et al. (2004). This instrument consisted of 12 items that evaluate the perceived ability to hold an open communication with parents. Higher scores represent young adults' perception of parental disposition for an open communication. The items are answered with a 7-point Likert scale (1 "Not well at all", 7 "Very well"). Cronbach's alpha was of 0.92.

### Perceived parental expectations

An Ad hoc questionnaire (which underwent pilot testing) to assess perceived parental expectations was designed for the project. This instrument aimed to evaluate young adults' beliefs about their parents' expectations regarding their

sexuality. This questionnaire consisted of 13 items. The items are answered with a 5-point Likert scale (1: "Completely disagree", 5: "Completely agree"). High scores represent the young adults' perception of parental traditional expectations about their sexuality (consistent with heteronormative sexual identity). Cronbach's alphas for the final sample in the study were 0.75 and 0.77 for paternal and maternal expectations, respectively.

### Perceived support of authenticity

We used *The Perceived Support of Authenticity Questionnaire* designed by Vargas-Trujillo et al. (2011), to assess the participants' perceived support of authenticity, which was based on Harter's (2014) conceptualization of authenticity. The questionnaire consisted of 25 items that assessed perceived support of authenticity in the family setting; the items are answered with a 4-point Likert scale (1: "Completely false in my case", 4: "Completely true in my case"). Higher scores represents young adults' perception of their authenticity; Cronbach's alpha for this questionnaire was of 0.84.

The instruments used to assess sexual identity were the following scales:

### Conformity with social gender constructs

We used *The Gender Identity Instrument* designed by Rojas (2007), which evaluated the degree of conformity with social norms as a function of the sex with which the person identifies. This instrument consisted of 12 items which were answered using a 4-point Likert scale (1: "Completely false in my case", 4: "Completely true in my case"). Higher scores represent high levels of conformity with traditional social gender norms. Cronbach's alpha for this questionnaire was 0.84.

### Acceptance of sexual orientation

To evaluate this variable, we used Vargas-Trujillo & Castro (2011) adaptation of *The Gay Identity Questionnaire* (designed by Brady & Busse, 1994). This questionnaire consisted of 19 items that evaluated the degree of acceptance of one's

sexual orientation. The items are answered as true and false. Cronbach's alpha for this questionnaire was 0.89. Higher scores represent high levels of self-acceptance of sexual orientation. Additionally, participants were asked the following question: ¿What sexual orientation you use to self-define your sexual orientation? They responded by using these five options: heterosexual, homosexual, bisexual, Other ¿Which? And "Don't know".

The evaluation of well-being used the following questionnaires:

#### *Psychological well-being*

To evaluate psychological well-being, we used the Spanish version of Ryff (1989) *Psychological Well-being Scale* (validated by Rincon, 2004). This scale evaluates the levels of self-perceived psychological eudaimonic well-being in terms of self-realization. This version consisted of 39 items that evaluated the six dimensions of the construct. This scale corresponds to the Spanish validated version of the instrument Diaz et al. (2006). The items are answered with a 6-point Likert scale (1 "Completely disagree", 6 "Completely agree"). Higher scores represent high levels of psychological well-being. Cronbach alphas for the three dimensions of the scale (Self-acceptance, Purpose in life, and Positive relationships) ranged from 0.76 and 0.80; the Cronbach alpha for the overall scale was 0.88.

#### *Authenticity*

To evaluate this variable, we used *The Scale of Authenticity* developed by Vargas & Barrera (2002), which was based on Harter's (2014) guidelines. This questionnaire consisted of 25 items. The items are answered with a 4-point Likert scale (1: "Completely false in my case", 4: "Completely true in my case"). Higher scores represent high levels of authenticity which represent the person's tendency to express themselves openly in all life scenarios. Cronbach's alpha for this instrument was 0.81.

#### *Anxiety and depression*

The presence of symptoms of anxiety was evaluated by using the *Self-Rating Anxiety Scale* (Zung, 1972) validated in the country in Colombia by De la Ossa et al., (2009) and Osma-Zambrano et al. (2019). The presence of symptoms of depression was evaluated using the *Self-Rating Depression Scale* (Zung, 1978), validated in Colombia by Campos-Arias et al. (2005). These questionnaires consisted of 20 items each and are answered using a 4-point Likert scale (1 "rarely" and 4 "Always"). Cronbach's alpha for the anxiety symptoms scale was 0.82 and 0.89 for the symptoms of depression scale.

#### **Analysis and procedures**

This study was approved by the Ethical Committee of the College of Social Science at the University of Los Andes. All participants voluntarily signed an informed consent forms which contained the study's goals and details of their participation. Data analysis was conducted using the statistical software SPSS (v.16). The analysis of the data included descriptive analyses (including the central trends and dispersion statistics, the analysis of symmetric, and kurtosis to confirm that there were not outliers), the verification of the normal distribution assumption by using the Kolmogorov-Smirnov test-according to the considerations of Habibzadeh, (2024), and bivariate correlation analyses for each of the four groups defined by sex and sexual orientation. Finally, we carried out mediation analysis using Baron and Kenny's (1986) successive regression method. We evaluated the hypothesis of bias in the results due to collinearity. We calculated Sobel's Z in cases in which mediation was identified and only the cases where the value was  $z > 1.96$ , then the mediation was confirmed.

#### **Results**

Results from the correlational analysis showed that the dimensions of the parent-child relationship have significant positive relationship with sexual

identity and well-being in the entire sample, but only in the men and women with sexual diversity identities, the sexual identity plays the roles of a

mediational variable between parent-child relationship and well-being. Table 2 shows the results of the correlation analysis.

**Table 2**

*Correlations Between the Perceived Quality of the Parent-Child Relationship, Sexual Identity and Well-Being in Each Group by Sex and Sexual Orientation*

			Quality of the parent-child relationship					
			Perceived acceptance		Perceived filial efficacy	Perceived support of authenticity	Perceived expectations	
			Maternal	Paternal			Maternal	Paternal
Heterosexual women	Sexual identity	Conformity with social gender constructs	0.05	0.37**	0.36**	0.33**	0.49**	0.36**
		Acceptance of sexual orientation	0.14	0.16	0.19	0.32**	0.38**	0.36**
	Well-being	Psychological Wellbeing	0.38**	0.35**	0.42**	0.50**	-0.14	0.31*
		Authenticity	0.25**	0.06	0.38**	0.24*	-0.25*	0.11
		Symptoms of depression	-0.07	-0.10	-0.41**	-0.46**	-0.07	-0.36**
		Symptoms of Anxiety	-0.32**	-0.33	-0.30**	-0.37**	-0.08	-0.18
Heterosexual men	Sexual Identity	Conformity with social gender constructs	0.27*	0.28*	0.22	0.24*	0.35**	0.27*
		Acceptance of sexual orientation	0.44**	0.59**	0.20	0.32**	-0.22	-0.07
	Well-being	Psychological Wellbeing	0.74**	0.60**	0.34**	0.69**	-0.19	-0.27*
		Authenticity	0.35**	0.33**	0.27*	0.45**	-0.11	0.09
		Symptoms of depression	-0.48**	-0.31**	-0.11	-0.38**	-0.09	0.02
		Symptoms of Anxiety	-0.29**	-0.20	0.04	-0.26**	-0.06	0.13
Women with diverse sexual orientations	Sexual Identity	Conformity with social gender constructs	0.89**	0.85**	0.83**	0.61**	0.03	0.31*
		Acceptance of sexual orientation	-0.92**	-0.96**	-0.95**	-0.13	0.07	-0.53**
	Well-being	Psychological Wellbeing	-0.48**	-0.47**	-0.41**	-0.78**	-0.49**	0.18
		Authenticity	0.11	-0.02	-0.04	0.83**	0.03	-0.43**
		Symptoms of depression	-0.07	-0.12	-0.16	0.75**	0.51**	0.48**
		Symptoms of Anxiety	-0.18	-0.33**	-0.32*	0.69**	0.04	-0.34
Men with diverse sexual orientations	Sexual Identity	Conformity with social gender constructs	0.16	0.33**	0.14	0.20	0.01	-0.09
		Acceptance of sexual orientation	0.76**	0.48**	0.13	0.34**	-0.50**	-0.40**
	Well-being	Psychological Wellbeing	0.55**	0.51**	0.28*	0.55**	-0.70**	-0.53**
		Authenticity	0.38**	0.34**	0.08	0.55**	-0.57**	-0.51**
		Symptoms of depression	-0.34**	-0.49**	-0.35**	-0.45**	0.43**	0.38**
		Symptoms of Anxiety	-0.11	-0.23	-0.12	-0.33**	0.07	0.04

\*p<0,05; \*\*p<0,01

In the group of heterosexual women, the majority of the variables of perceived quality of the Parent-Child relationship, except for perceived maternal acceptance, were significantly and positively correlated with conformity with social gender constructs. In this same group, only perceived support of authenticity and perceived maternal and paternal expectations regarding sexuality were significantly and positively correlated with sexual orientation. Likewise, most of the variables of perceived quality of the Parent-Child relationship were significantly and positively correlated with psychological well-being, except for perceived maternal expectations regarding sexuality. Finally, in this group, with some variations in the measures of perceived quality of the Parent-Child relationship, the correlations with symptoms of anxiety and depression were negative. Additionally, acceptance of sexual orientation was significantly correlated with psychological well-being. In the group of heterosexual men, the majority of the variables of perceived quality of the Parent-Child relationship were significantly and positively correlated with conformity with social constructs of masculinity, except for perceived filial efficacy. Additionally, in this group, conformity with social gender constructs was significantly and negatively correlated with symptoms of depression.

In the group of women with diverse minority sexual orientations, most of the measures of perceived quality of the Parent-Child relationship, except perceived maternal expectations, were significantly and positively correlated with conformity with social gender constructs. The relations between the study variables and the conformity with social gender constructs were all positive.

Something similar occurred with acceptance of sexual orientation with most of the measures of perceived quality of the Parent-Child relationship, except perceived paternal expectations and support of authenticity; in that case, the correlations were significant but negative. Similarly, a negative correlation was found between the perceived quality of the Parent-Child relationship measures

and psychological well-being. Results showed a positive correlation between the perceived quality of Parent-Child relations and depression. On the other hand, in this same group these results showed negative relationship between Parent-Child Relationship and anxiety. This should be analyzed in this group, taking into consideration that acceptance of sexual orientation and psychological well-being are significantly and positively correlated. These findings suggest that well-being and diverse or non-normative sexual orientation in this group of women find the family setting to be an unfavorable setting for the development of a motivational component of sexuality —sexual orientation— while finding it favorable for the development of the social component —conformity with traditional gender identity. These results are limited to a descriptive account of the findings, without any inferential analysis. Additionally, in this particular group, more than half of the relationships were negative, making the findings of this group the most divergent compared to the others.

In the case of men with diverse sexual orientations, only the perception of paternal acceptance was significantly and positively correlated with conformity with social gender constructs. Most measures of perceived quality of the Parent-Child relationship were significantly correlated with acceptance of sexual orientation, except perceived filial efficacy. Additionally, in the case of perceived paternal and maternal expectations regarding sexuality, the correlation with acceptance of sexual orientation is negative. Similar findings were obtained for psychological well-being and authenticity for this group, with which correlations were positive and with symptoms of anxiety and depression. In this group, acceptance of sexual orientation was also significantly and positively correlated with the two measures of well-being and negatively with symptoms of depression.

Table 3 shows the results of the correlation analysis between measures of sexual identity and measures of well-being.

**Table 3***Correlations Between Sexual Identity and Well-Being in Each Group by Sex and Sexual Orientation*

Sample	Dimensions of wellbeing	Sexual identity	
		Conformity with social gender constructs	Acceptance of sexual orientation
Heterosexual women	Psychological wellbeing	0.16	0.26*
	Authenticity	-0.14	-0.01
	Symptoms of depression	-0.08	-0.16
	Symptoms of anxiety	0.08	-0.17
Heterosexual men	Psychological wellbeing	0.15	0.21
	Authenticity	0.02	0.13
	Symptoms of depression	-0.24*	-0.07
	Symptoms of anxiety	-0.17	0.05
Women with diverse sexual orientations	Psychological wellbeing	-0.79**	0.47**
	Authenticity	0.38**	0.07
	Symptoms of depression	0.29*	0.20
	Symptoms of anxiety	0.07	0.46**
Men with diverse sexual orientations	Psychological wellbeing	-0.05	0.58**
	Authenticity	-0.01	0.61**
	Symptoms of depression	-0.06	-0.34**
	Symptoms of anxiety	0.13	-0.12

\*p&lt;0,05; \*\*p&lt;0,01

Considering the results of this part of the correlations, presented in Table 3, only the cases where the correlation between well-being variables and sexual identity were found as significant, the mediation statistical analysis was then tested.

The mediation analysis was based on the results of the bivariate correlation analyses for the four groups; based on these results, we considered only the groups of men and women with diverse

sexual orientations. The inclusion of these groups was based on the simultaneous correlations between the perceived quality of the Parent-Child relationship, measures of sexual identity and well-being, and sexual identity and well-being. We analyzed all possible mediation models, finding mediation only in the three models shown in Table 4.

**Table 4***Mediation Analyses Found in Women and Men with Diverse Sexual Orientations*

	Dependent variable: wellbeing Independent variable: perceived maternal acceptance Mediator variable: acceptance of sexual orientation			
	Regression models			
	1 <sup>st</sup> Perceived maternal acceptance on wellbeing	0.28	0.46	0.00
	2 <sup>nd</sup> Perceived maternal acceptance on acceptance of sexual orientation.	0.56	0.75	0.00
	3 <sup>rd</sup> Acceptance of sexual orientation on wellbeing	0.34	0.39	0.01
	4 <sup>th</sup> Perceived maternal acceptance and acceptance of sexual orientation on wellbeing.	0.34	0.24	0.12
	(Sobel test, z value = 2.37)			
	Dependent variable: authenticity Independent variable: perceived maternal acceptance. Mediator variable: acceptance of sexual orientation.			
	Regression models			
	1 <sup>st</sup> Perceived maternal acceptance on authenticity	0.12	0.37	0.00
	2 <sup>nd</sup> Perceived maternal acceptance on acceptance of sexual orientation	0.56	0.75	0.00
	3 <sup>rd</sup> Acceptance of sexual orientation on authenticity	0.39	1.98	0.00
	4 <sup>th</sup> Perceived maternal acceptance and acceptance of sexual orientation on authenticity	0.39	0.19	0.21
	(Sobel test, z value = 4.25)			
	Dependent variable: authenticity Independent variable: perceived paternal acceptance Mediator variable: acceptance of sexual orientation			
	Regression models			
	1 <sup>st</sup> Perceived paternal acceptance on authenticity	0.09	0.33	0.01
	2 <sup>nd</sup> Perceived paternal acceptance on sexual orientation	0.21	0.48	0.00
	3 <sup>rd</sup> Acceptance of sexual orientation on authenticity	0.38	0.61	0.00
	4 <sup>th</sup> Perceived paternal acceptance and acceptance of sexual orientation on authenticity	0.38	0.40	0.74
	(Sobel test, z value = 3.06)			
Men with diverse sexual orientations				

Mediation is considered to be present only if a reduction in the significance of the association is observed when including both the predictive and mediator variables in the fourth regression.

In men with diverse minority sexual orientations, the positive relationship between perceived maternal acceptance and perceived psychological wellbeing varies as a function of the degree of acceptance of sexual orientation. The greater the acceptance of sexual orientation, the stronger the relationship between perceived maternal acceptance and wellbeing. The same phenomenon was observed with authenticity, for both maternal and paternal expectations. We conclude that only in men youngsters with diverse minority sexual orientations, the degree of acceptance of sexual orientation mediates the relationship between perceived quality of the Parent-Child relationship and well-being.

### Discussion

The results of this study allowed us to observe that relationships for groups classified by sex and sexual orientation were overall positive, with mediations observed only for men with diverse minority sexual orientations. When men young adults perceived that they were accepted by their parents and encouraged to express themselves authentically, they perceived more significant levels of psychological well-being and authenticity. The magnitude and significance of this association increase in men with diverse sexual orientations as long as there is a concomitant increase in acceptance of sexual identity.

The relationship between the perceived quality of the parent-child relationship and sexual identity confirms what Savin-Williams & Ream (2003) and Hubachek et al. (2023) have suggested regarding the role of parental relationships in the development of the sexual identity of people with diverse sexual orientations. This was only found in the male cases.

According to these authors, the perception of positive relationships between caregivers and

their children reduces stigmatization (Herek, 2003; McIntosh et al., 2022).

The results showed a significant positive association between the perception of parental relationships, sexuality (social gender constructs and sexual orientation), and well-being in heterosexual women and men. The association between these variables was different for non-heterosexual women and men. In women, we found a significant and negative correlation between the perceived quality of Parent-Child relationships and acceptance of sexual orientation. In men, we found a significant and positive correlation between the perceived quality of Parent-Child relationships, conformity with social gender constructs and acceptance of sexual orientation. These findings could be related to the support perceived when there is not correspondence with normative sexuality models, especially in the male cases (Konik & Stewart, 2004). However, further study is required in the group of non-heterosexual women, given the counterintuitive results, also considering that in their cases, the mediation was not found. However, one might think that women with diverse sexual orientations do not consider their gender identity constructs to be contrary to parental expectations, giving rise to a negative correlation (Figueroa & Tasker, 2020). In men, greater perceived parental acceptance is positively correlated with their gender identity constructs (Conlin et al., 2019). This difference between women and men with diverse sexual orientations regarding the perception of parental social support, and parental acceptance rejection is not found in studies from different cultural contexts (McCurdy & Russell, 2023); a similar case occurs concerning the identity acceptance with sexual orientation (Taylor & Neppel, 2023).

The findings showed positive correlations in all four groups between perceived support of authenticity and sexual identity, which supports the role of perceived positive relationships with parents and support of authenticity in shaping the well-being of youngsters (Harter, 2014). Regarding

the relationship between sexuality and well-being, the results support the approach suggested by Ryff (1995) regarding the importance of self-acceptance in the well-being of individuals since this favors the development of autonomy, environmental mastery, and positive relationships. Additionally, these results support the point of view of Harter (2014) who suggested that acceptance of the different dimensions of identity—including the sexual dimension— encourages youngsters to express themselves according to their feelings and thoughts, thus supporting their well-being (Harter, 2014).

The findings regarding mediation showed that sexuality plays a role in the relationship between parental relationships and well-being. These findings are consistent with the results of Figueroa and Tasker (2020), who reported that positive relationships with parents are related to the acceptance of sexual identity in young people. Likewise, family settings that favor acceptance of sexual identity foster well-being in this stage of life (García-Mendoza et al., 2019) and reduce symptoms of anxiety and depression (Herek, 2003; Queen et al., 2013).

The results highlight the importance of parental relationships in shaping environments that foster the development of sexuality and the well-being of youngsters. Despite this, it is essential to point out the limitations of this study. The first corresponds to the limited sample size, which limits the generalization of the results, especially when considering the number of participants in each group divided by sex and sexual orientation. The second limitation is based on the type of non-probabilistic convenience sampling. Probabilistic sampling, which samples participants in appropriate proportions from each socioeconomic and educational level, would favor sample diversity and increase the external validity of the results. The third relates to the fact that some instruments may require validation in this context (authenticity and perceived support of authenticity, even though they showed appropriate levels of reliability in the

present study). Finally, it would be worthwhile to develop a greater understanding of the social and cultural aspects involved in the construction of sexual identity and their relationship with Parent-Child interaction dynamics. Some interesting questions remain regarding the variables that may help us understand why, particularly, in men with diverse sexual orientations, the mediation influences positive indicators of mental health. Further research is required on the characteristics of gender constructs as a function of the sex with which a person identifies. This would help us understand these phenomena in a way that it would allow us to propose treatment and prevention strategies to foster mental health in youngsters. The complexity of the configuration of sexual identity and the constant changes in context will make it necessary to carry out studies with different methodologic and paradigmatic approaches.

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# Unveiling the Psychometric Properties of the Satisfaction with Life Scale: An Item Response Theory Study in Gay Adults

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SCIENTIFIC RESEARCH ARTICLE

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### **Abstract**

The Satisfaction with Life Scale (SWLS) has been validated in heterosexual individuals using Classical Test Theory (CTT). The aim of the present study was to analyze the psychometric properties of the SWLS using Item Response Theory (IRT) to address gaps in the existing literature. The original structure comprising five items, as well as an abbreviated version with four items, were examined in a sample of 400 cisgender gay people from Lima, Peru. The results confirmed the unidimensionality of the scale in both versions, which demonstrated adequate psychometric properties with slight differences. Both versions can be used interchangeably without affecting the scale's structure. However, if the objective is to assess more accurately across a broader range of abilities, the 5-item version appears to be superior. Practical implications are discussed.

*Keywords:* Item Response Theory, satisfaction with life, cisgender gay people, sexual orientation, psychometric properties.

### **Desvelando las Propiedades Psicométricas de la Escala de Satisfacción con la Vida: Un Estudio de Teoría de Respuesta al Ítem en Adultos Homosexuales**

#### **Resumen**

La Escala de Satisfacción con la Vida (SWLS) cuenta con múltiples validaciones en personas heterosexuales desde la teoría Clásica de Tests (CTT). El objetivo del presente estudio fue analizar sus propiedades psicométricas a partir de la Teoría de Respuesta al Ítem (TRI). Se examinó la estructura original de cinco ítems y una versión abreviada de cuatro, en una muestra de 400 personas gais cisgénero de Lima (Perú). Los resultados confirmaron la unidimensionalidad de la escala en sus dos versiones, con adecuadas propiedades psicométricas y ligeras diferencias. Ambas versiones pueden ser utilizadas indistintamente sin afectar su estructura, pero si el objetivo es evaluar con mayor precisión en el rango de habilidades, la versión de 5 ítems parece ser superior. Se discute sus implicancias a nivel práctico.

*Palabras clave:* Teoría de Respuesta al Ítem, satisfacción con la vida, personas homosexuales cisgénero, orientación sexual, propiedades psicométricas.

## Introduction

The study of well-being has become a significant focus within psychology, particularly in developed societies where its measurement is of growing concern (Helliwell et al., 2023; Lingán-Huamán et al., 2024). Its relationship with health is indisputable, extending beyond the absence of disease to encompass an enhanced quality of life (Fernández-López et al., 2010; World Health Organization [WHO], 2014).

Psychological research identifies two main approaches to well-being: the hedonistic and eudaimonic. The hedonistic approach focuses on pleasure and the avoidance of pain (Diener et al., 2009; Ryan & Deci, 2001), while the eudaimonic approach emphasizes human potential and self-realization (Ryan & Deci, 2001; Ryff & Singer, 2008). The former frames Subjective Well-Being (SWB) as an individual's assessment of life satisfaction (LS), whereas the latter views Psychological Well-Being (PWB) as a relational construct tied to life's meaning (Keyes et al., 2002; Pavot, 2014; Ryan & Deci, 2001).

This study focuses on LS, a component of SWB that reflects its evaluative-critical aspect without directly addressing the emotional experience of happiness associated with the affective component. LS represents a global assessment of quality of life, based on personal and subjective appraisals that compare one's current state with an ideal life state (Diener et al., 1985, Diener et al., 2018; Shin & Johnson, 1978). The construct can be measured using the Satisfaction with Life Scale (SWLS), developed by Diener et al. (1985). This instrument is widely used and has been adapted in multiple countries (Emerson et al., 2017; Jovanović et al., 2022; Pavot & Diener, 2008; Pavot, 2014). However, when evaluating its psychometric properties, sexual orientation has not been explored. This leaves a gap in knowledge and an opportunity for research in individuals with diverse sexual orientations.

For sexual minorities, LS reflects the attainment of their rights, including access to a strong healthcare system, equal employment

opportunities, participation in political decisions, and, most importantly, the assurance of acceptance and protection from violations (Badgett & Sell, 2018). However, in many countries, heteronormative views on sexuality persist (Ading et al., 2021; Bartram, 2021; Petrou & Lemke, 2018; Zambrano, 2022). Research has shown that discrimination and/or homophobia are linked to increased stress levels (Elmer et al., 2022; Meyer, 2003; Michaels et al., 2019; Pepping et al., 2018), as well as a negative perception of life (Douglas et al., 2020). Such experiences hinder self-acceptance (Batten et al., 2020; Camp, 2020; Peng et al., 2020; Pineda-Roa et al., 2021) and contribute to low levels of LS (Checa et al., 2022; Michaels et al., 2019; Petrou & Lemke, 2018).

The study of life satisfaction (LS) in sexual minorities is an emerging field (Checa et al., 2022; Herran, 2022; Michaels et al., 2019; Petrou & Lemke, 2018); however, there is a lack of adapted or validated instruments to assess it. One review identified a study in Spain that examined the sexual orientation invariance of the SWLS. The study's primary findings included the demonstration of satisfactory psychometric properties and sexual orientation invariance. However, the sample size ( $n = 212$  heterosexuals, 182 gays, and 138 bisexuals) and the heterogeneity of the analysis of the results were identified as limitations (Checa et al., 2022). In Peru, the SWLS was employed in a correlational study with LGBT individuals, but no data on its psychometric properties were provided (author, 2022).

The SWLS consists of five items with seven response options (Pavot & Diener, 1993). The scale has a unifactorial structure and demonstrates relationships with other constructs linked to well-being, as well as clinical measures of anxiety and depression. It also shows high internal consistency ( $\alpha$  between .79 and .89) and temporal stability (test-retest reliability of .83). Notably, the use of short scales like the SWLS offers significant advantages when the goal is to efficiently assess psychological traits in large populations through

large-scale applications (Kjell & Diener, 2021; Sandy, 2017). Some researchers suggest that reducing the number of response options may help to minimize errors in participants' response patterns (Álvarez-Merlano & Castro-Bocanegra, 2022; Atienza et al., 2000; Flaskerud, 2012; Hanzlová, 2022; O'Connor et al., 2015).

In 2021, an abbreviated version of the SWLS was introduced, featuring the first three items of the original scale. Its one-factor structure was validated within a cognitive well-being model (Espejo et al., 2022; Kjell & Diener, 2021). Regarding the original version of the SWLS, numerous studies have confirmed its unidimensionality and psychometric robustness using Classical Test Theory (CTT), which assumes a linear relationship between item characteristics and observed scores (Emerson et al., 2017; Jovanović et al., 2022; Pavot & Diener, 2008). However, there is a notable lack of research utilizing Item Response Theory (IRT) to evaluate the relevance of individual items to the construct (Hanzlová, 2022; Nima et al., 2020; Oishi, 2006; Vittersø et al., 2005). IRT models the relationship between the traits of the individuals being assessed and the properties of the items, optimizing the precision of trait or attribute estimation.

CTT analysis reveals that item 5 of the original SWLS shows reduced factor loadings and weaker convergence with the overall scale (Atienza et al., 2000; Calderón-De la Cruz et al., 2018; Caycho-Rodríguez et al., 2018; Diener et al., 1985; Kjell & Diener, 2021; Jovanović, 2016; Jovanović et al., 2022; Moksnes et al., 2014; Pavot & Diener, 2008). Researchers suggest that these discrepancies may be due to differences in item content and temporal orientation. Items 1 through 4 exhibit heterogeneity, with their wording focused on the present, whereas item 5 may overlap in content with item 4 been both more retrospective and meta-evaluative in nature (Calderón-De la Cruz et al., 2018; Clench-Aas et al., 2011; Moksnes et al., 2014).

The application of IRT in the validation of the SWLS has demonstrated that item 5 presents response difficulty and should be modified or eliminated to enhance the psychometric properties of the instrument (Hanzlová, 2022; Nima et al., 2020; Oishi, 2006; Vittersø et al., 2005). This is supported by the arguments presented by Pavot and Diener (2008) and Kjell and Diener (2021), who posit that the item in question has an evaluative connotation regarding the past. As a result, it may prompt memories at the cognitive level and affect perception at the time of testing, in contrast to the other items. The aforementioned evidence suggests that validating a four-item version may yield more robust measures of SV.

Considering the preceding points, it is anticipated that the discrepancy in the evaluation and validation of instruments designed to assess positive psychological constructs among sexual minority populations will be addressed. The majority of existing studies focus on the adverse consequences associated with non-heterosexual orientations. Consequently, the value of this study lies in its contribution to the field by initiating a line of research aimed at further validating positive instruments in sexual minorities. The objective of the present research is twofold: firstly, to analyze the psychometric evidence pertaining to the original version of the SWLS; and secondly, to compare the results obtained with a four-item version using IRT in cisgender gay people in Lima.

## Method

### Participants

The sample consisted of 400 self-identified cisgender gay people between the ages of 18 and 70 ( $M = 32.4$ ,  $SD = 9.24$ ). 75.5% were from Lima (Peru), while the remaining 24.5% were from the provinces. In terms of sexual orientation, 97.2% of the participants identified as gay men, while

2.8% identified as lesbian women. In terms of educational attainment, 46.5% of the sample had completed secondary education, 52.5% had obtained a higher education qualification, 0.8% had completed primary education, and 0.2% had no formal education. Regarding employment status, 5.2% were unemployed, 73.8% were dependent workers, and 21% were self-employed. It should be noted that individuals who were in a process of self-acceptance or uncertainty about their identity and/or sexual orientation were not included in the sample.

### Measures

The SWLS is a widely applicable instrument for assessing life satisfaction (Diener et al., 1985). It was originally developed in the United States and later adapted into Spanish by Atienza et al. (2000). The instrument is unidimensional, consisting of five items. This study utilized the Peruvian version validated by Caycho-Rodríguez et al. (2018), which employs a five-point Likert-type scale ranging from 1 (totally disagree) to 5 (totally agree). The scale demonstrates satisfactory evidence of internal structural validity (CFI = .99, GFI = .98, RMSEA = .71, SRMR = .01), validity in relation to other variables such as resilience ( $r = .99, p < .01$ ) and depression ( $r = -.58, p < .01$ ), and adequate reliability ( $\alpha = .93, \omega = .93$ ).

### Procedures

The research was approved by the Institutional Ethics Committee of Universidad Peruana Cayetano Heredia (N°211831). The scales were administered online over four months across eight organizations advocating for the rights of sexual minorities in Lima. Ethical standards for psychological research (American Psychological Association [APA], 2017) were followed, with participants providing informed consent and their anonymity ensured.

### Data analysis

Statistical analyses were conducted using RStudio, version 4.3.3 (R Core Team, 2024). Preliminary analyses included the computation of descriptive and frequency statistics, along with an assessment of the reliability of the measurement scales. Data dimensionality was evaluated using the *psych* package (Revelle, 2024), with an exploratory factor analysis (EFA) based on a polychoric correlation matrix. The oblique rotation method (Oblimin) and the unweighted least squares extraction method (minimum residuals) were employed. Parallel analysis was used to determine the optimal number of factors. Fit indices considered in this analysis included the root mean square error of approximation (RMSEA), with expected values below .09, and the comparative fit index (CFI) and Tucker–Lewis index (TLI), both with values above .90 (Aldás & Uriel, 2017; Hu & Bentler, 1999).

Subsequently, item response analyses were conducted using the LTM (Rizopoulos, 2006) and MIRT (Chalmers, 2012) packages. A graded response model (GRM; Samejima, 1969) was employed to estimate the discrimination parameter and the corresponding difficulty parameters for each item. Two versions of the scale were evaluated: the first corresponded to the original version, which consisted of five items, while the second consisted of an abbreviated version that excluded item 5.

### Results

Analysis of the descriptive statistics shows that the most frequently selected response for the first four items was 'agree' ( $Mo = 4$ ), whereas for the fifth item, it was 'totally agree' ( $Mo = 5$ ). This trend is supported by response distribution, with 'agree' representing 37.8% of total responses and 'totally agree' accounting for 25.8%. Additionally, the mean and standard deviation across all five items show minimal variation, with no significant skewness or kurtosis observed (Table 1).

**Table 1**  
*Descriptive statistics for SWLS*

	M	SD	Mode	Range	Skewness	kurtosis
Item 1	3.66	1.12	4	1 - 5	-0.92	0.30
Item 2	3.58	1.07	4	1 - 5	-0.73	0.08
Item 3	3.76	1.20	4	1 - 5	-0.92	0.02
Item 4	3.71	1.17	4	1 - 5	-0.79	-0.11
Item 5	3.53	1.32	5	1 - 5	-0.54	-0.88

Prior to conducting the dimensionality analysis, the reliability of the scales was assessed. Both versions demonstrated satisfactory internal consistency and homogeneity: the original five-item ( $\omega = .91$ ;  $\text{astd} = .90$ ) and the four-item version ( $\omega = .90$ ;  $\text{astd} = .89$ ). The KMO and Bartlett's sphericity tests confirmed appropriate values for both the original version (KMO = .89, Bartlett's

$p < .001$ ) and the four-item version (KMO = .84, Bartlett's  $p < .001$ ).

For the EFA, the original version produced an RMSEA of .08 (90% CI = .05-.13), while the four-item version yielded an RMSEA of .09 (90% CI = .04-.16). The latter exhibited a slight decline in model fit. Nevertheless, both models demonstrated adequate fit indices and factor loadings (Table 2).

**Table 2**  
*Exploratory Factor Analysis for both versions of the SWLS*

	5-item version (original)			4-item version		
	F1	$h^2$	$u^2$	F1	$h^2$	$u^2$
Item 1	.81	.66	.34	.82	.67	.34
Item 2	.83	.70	.30	.85	.73	.27
Item 3	.84	.70	.30	.83	.70	.30
Item 4	.82	.67	.33	.80	.64	.36
Item 5	.78	.62	.39			
% exp. var.	66.90%			68%		
RMSEA	.08			.09		
CFI	.99			.99		
TLI	.98			.98		

Nota.  $h^2$ : Communalidad;  $u^2$ : Uniqueness.

Regarding the discrimination and difficulty parameters of both scale versions, item 5 displays a higher level of difficulty in distinguishing between participants with varying levels of the construct ( $a = 2.25$ ). This item requires only a slight increase in the presence of the measured attribute for respondents to progress from one response category to the next. Specifically, challenges may arise in the differentiation of alternatives 2 (disagree) to 3

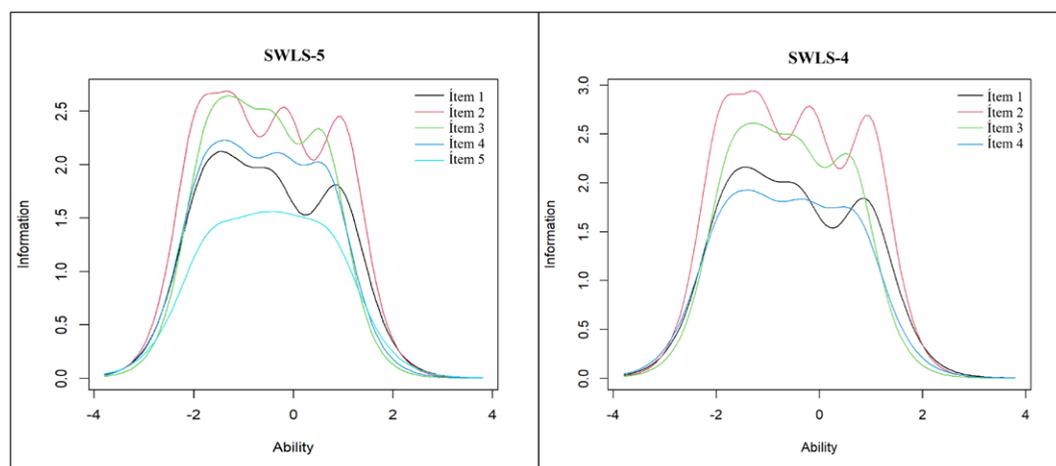
(neutral) ( $b_2 = -0.80$ ) and 3 (neutral) to 4 (agree;  $b_3 = -0.14$ ). In both versions of the scale, item 2 is the most sensitive in differentiating the levels of the measured attribute ( $a = 3.09$ ;  $a = 3.24$ ). In this item, a notable discrepancy is evident between parameters  $b_3$  and  $b_4$ , which indicate a greater challenge in advancing the marking of alternatives 4 and 5, which reflect a stronger presence of the measured attribute (Table 3).

**Table 3***Discrimination and difficulty parameters for both versions of the SWLS*

	Discrimination parameter		Difficulty Parameter		
	a(SE)	b1(SE)	b2(SE)	b3(SE)	b4(SE)
SWLS-5					
Item 1	2.65 (.25)	-1.80 (.13)	-1.28 (.20)	-0.41 (.15)	0.89 (.27)
Item 2	3.09 (.31)	-1.92 (.13)	-1.19 (.22)	-0.18 (.17)	0.96 (.46)
Item 3	2.98 (.28)	-1.72 (.12)	-1.14 (.20)	-0.40 (.16)	0.59 (.16)
Item 4	2.74 (.26)	-1.80 (.13)	-1.18 (.21)	-0.29 (.15)	0.65 (.18)
Item 5	2.25 (.21)	-1.66 (.13)	-0.80 (.16)	-0.14 (.12)	0.70 (.19)
SWLS-4					
Item 1	2.68 (.26)	-1.80 (.13)	-1.27 (.21)	-0.41 (.16)	0.90 (.29)
Item 2	3.24 (.35)	-1.89 (.13)	-1.17 (.24)	-0.18 (.18)	0.96 (.55)
Item 3	2.96 (.30)	-1.71 (.12)	-1.14 (.21)	-0.41 (.16)	0.59 (.16)
Item 4	2.54 (.25)	-1.84 (.14)	-1.21 (.22)	-0.30 (.16)	0.67 (.18)

The item information curves of the two versions of the scale indicate items two and three provide the highest levels of information at both the lower ( $I(\theta) \approx 2.5$ ,  $\theta \approx -2$ ) and upper ( $I(\theta) \approx 1.5$ ) ends of the measured attribute spectrum. These items were the most informative across a broader range of ability levels compared to

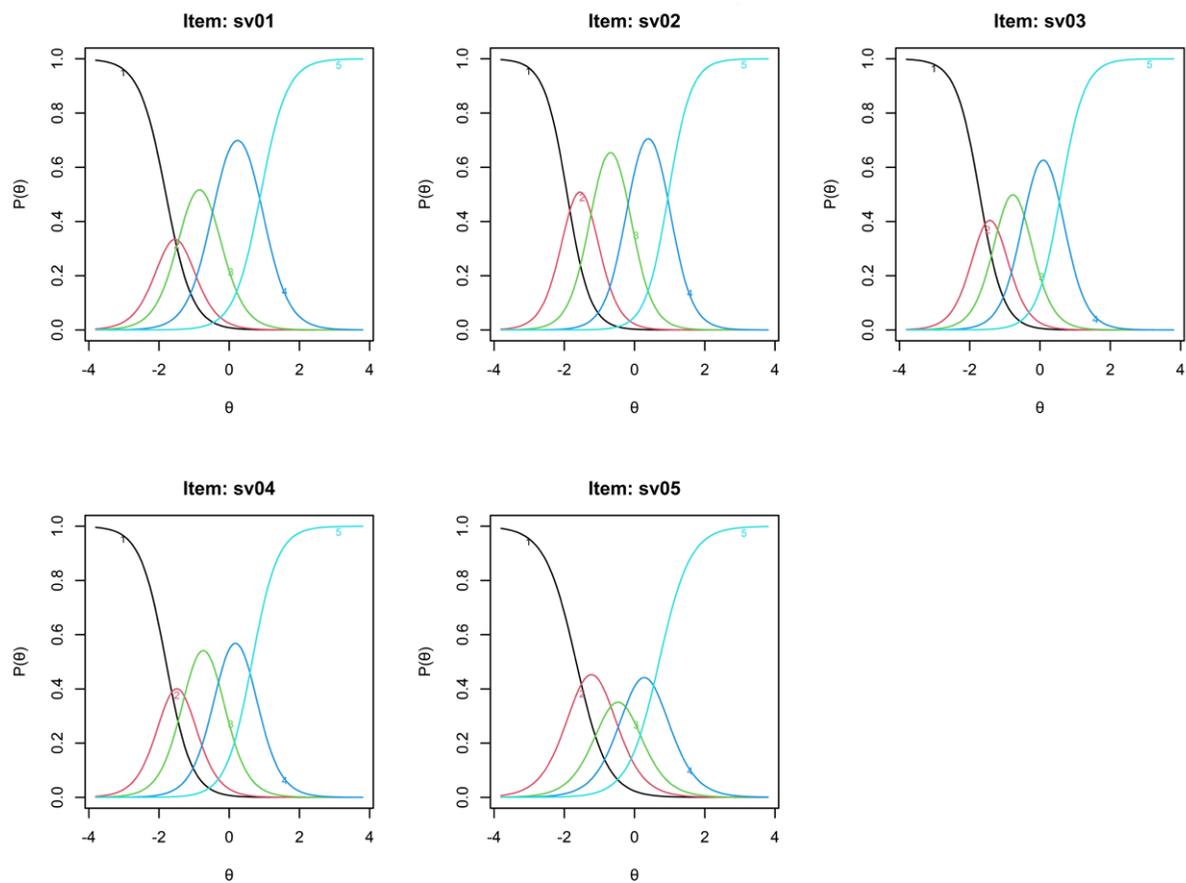
other items. In contrast, items one and four offer slightly less information, with peaks around  $\theta \approx 2.0$ . Consistent with previous findings, item five provides the least information and does not exhibit any notable peaks for the varying levels of the measured attribute (Figure 1).

**Figure 1.** Item information curves of both versions of the SWLS.

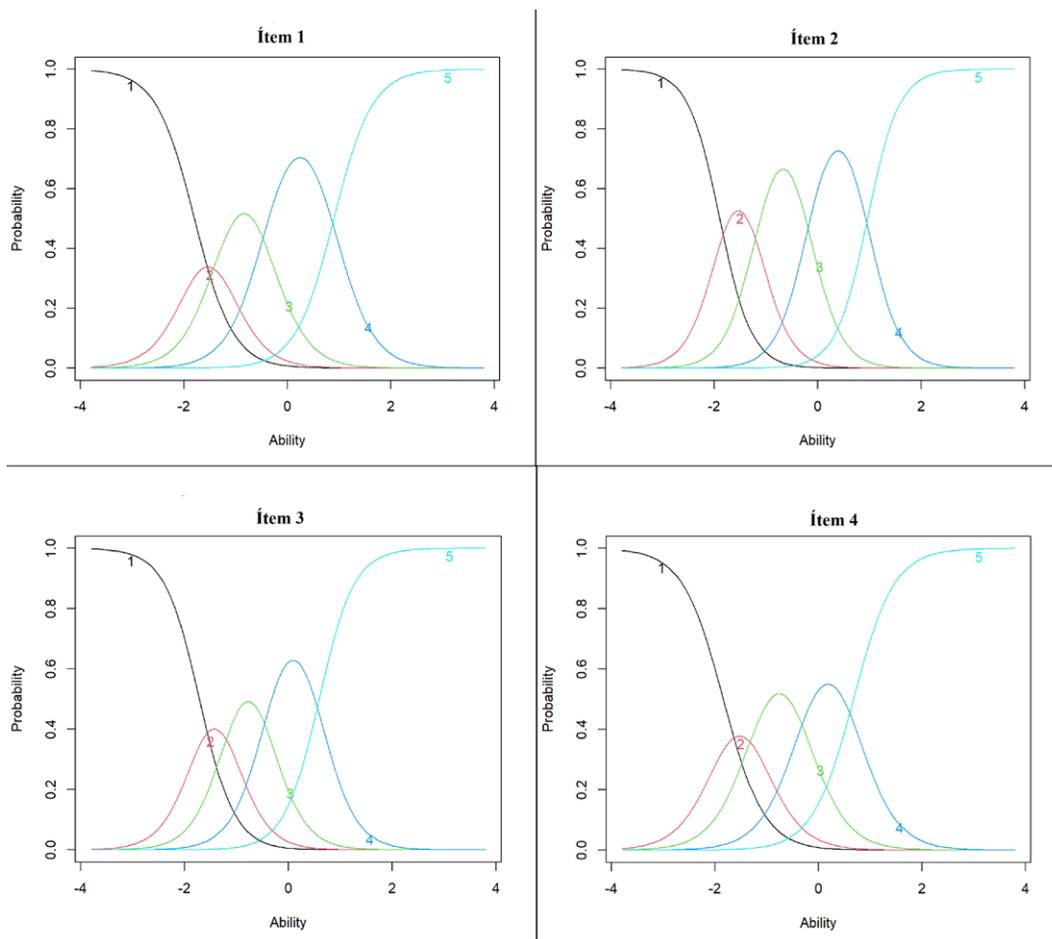
In the characteristic curves for the 4- and 5-item versions of the scale, alternative 1 (strongly disagree) and 5 (strongly agree) exhibit the highest probability of being selected at the lowest and highest levels of the construct, respectively. In items 1, 3, and 4, it is observed that alternative 2 (disagree) exhibits its maximum probability of being selected at an ability level proximate to -1. Although this alternative is more likely to be selected by subjects

with slightly below-average ability, its overlap with alternatives 1 (strongly disagree) and 3 (neutral) indicates that it does not effectively discriminate in this ability range. Ultimately, in item 5, alternative 3 (neutral) is unable to effectively differentiate between superior or inferior ability levels due to its overlap with alternatives 2 (disagree) and 4 (agree; see Figures 2 and 3).

**Figure 2.** Item Characteristic Curve of the SWLS-5 (original version).



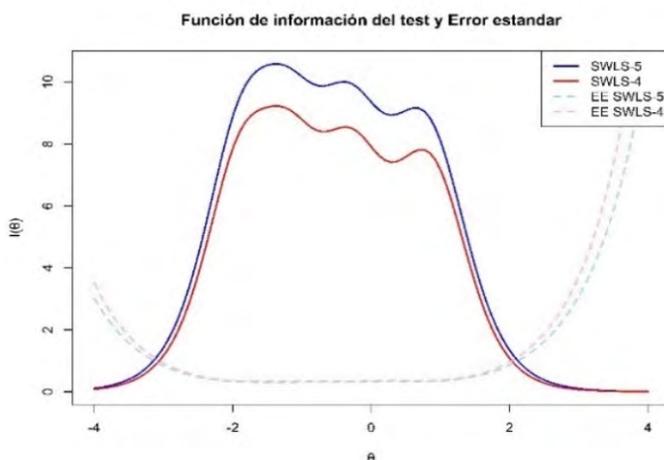
**Figure 3.** Item Characteristic Curve of the SWLS-4.



The information provided by the five-item version of the scale reaches its maximum peak in the ability range of -2 to 1, demonstrating greater accuracy for measuring abilities within that range.

The 4-item version provides less information yet remains relatively accurate within the same ability range as the previous one, albeit with a reduced magnitude of information (Figure 4).

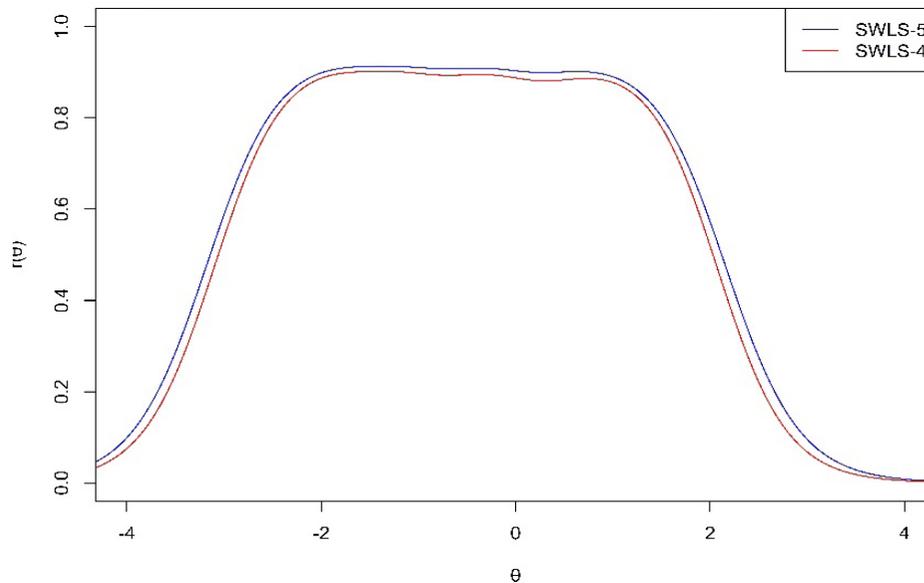
**Figure 4.** Test information function and standard error of both versions of the SWLS.



The conditional reliability of the two versions of the instrument demonstrates satisfactory coefficients at the -2 to 2 ability levels, with values exceeding 0.80 in both cases. Reliability is reduced at the upper and lower limits of the scale,

indicating inconsistency in identifying subjects with extremely low or extremely high levels of the construct. However, reliability is maintained at high, moderate, and low levels (Figure 5).

**Figure 5.** Conditional reliability of both versions of the SWLS scale.



## Discussion

The present study examined two unifactorial structures of the life satisfaction scale. Initially, it was observed that both versions demonstrated adequate fit. Nevertheless, an examination of the RMSEA confidence intervals reveals a slight variation in the coefficients for the 4-item version. This could be an indication that the elimination of item 5 does not significantly affect the structure of the scale. This finding is consistent with previous research (Atienza et al., 2000; Calderón-De la Cruz et al., 2018; Caycho-Rodríguez et al., 2018; Clench-Aas et al., 2011; Diener et al., 1985; Kjell & Diener, 2021; Jovanović, 2016; Jovanović et al., 2022; Moksnes et al., 2014; Pavot & Diener, 2008). Accordingly, the exclusion of this item would not impact the internal structure of the instrument; however, it could affect the measurement of the life satisfaction construct.

The discrimination and difficulty parameters demonstrates that items 2 “The conditions of my life are excellent” and 3 “I am satisfied with my life” have the most effective discrimination levels in comparison to item 5 “If I could live my life over again, I would change almost nothing”, which exhibits the lowest level of discrimination. These results may be explained by considering the connotations of the phrases in question. On the one hand, items 2 and 3 address fundamental elements of the life satisfaction construct, whereas item 5 focuses on retrospective assessments framed in a counterfactual manner (Kjell & Diener, 2021). This situation makes it challenging to identify the central response alternatives, as evidenced by the shift from “disagree” to “neutral” ( $b_2 = -0.80$ ) as well as from “neutral” to “agree” ( $b_3 = -0.14$ ) and would generate a predominance of extreme responses.

Upon examination of the characteristic curve for item 5, it becomes evident that the alternatives “disagree”, “neutral”, and “agree” exhibit substantial overlap. It may therefore be necessary to either revise these response options or modify the counterfactual wording of item 5 in order to increase the levels of discrimination between the levels of ability in the central response options. One potential solution that aligns with Hanzlová (2022) proposal is to maintain a dichotomous or reduced alternatives structure without a neutral value. This approach could be beneficial as it allows for a more effective differentiation between the extremes of the life satisfaction scale, which consistently demonstrate superior performance in terms of attribute discrimination.

The 5-item version (SWLS-5) consistently provides more information than the 4-item version (SWLS-4) across the ability range, especially between -2 and 1. This suggests that the addition of the fifth item improves slightly the test's ability to discriminate in that range, making it more accurate in measuring life satisfaction considering its temporality (Kjell & Diener, 2021; Hanzlová, 2022; Nima et al., 2020). Nonetheless, both versions (SWLS-5 and SWLS-4) are suitable for evaluating the construct in individuals with ability levels within this range. This conclusion is supported by the coefficients obtained in the conditional reliability analysis. In this instance, if the objective is to assess individuals with the aforementioned abilities with greater accuracy, the 5-item version appears to be the superior choice. However, if the objective is to achieve a balance between test length and accuracy, the 4-item version may be an adequate alternative, although with lower accuracy.

The topic of sexual minorities has been the focus of considerable interest among researchers, with the majority of studies concentrating on the negative psychological implications associated with sexual orientation. Thus, the validation of instruments that assess positive psychological variables, as life satisfaction, represents a significant advancement in the field of positive psychology.

In practical terms, the four-item version may be employed for large-scale applications where a retrospective meta-evaluation of the construct is not required (Kjell & Diener, 2021). However, if the objective is to evaluate satisfaction with life in the present and past, it is recommended to use the original five-item version, as it can be more consistent over time. The results of the IRT analysis indicate that there is sufficient psychometric evidence to support the use of both the original version (SWLS-5) and the shortened four-item version (SWLS-4).

In terms of limitations, this study employed non-probabilistic convenience sampling, which restricts the generalizability of the findings to the broader population of gay individuals in Peru. However, the results are significant insofar as mental health professionals utilize the SWLS as a screening tool and shape their mental health promotion and intervention strategies from a well-being perspective. The participants were recruited from organizations advocating for the visibility and rights of sexual minorities in Lima. Consequently, it is recommended that the SWLS be validated in other sociocultural contexts. Additionally, the study had limited representation of lesbian women, highlighting the need for future research to examine whether the SWLS retains its psychometric properties in this population and among other sexual minority groups.

#### Declaration of Interests

The authors declare no conflict of interest, as this article has no commercial or financial objectives.

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**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.

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**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.

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**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.

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