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# Psychometric properties of the Italian version of the 6-Item Identity Bubble Reinforcement Scale (IBRS-6)

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Social media, a cornerstone in the lives of early adolescents, facilitates processes such as self-disclosure, fostering peer relationships and identity definition. Early access to social media requires an examination of its impact on psychosocial dynamics and psychological well-being in early adolescence. Social media limits the diversity of social contacts and leads to the formation of “psychosocial bubbles” which, according to the Identity Bubble Reinforcement Model (Keipi et al. 2017), encourages people to build relationships with like-minded people and trust the information shared in their social network more. The aim of the present study was to evaluate the psychometric properties of a new Italian translation of the 6-item Identity Bubble Reinforcement Scale (Kaakinen et al. 2020) in a sample of early adolescents. Middle school students ( $N = 560$ ) completed an online survey including sociodemographic and internet-related information, the IBRS-6, the Preference for Online Social Interaction (POSI), number of social media profiles, time spent on social media and the Digital Ecology Scale. Exploratory factor analysis confirmed the three-factorial structure (Social Identification, Homophily, Information Bias) with good fit. Internal consistency was good for total scale and subscales. Correlation analyses showed convergent validity with the POSI, number of social media profiles, and time spent on social media and good criterion validity with the Digital Ecology Scale. The IBRS-6 is the first brief instrument for identifying Identity Bubble factors (Kaakinen et al. 2020) among early adolescents in Italy. The factorial structure and validity reported in other cultural contexts were confirmed; moreover, findings add evidence to the scale’s criterion validity. In addition to its role in measuring aspects of identity formation during adolescence, predicting health outcomes and online risk behaviors, and guiding primary prevention interventions in early secondary school settings, the IBRS-6 will also support international comparability in examining the dynamics of identity bubble phenomena across diverse populations and cultural contexts.

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## Introduction

**Social Media Use and Psychosocial Dynamics in Early Adolescence.** The use of various social media is widespread among adolescents, and has become an integral part of their lives. According to recent data, 95% of teens (13–17 years) say they use social media platforms (Anderson et al. 2023). YouTube in particular is the most frequently used (95% of teenagers), followed by TikTok (67%), Instagram (62%) and Snapchat (59%) (Anderson and Jiang 2022). Teens spend an average of 8 h and 39 min a day in front of screens, with a significant amount of this time dedicated to social media, and about half of teens report being online almost constantly (Rideout and Robb 2023). Furthermore, young people are starting their social networking lives at an increasingly earlier age. Although there is a minimum age requirement of 13 for most social media platforms, the average age of first access to social media is around 10–12, and many young people have access to social media much earlier, often via shared devices in the family (OFCOM 2023). The ubiquity of social media in the daily lives of people of all ages is blurring the boundaries between online and offline experiences. The term “onlife-world” was introduced (Floridi 2015) to emphasize the overlap between real and digital experiences in a constantly connected world. For young people in particular, it often becomes irrelevant to distinguish between their ‘online’ and ‘offline’ lives, and therefore the use of the term “onlife” seems particularly appropriate to describe their social experiences.

Social media are very attractive to adolescents because they fulfill some of the most important developmental tasks of this age, especially the need for social interaction with peers, self-expression, and emotional connection (Davis 2012, 2013; Schwartz 2012). According to some studies, adolescents can build their sense of belonging to a peer group and define their identity through a self-revelation process facilitated by the mediation of social media platforms (Davis 2013; Elsayed 2021). Online communication offers adolescents the opportunity to maintain and deepen existing friendships and increase their sense of connectedness with friends (Davis 2013; Elsayed 2021; Valkenburg and Peter 2011). Social media features, such as perceived availability and visual content, are associated with increased feelings of companionship and intimacy among friends, suggesting that social media can foster supportive relationships (Angelini 2024). Adolescents often use these platforms to express themselves and seek social validation (Bozzola et al. 2019; Di Gesto et al. 2023; Gündüz 2017).

However, massive social media use can lead to negative consequences such as social anxiety, depression, difficulties in emotion regulation (Marengo et al. 2021; Muzi et al. 2021), addictive gambling behavior or cyberbullying (Savolainen et al. 2020). A special focus on early adolescence is particularly relevant in view of the clear developmental characteristics that distinguish this phase from later phases of adolescence. Indeed, adolescents in early adolescence (around the ages of 10 to 14) are in a transitional period characterized by immature emotion regulation, increased reactivity to social cues and an intense need to belong to peers, which makes them highly vulnerable to external influences (Blakemore and Mills 2014; Calandri et al. 2021). Unlike older adolescents, they are still in the process of acquiring essential social-cognitive and relational skills such as perspective-taking, assertiveness, critical thinking and emotional self-awareness, which limits their ability to navigate complex interpersonal and digital environments (Rose and Rudolph 2006; Rubin et al. 2011). This vulnerability is particularly evident in the context of peer relationships, which take on central importance in early adolescence, often outweighing previous ties to parents and strongly influencing self-perception and behavior (Brown and Larson 2009a, Brown and Larson 2009b; Santrock 2019). Peer

acceptance becomes closely linked to emotional well-being and self-esteem, leading many early adolescents to conform to group norms or adopt behaviors that are sometimes inappropriate just to maintain their social status (Incognito and Tarchi 2024; Rubin et al. 2011). Moreover, early adolescence often coincides with the onset of social media use, exposing early adolescents to digital environments that reinforce social comparison, performance-based affiliation, and pressure to self-express in idealized ways (Nesi and Prinstein 2015; Uhls et al. 2017). In these contexts, visibility and popularity often play a central role, reinforcing the importance of peer recognition and amplifying the emotional impact of exclusion or online criticism (Skogen et al. 2023).

In light of these considerations, it is important to further investigate the links between social media use and how early adolescents engage with digital peer contexts. For this purpose, this paper refers in particular to the Identity Bubble Reinforcement Model (Keipi et al. 2017), which to our knowledge has not yet been applied to social media use in early adolescents.

**The Identity Bubble Reinforcement Model.** Previous literature has pointed out that people tend to socialize with others who share and reinforce their identity, and at the same time are more likely to trust the information shared in their social network. This can lead to the formation of so-called “psychosocial bubbles” (Pariser 2011; Zollo et al. 2017).

The Identity Bubble Reinforcement Model (IBRM) proposed by Keipi et al. (2017) aims to understand the phenomenon of social media bubbles from a socio-psychological perspective. According to this model, identity bubbles are characterized by three elements: social identification (i.e., identification with online social networks), homophily (i.e., the tendency to interact with like-minded people), and information bias (i.e., reliance on like-minded information on social media). This theoretical model served as the basis for the development and validation of the Identity Bubble Reinforcement Scale (IBRS) (Kaakinen et al. 2020) in adolescent and adult samples (Polanco-Levicán et al. 2022), while to our knowledge it has not yet been applied to early adolescents and scale validation for this age is lacking. Although the IBRM is conceptually linked to processes relevant for adolescent identity development, the IBRS-6 does not aim to measure identity formation directly. Rather, it assesses patterns of online peer engagement—such as social identification, homophily, and information bias—which may serve as underlying dynamics in digital interactions during early adolescence.

The three dimensions of the IBRM (social identification, homophily, and information bias) are conceptually connected to peer affiliation and selective engagement processes, which are especially relevant in early adolescence, a phase marked by the need for belonging and social comparison (Rose and Rudolph 2006; Rubin et al. 2011).

First, identity bubbles can fulfill early adolescents’ need for social identification with peers, which is crucial at this age. According to identity status theory (Marcia 1980), early adolescence is typically marked by a phase of identity diffusion, in which youth begin to explore different interests, preferences, and affiliations. In this context, social identification reflects adolescents’ alignment with online communities that validate emerging self-concepts and provide behavioral models for social navigation (Avci et al. 2024; Pérez-Torres 2024). However, identity bubbles can also have potentially negative consequences because early adolescents may come under pressure to conform to idealized identity representations on social media, leading to feelings of inadequacy and low self-esteem (Elsayed 2021).

Previous research has shown that adolescents tend to identify even more strongly with online peer groups than with offline groups (Lehdonvirta and Räsänen 2011; Mikal et al. 2016). Online social bonds and strong social identification with online communities can promote increased and often compulsive and problematic social media use among young people (Mikal et al. 2016). These risks are greater in early adolescence, when the need for peer belonging is heightened and emotion regulation and critical thinking are still maturing (Santrock 2019; Calandri et al. 2021).

The second dimension, homophily, refers to the tendency to interact with like-minded peers. This dynamic is particularly salient in adolescence, a developmental phase in which similarity among peers supports both influence and selection processes (Laninga-Wijnen and Veenstra 2021). Homophily fosters identification and perceived belonging within the peer group and plays an important role in shaping identity development and the emergence of social support networks (De Lorenzo et al. 2024; Latikka et al. 2022). In early adolescence—a period marked mostly by identity diffusion (Marcia 1980)—seeking out similar others online may provide a safe and validating space for identity exploration. Interacting with like-minded peers helps adolescents clarify their preferences, experiment with affiliations, and feel accepted during a phase of psychological and social instability. However, homophily may also have negative consequences. In digital contexts, strong group similarity can limit exposure to diverse viewpoints, reduce openness to difference (Polanco-Levicán et al. 2022), and contribute to online fragmentation. These effects may be especially problematic for adolescents who already experience marginalization in their offline lives, as online homophilous dynamics may reinforce social exclusion and intensify feelings of isolation (Angelini 2024; Beccaria et al. 2022; Zych et al. 2021).

Third, social identification and homophily also influence the type of content and information that adolescents are exposed to and choose to share online. These peer-based mechanisms shape the perceived credibility of information and can lead to information bias, which constitutes the third dimension of identity bubbles. In other words, on social media, people tend to share similar selective information that they consider reliable and agree with (Flanagin 2017). This can lead to less diversity of information and increase polarization and conflict online (Boutyline and Willer 2017; Peterson and Densley 2017), which can be particularly detrimental for early adolescents, who generally have less structured cognitive and emotional skills than adults to evaluate the reliability of information and manage conflict.

All dimensions of identity bubbles are related to increased social media use (Mikal et al. 2016) as well as a preference for online social interactions, which are perceived as safer and more enjoyable than traditional social relationships (Caplan 2003, 2010). Indeed, repeated interactions with other network users and sharing similar content foster a sense of closeness and trust with them, reinforcing the perception that the online environment is safer and more welcoming than the real world (Figeac and Favre 2023). The perception of online environments, often referred to as digital ecology, is crucial as it shapes young people's online behavior (Smahel et al. 2020).

Digital ecology refers to adolescent's subjective perception of the online environment as more or less safe, inclusive and supportive of personal and relational development. It is a multidimensional construct involving emotional (e.g., trust), relational (e.g., belonging) and structural (e.g., control over content) aspects. Although it is not always explicitly defined, it has emerged as an important interpretive framework linking risks, opportunities and digital literacies (Livingstone et al.

2019; Smahel et al. 2020). This perception is increasingly recognized as central to adolescents' online experience. Recent studies have shown that the way young people perceive digital spaces significantly influences their psychosocial adjustment and online behavior (Best et al. 2014; Nesi 2020). In particular, Best et al. (2014) emphasize that positive perceptions of digital environments are associated with greater social connectedness, emotional well-being and constructive forms of online engagement. Conversely, negative perceptions are associated with withdrawal, decreased trust and increased susceptibility to social stressors. Similarly, Nesi (2020) and Uhls et al. (2017) emphasize that adolescents' willingness to interact online depends on how "safe" or "hostile" they perceive these spaces to be, which affects processes such as communication with peers, expression of emotions, and help-seeking behavior.

From this perspective, digital ecology plays a crucial role in shaping how adolescents engage with online interactions and interpret their social experiences. The ways in which young people evaluate the quality of their digital environments—such as the presence of support, recognition, or conflict—can influence their emotional responses and behavioral patterns in meaningful ways. Research has shown that positive perceptions of online social contexts are associated with more adaptive forms of digital engagement and improved psychological adjustment (Benvenuti et al. 2024). Rather than introducing separate constructs, digital ecology provides a coherent lens through which to understand how adolescents' interpretations of their online environments contribute to their broader psychosocial functioning. These interpretations are embedded in the dynamics of everyday digital interaction and emphasize the importance of perceived relational quality in online spaces.

In light of the above considerations, the Identity Bubble Reinforcement Model (Keipi et al. 2017) provides a useful conceptual framework for interpreting the ways in which early adolescents engage with peer dynamics in digital contexts. This developmental stage is characterized by heightened sensitivity to social feedback and a strong motivation to maintain peer connections, making adolescents particularly susceptible to the mechanisms described by the model. The present study does not directly investigate identity-related processes, but focuses on the validation of a measurement instrument that captures the social-cognitive dynamics of online peer interactions. The instrument presented here provides a psychometrically sound way to assess how adolescents perceive and respond to relational experiences in social media and can be used in both research and educational settings. Within this framework, digital ecology, understood as adolescents' subjective perceptions of social and emotional safety in online environments, emerges as a relevant contextual factor influencing their online behavior and psychosocial adjustment (MacDonald et al. 2023). This perspective supports a clearer understanding of digital peer relationships in early adolescence.

In this framework, digital ecology was selected as the criterion variable for validating the IBRS-6 because it captures adolescents' global perception of the social and emotional climate of online interactions. While the IBRS-6 focuses on specific peer-related cognitive and behavioral dynamics (e.g., social identification, homophily, and information bias), digital ecology reflects how adolescents experience the broader context in which these dynamics take place (MacDonald et al. 2023). A positive digital ecology may be both a consequence and a reinforcement of adolescents' active involvement in identity bubbles. Therefore, although digital ecology does not measure identity construction per se, it represents a theoretically grounded indicator of how adolescents experience the broader context in which identity

| Table 1 Sociodemographic, Internet-connected devices and Personal profiles on social networks for the first sample (n = 280). |                |
|-------------------------------------------------------------------------------------------------------------------------------|----------------|
| Variables                                                                                                                     | Mean ± SD or % |
| Age                                                                                                                           | 13.23 ± 0.47   |
| Gender                                                                                                                        |                |
| Male                                                                                                                          | 55.4%          |
| Female                                                                                                                        | 44.6%          |
| Education level                                                                                                               |                |
| Middle school                                                                                                                 | 100%           |
| Place of residence                                                                                                            |                |
| Northern Italy                                                                                                                | 100%           |
| Internet-connected devices                                                                                                    |                |
| Smartphone                                                                                                                    | 95.4%          |
| Tablet                                                                                                                        | 58.6%          |
| Personal computer                                                                                                             | 81.1%          |
| Game console                                                                                                                  | 51.1%          |
| Wearable device                                                                                                               | 38.9%          |
| Personal profiles on social networks                                                                                          |                |
| None                                                                                                                          | 4.6%           |
| One                                                                                                                           | 21.4%          |
| More than one                                                                                                                 | 73.9%          |

| Table 2 Sociodemographic, Internet-connected devices and Personal profiles on social networks for the second sample (n = 280). |                |
|--------------------------------------------------------------------------------------------------------------------------------|----------------|
| Variables                                                                                                                      | Mean ± SD or % |
| Age                                                                                                                            | 13.21 ± 0.48   |
| Gender                                                                                                                         |                |
| Male                                                                                                                           | 54.6%          |
| Female                                                                                                                         | 45.4%          |
| Education level                                                                                                                |                |
| Middle school                                                                                                                  | 100%           |
| Place of residence                                                                                                             |                |
| Northern Italy                                                                                                                 | 100%           |
| Internet-connected devices                                                                                                     |                |
| Smartphone                                                                                                                     | 95.7%          |
| Tablet                                                                                                                         | 61.4%          |
| Personal computer                                                                                                              | 79.6%          |
| Game console                                                                                                                   | 55.7%          |
| Wearable device                                                                                                                | 42.9%          |
| Personal profiles on social networks                                                                                           |                |
| None                                                                                                                           | 3.2%           |
| One                                                                                                                            | 24.6%          |
| More than one                                                                                                                  | 72.1%          |

bubbles form and operate—namely, the perceived safety and relational quality of the digital environment.

**The Current Study.** Currently, the IBRS stands as a promising instrument for the identification of Identity Bubble factors (Kaakinen et al. 2020). Although both the 9-item and 6-item versions of the IBRS exist, Kaakinen et al. (2020) provided strong evidence supporting both versions but we chose to test the IBRS-6 version to meet the requirements of parsimony in instrument selection (Falk and Muthukrishna 2023). Kaakinen et al. (2020) found that the IBRS-6 demonstrated good psychometric properties and high reliability in both Finnish and English, highlighting the validity and potential applicability of this shorter version. They recommended that future studies further investigate the psychometric properties of the 6-item version, given its strong psychometric properties and brevity, which make it particularly valuable in various research and intervention contexts. While several validation studies have addressed convergent and divergent validity of the IBRS-6, none have examined the criterion validity of the scale. Moreover, the validation is notably absent from the Italian context. To address these gaps, the present study aimed to assess the psychometric properties of a novel Italian translation of the IBRS-6 (Kaakinen et al. 2020). Firstly, to evaluate the factorial structure of the items, the exploratory-confirmatory analytical method was employed, in line with suggestions regarding the adaptation of measures (Rogers 2024). This allowed for exploring the most suitable model for the items of the IBRS-6 without modeling constraints (i.e., considering item scores within the analyzed sample) and confirming the factorial validity of hypothesized models (i.e., examining the fit of models based on the conducted analyses, as well as on the reference theory). Secondly, the internal consistency of both the overall IBRS-6 and its subscales was examined through Cronbach’s alphas ( $\alpha$ ) and McDonald’s omega ( $\omega$ ). Thirdly, the convergent validity of the IBRS-6 was investigated through its associations with scores related to the measurement of preference for online social interaction (POSI), number of social media profiles, and time spent on social media. Finally, the criterion validity was assessed by computing associations between the average scores on the digital ecology scale.

Methods

**Participants.** A total of 560 middle school students participated. For the study, the total sample was divided into two gender- and age-balanced subsamples, the first consisting of 280 (mean age = 13.23; SD = 0.47) and the second of another 280 (mean age = 13.21; SD = 0.48). Tables 1 and 2 present details on the socio-demographic information, ownership of devices with internet connection and the number of personal profiles on social networks (either personal or shared with family and friends) for the first and second subsamples respectively.

Although a small proportion of participants (5.3%) reported not having a personal profile on social media, all respondents indicated using at least one social media platform when asked to select from a predefined list included in the questionnaire, although responses to this item were not analyzed in the present study. This suggests that some adolescents access social media through shared or third-party accounts (e.g., family or friends). These individuals were included in the analyses, as they still engage with digital environments in ways that are directly relevant to the social-cognitive dynamics under investigation.

Measures

*The Identity Bubble Reinforcement Scale-6 item version (IBRS-6).* Participants were asked to complete the Italian translation of the IBRS-6 (Kaakinen et al. 2020). The IBRS-6 scale measures the cognitive process of relating to online social networks and is composed of three related factors: social identification, homophily, and information bias. These three social elements underlie the “identity bubble” factor, i.e., the personal tendency to participate in online social cliques. The IBRS-6 scale has been validated in 6-item versions in English and Finnish (Kaakinen et al. 2020). It is a self-report instrument with a Likert response with a scale of 1 (does not describe me at all) to 10 (describes me completely). In the original validation study, the 6-item version of the scale consists of three subscales, the *Social Identification* subscale (2 items; e.g., “In social media, I belong to a community or communities that are important part of my identity”), consisting of items that measure the extent to which group membership becomes an aspect of self-concept, the *Homophily*

**Table 3** Italian translation of the items of the IBRS-6.

| Item | English version                                                                                    | Italian version                                                                                    |
|------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 1    | In social media, I belong to a community or communities that are an important part of my identity. | Sui social media, appartengo a una o più comunità che sono una parte importante della mia identità |
| 2    | In social media, I belong to a community or communities that I'm proud of.                         | Sui social media, appartengo a una o più comunità di cui sono orgoglioso/a                         |
| 3    | In social media, I prefer interacting with people who are like me.                                 | Sui social media, preferisco interagire con persone che sono come me                               |
| 4    | In social media, I prefer interacting with people who share similar interests with me.             | Sui social media, preferisco interagire con persone che condividono interessi simili ai miei       |
| 5    | In social media, I trust the information that is shared with me.                                   | Sui social media, mi fido delle informazioni che mi vengono condivise                              |
| 6    | In social media, I feel that people think like me.                                                 | Sui social media penso che le persone la pensino come me                                           |

subscale (2 items; e.g., “In social media, I prefer interacting with people who are like me”), consisting of items assessing the probability that people will enter into social relationships with others who are similar to them, and the *Information Bias* subscale (2 items; e.g., “In social media, I trust the information that is shared with me”), consisting of items that measure the perception that information on social media can be trusted.

The psychometric qualities measured in the original study (Kaakinen et al. 2020) provided validity evidence that confirmed the three-factor correlated structure for the 6-item version ( $\chi^2_{(13,110)}/6 = 2.185$ ,  $p = 0.041$ , RMSEA = 0.049, 90% CI [0.009, 0.085], SRMR = 0.016, CFI = 0.994, TLI = 0.984). The procedure for the Italian adaptation of the original scale is detailed in the Procedure section, while Table 3 presents the items of the IBRS-6 in both the English and Italian versions. The Internal Consistency section provides the reliability values for the overall scale and its subscales.

*Preference for Online Social Interaction (POSI).* Preference for Online Social Interaction was assessed using the POSI subscale of the Italian version (Fioravanti et al. 2013) of the Generalized Problematic Internet Use Scale 2 (GPIUS-2; Caplan 2010). Participants rated their agreement on a scale consisting of 3 items ranging from 1 (strongly disagree) to 5 (strongly agree). An example item is: “Online social interaction is more comfortable for me than face-to-face interaction.” In the present study, the internal consistency of the scale was found to be high ( $\alpha = 0.89$ ;  $\omega = 0.83$ ). Higher scores on this scale indicate greater levels of preference for online interaction.

*Number of Social Media Profiles.* Number of Social Media Profiles (i.e., social media breadth) was assessed using a single item from the Italian version of the survey developed by Mascheroni and Ólafsson (2016). Participants were asked to indicate how many different social media profiles they currently use (including both personal accounts and shared profiles, e.g., with family or friends). Responses were given on a 5-point Likert scale ranging from 1 (none) to 5 (more than three), with higher scores indicating greater social media breadth.

*Time Spent on Social Media.* Time Spent on Social Media (i.e., social media intensity) was assessed using a single item from the Italian version of the survey of Mascheroni and Ólafsson (2016). Participants were asked to report how many hours per day they typically spend on social media platforms. Responses were given on a 5-point Likert scale ranging from 1 (never) to 5 (always), with higher scores reflecting greater social media intensity.

*Digital Ecology Scale.* Perceptions of digital ecology were assessed using three items developed for the Italian context (Mascheroni et al. 2022), drawing on the EU Kids Online framework (Smahel et al. 2020). The questions about digital ecology investigated

whether the participants feel safe online and whether they perceive people on the internet as friendly and helpful. An example item is: “I find other people are kind and helpful on the internet”. They are rated on a Likert scale from 1 (never) to 5 (always). In the present study, the internal consistency of the scale was found to be high ( $\alpha = 0.88$ ;  $\omega = 0.85$ ). Higher scores on this scale indicate greater levels of digital ecology.

*Test Adaptation.* In order to develop an Italian version of the IBRS-6, we adhered to Beaton et al.'s (2000) five-stage test adaptation procedure. During the initial stage, both an informed and an uninformed translator independently conducted forward translations of the IBRS-6 items, instructions, and response options from English to Italian. Subsequently, in the second stage, a third translator reviewed the two forward translations, addressed any disparities, and generated a synthesized translation. Moving to the third stage, two additional independent translators, unfamiliar with the IBRS-6, performed back-translations of the synthesized translation into English. In the fourth stage, a bilingual committee, consisting of all the aforementioned translators and authors of the current study, examined both the forward and back translations. Since no concerns were identified at this stage, we proceeded to the fifth stage. In the fifth stage, a pre-final version of the IBRS-6 underwent pre-testing in a purposefully selected sample of 25 early adolescents (mean age = 12.63 years,  $SD = 5.24$ ). Participants were instructed to rate each item's comprehensibility on a 5-point scale (1 = do not understand at all; 5 = understand completely). The mean responses per item were evaluated, and as all items received high ratings (all means  $\geq 4.20$ ), no further revisions were made to the item content. The items of the final translation used in the present study are detailed in Table 3.

*Procedure.* The research team applied to the Bioethics Committee of the University of Turin and obtained approval to conduct the study (Prot. No. 202854 approved on 29.3.2021). The approval covered the administration of an anonymous online self-report questionnaire to secondary school students, including procedures for participant recruitment, collection of informed consent from parents or guardians and students, data management, secure storage, and the analysis and dissemination of anonymized findings. Ethical approval was granted before data collection began.

All research procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee, the 1964 Declaration of Helsinki and its subsequent amendments, and applicable national regulations governing research involving minors and data protection legislation in force at the time of the study.

Following ethical approval, the research team contacted several secondary schools in northern Italy; three schools agreed to participate. Information letters describing the aims of the study,

procedures, data protection measures, and the estimated time required to complete the questionnaire (approximately 20 min) were provided to families and students before participation. Participation was entirely voluntary, and no incentives were offered.

Because the study involved minors, written informed consent was obtained from parents or legal guardians, and written assent was obtained from the students before inclusion in the study. Consent forms specified the scope of consent, including participation in the study, the anonymous use of data for research purposes, and consent to publish aggregated findings in scientific outlets. Signed consent forms were returned to the research team through the schools and securely archived in accordance with institutional and national data protection regulations.

Participants were informed on the first page of the online questionnaire about the aims of the research, the voluntary nature of participation, their right to withdraw at any time, and the anonymous handling of data. No identifying information was collected. Data were processed and stored in encrypted, password-protected systems accessible only to authorized members of the research team.

Data collection took place in fall 2023, and a total of 560 secondary school students from northern Italy completed the questionnaire.

**Analytic Strategy.** All analyses were conducted using the statistical software Jamovi (The Jamovi Project 2019).

**Data Treatment.** There were no missing responses in the dataset, as the questionnaire was administered online, with all questions set as mandatory. A descriptive analysis of the scale items was carried out, including calculations for mean, standard deviation, skewness, and kurtosis. The factorial structure was examined using both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The sample size was determined based on the number of items in the scale and the requirements of the analyses. Following Nunnally's (1978) guideline of having 10 participants per item, a subset of the total sample was randomly selected to ensure adequate sizes for both EFA and CFA. This approach resulted in subsamples of 280 participants for each analysis.

**Exploratory Factor Analysis.** The data from the first subsample ( $n = 280$ ) were subject to EFA using principal axis factorization with Varimax rotation. Prior to analysis, prerequisites such as the correlation matrix (Kaiser 1974) and the significance of Bartlett's sphericity test (Bartlett 1950) were assessed. Principal axis factorization was chosen as it yields results similar to the commonly used maximum likelihood estimation without assuming multivariate normality (Fabrigar et al. 1999; Goretzko and Bühner 2020). Factor loadings were considered adequate if they exceeded 0.30 (Osborne et al. 2008). The number of extracted factors was determined based on eigenvalues greater than 1.0 (Kaiser 1960).

**Confirmatory Factor Analysis.** With the data from the second subsample ( $n = 280$ ), a CFA was performed. Model fit was assessed using the following indices: (i) relative/normed chi-square ( $\chi^2/df$ ), with values lower than 5.0 indicating acceptable model fit (Browne and Cudeck 1992; Wheaton et al. 1977) [regarding the  $\chi^2$  value, poor fit on a small sample might result in a non-significant  $\chi^2$ , while good fit based on a larger sample might result in a significant  $\chi^2$ ; however,  $\chi^2/df$  minimizes the impact of sample size on  $\chi^2$ ]; (ii) Comparative Fit Index (CFI); (iii) Tucker-Lewis Index (TLI); (iv) Root Mean Square Error of Approximation (RMSEA); (v) Standardized Root Mean Square Residual

| Table 4 Descriptive statistics for the items of the IBRS-6 (n = 280). |             |                |               |
|-----------------------------------------------------------------------|-------------|----------------|---------------|
| Item                                                                  | Means (SD)  | Asymmetry (SD) | Kurtosis (SD) |
| 1                                                                     | 4.48 (2.79) | 0.31 (0.10)    | -1.05 (0.21)  |
| 2                                                                     | 4.67 (3.01) | 0.19 (0.10)    | -1.30 (0.21)  |
| 3                                                                     | 6.37 (2.78) | -0.53 (0.10)   | -0.78 (0.21)  |
| 4                                                                     | 6.77 (2.50) | -0.80 (0.10)   | -0.13 (0.21)  |
| 5                                                                     | 4.56 (2.07) | 0.08 (0.10)    | -0.52 (0.21)  |
| 6                                                                     | 4.63 (2.30) | 0.13 (0.10)    | -0.65 (0.21)  |

(SRMR). RMSEA and SRMR values of 0.05 and 0.08, respectively, were considered for good and moderate fit (Browne and Cudeck 1992), and CFI and TLI values of 0.90 and 0.95, respectively, were considered for good and excellent fit (Hu and Bentler 1999). Additionally, for CFA, factor loadings were deemed appropriate if they exceeded 0.30 (Costello and Osborne 2005).

**Internal Consistency and Validity Analysis.** To assess internal consistency, Cronbach's alpha ( $\alpha$ ) was calculated for both the total score of the scale and subscales. Values in the range of 0.70–0.90 are considered excellent, while values around 0.60 are considered good (Bergström et al. 1998). In addition, McDonald's omega ( $\omega$ ) was also computed, as it provides a more accurate estimate of internal consistency. Values of  $\omega$  above 0.70 are generally considered acceptable, with values above 0.80 indicating good reliability (Hayes and Coutts 2020).

Convergent validity was measured through bivariate Pearson correlations ( $r$ ) between the total score of the IBRS-6, its subscales (i.e., Social Identification, Homophily, Information Bias), preference for online social interaction (POSI), number of social media profiles, and time spent on social media. Observed relationships between variables are considered small if around 0.10, moderate if around 0.30, and strong if 0.50 or above (Cohen 1988).

Moreover, criterion validity was assessed through a linear regression model using digital ecology as the criterion variable.

Results

**Item Analysis.** Table 4 presents the descriptive statistics (mean, skewness, and kurtosis) for the six items of the IBRS-6.

All items demonstrated skewness and kurtosis values within the recommended thresholds of 2.0 and 7.0, respectively, as suggested by Curran et al. (1996). Consequently, the preliminary item analysis indicated no violations of normality, and all six items were retained for the final factor extraction analysis.

**Exploratory Factor Analysis.** Based on the item distribution, the average correlation with other items, and item-total correlations (Clark and Watson 2019), the data proved suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy (0.92) and the significance of Bartlett's test of sphericity ( $\chi^2_{(15)} = 993$ ,  $p < 0.001$ ) in the present study indicate that these data exhibit satisfactory factorability. Consistent with the original version of the IBRS-6, the EFA showed a three-factorial structure of the scale, explaining 52.4% of the total variance, with the subscales Social Identification, Homophily, Information Bias, accounting for 18.4%, 18% and 16% of the variance, respectively.

The factor loadings of the IBRS-6 are displayed in Table 5 with all items showing values above 0.30 on the corresponding factor.

**Confirmatory Factor Analysis.** To confirm the factor structure identified in the EFA, a CFA was performed on a subsample of 280 participants to evaluate the fit of the model.

The three-factor model with three correlated dimensions in accordance with the original validation of the IBRS-6 (i.e., Social Identification, Homophily, Information Bias) exhibited a good fit ( $\chi^2/df = 1.76$ ,  $p < 0.001$ ; CFI = 0.99, TLI = 0.99, RMSEA [90% CI] = 0.04 [0.00; 0.07], SRMR = 0.02). Factor loadings for the three subscales are reported in Fig. 1. Each item loaded strongly onto its intended factors. Standardized factor loadings ranged from 0.65 to 0.86, and the level of significance was below 0.001. The correlation between the three factors was positive and statistically significant, following the original validation.

**Internal Consistency.** As for reliability, both for the overall scale score ( $\alpha = 0.90$ ;  $\omega = 0.89$ ) and the subscales (Social Identification:  $\alpha = 0.91$ ,  $\omega = 0.85$ ; Homophily:  $\alpha = 0.88$ ,  $\omega = 0.82$ ; Information Bias:  $\alpha = 0.86$ ,  $\omega = 0.83$ ), the levels of internal consistency were excellent, supporting the use of the overall IBRS-6 and its subscales.

**Convergent Validity.** With regard to convergent validity, the bivariate correlations in Table 6 reveal significant positive associations between the IBRS-6 total score and the related constructs. The total IBRS-6 score showed strong positive and statistically significant correlations with the Social Identification ( $r = 0.83$ ,  $p < 0.001$ ), Homophily ( $r = 0.82$ ,  $p < 0.001$ ), and Information Bias ( $r = 0.76$ ,  $p < 0.001$ ) subscales. Additionally, the total IBRS-6 score exhibited a moderate positive and statistically significant correlation with the Preference for Online Social Interaction (POSI) ( $r = 0.36$ ,  $p < 0.001$ ). Among the subscales, Homophily showed a moderate correlation with POSI ( $r = 0.32$ ,  $p < 0.001$ ), followed by Social Identification ( $r = 0.33$ ,  $p < 0.001$ ) and Information Bias ( $r = 0.19$ ,  $p < 0.001$ ). The correlations between the IBRS-6 total and its subscales with the two indicators of social media use were statistically significant. Specifically, the IBRS-6 total score was correlated with both the number of social media

profiles ( $r = 0.17$ ,  $p < 0.01$ ) and time spent on social media ( $r = 0.22$ ,  $p < 0.001$ ). Regarding the subscales, Social Identification correlated with number of social media profiles ( $r = 0.15$ ,  $p < 0.01$ ) and time spent on social media ( $r = 0.18$ ,  $p < 0.01$ ); Homophily showed smaller but significant associations with number of social media profiles ( $r = 0.12$ ,  $p < 0.05$ ) and time spent on social media ( $r = .15$ ,  $p < 0.01$ ); Information Bias correlated with both number of social media profiles ( $r = 0.14$ ,  $p < .01$ ) and time spent on social media ( $r = 0.20$ ,  $p < 0.001$ ).

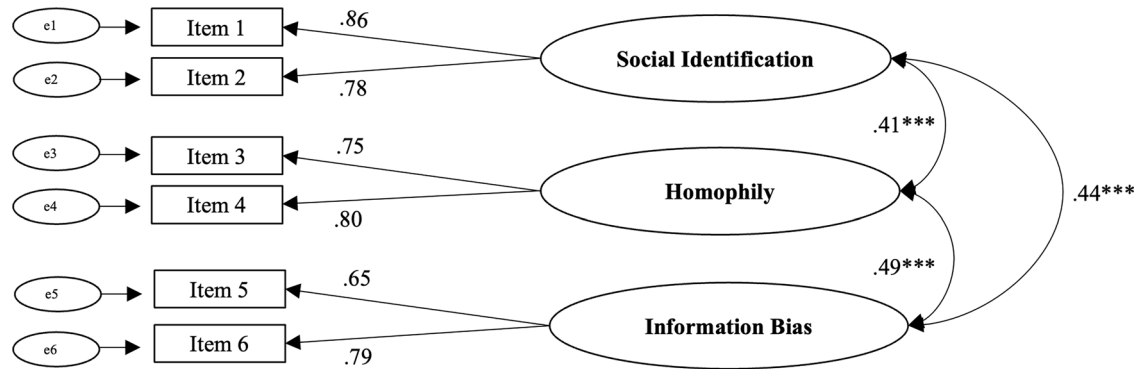
Regarding criterion validity, the linear regression analysis indicates that the overall score of the IBRS-6 ( $\beta = 0.24$ ,  $p < 0.001$ ) significantly predicts Digital Ecology. With regard to the subscales, while the Social Identification subscale ( $\beta = 0.01$ ,  $p > 0.05$ ) does not statistically significantly predict Digital Ecology, the Information Bias ( $\beta = 0.11$ ,  $p < 0.05$ ) and Homophily subscales ( $\beta = 0.21$ ,  $p < 0.001$ ) emerge as significant predictors. The regression model explains 28% of the variance (Table 7).

Discussion

The social selectivity and filtering technologies of social media platforms, which contribute to the formation of psychosocial bubbles that restrict the diversity of online social contacts and information exposure, have garnered increasing attention in recent research and clinical practice (e.g., Martinez et al. 2024; Soliman 2024). Although the Identity Bubble Reinforcement Scale (IBRS) has been translated into English, Finnish, Chilean, Korean, and Spanish (Kaakinen et al. 2020; Oksanen et al. 2021; Polanco-Levicán et al. 2022; Savolainen et al. 2020; Sirola et al. 2021), no studies in Italy have yet evaluated its psychometric properties, particularly among early adolescents. Therefore, the aim of the study was to assess the psychometric properties of a novel Italian translation of the IBRS-6.

Besides providing empirical evidence for the factor structure of the scale and its convergent validity in line with previous studies (e.g. Kaakinen et al. 2020), we aimed to extend existing research evaluating also its criterion validity. Notably, the study first evaluated the factorial structure of the items. Secondly, the internal consistency of the overall IBRS-6 and its subscales was assessed. Finally, both convergent and criterion validity were examined. From the exploratory analysis of the factorial structure, a three- factor structure emerged also for the Italian version of the scale, consistent with validation studies of both the original version of the scale (Kaakinen et al. 2020) and versions adapted to other cultural contexts (Polanco-Levicán et al. 2022). The Social Identification subscale explains 18.4% of the variance, the Homophily subscale explains 18%, and the Information Bias subscale explains 16%. All the subscales and the overall scale score showed good internal consistency ( $\alpha$  range: 0.86-0.91;  $\omega$

| Table 5 Factor loadings of the items of the IBRS-6 (n = 280). |                       |           |                  |
|---------------------------------------------------------------|-----------------------|-----------|------------------|
| Item                                                          | Factors               |           |                  |
|                                                               | Social Identification | Homophily | Information Bias |
| 1                                                             | 0.85                  |           |                  |
| 2                                                             | 0.87                  |           |                  |
| 3                                                             |                       | 0.67      |                  |
| 4                                                             |                       | 0.69      |                  |
| 5                                                             |                       |           | 0.62             |
| 6                                                             |                       |           | 0.66             |



Confirmatory factor analysis model, factor loadings and correlations between factors (n = 280). \*\*\*  $p < .001$

Fig. 1 Confirmatory factor analysis model, factor loadings and correlations between factors (n = 280). \*\*\*  $p < 0.001$ .

| Table 6 Bivariate correlations among the variables of interest (n = 280). |         |         |         |         |         |         |   |
|---------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---|
|                                                                           | 1       | 2       | 3       | 4       | 5       | 6       | 7 |
| 1. IBRS-6                                                                 | 1       |         |         |         |         |         |   |
| 2. Social Identification                                                  | 0.83*** | 1       |         |         |         |         |   |
| 3. Homophily                                                              | 0.82*** | 0.45*** | 1       |         |         |         |   |
| 4. Information Bias                                                       | 0.76*** | 0.44*** | 0.53*** | 1       |         |         |   |
| 5. Preference for Online Social Interaction                               | 0.36*** | 0.33*** | 0.32*** | 0.19**  | 1       |         |   |
| 6. Number of social media profiles                                        | 0.17**  | 0.15**  | 0.12*   | 0.14**  | 0.15**  | 1       |   |
| 7. Time spent on social media                                             | 0.22*** | 0.18**  | 0.15**  | 0.20*** | 0.28*** | 0.27*** | 1 |

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

| Table 7 Linear regression on the levels of digital ecology (n = 280). |           |                         |                |
|-----------------------------------------------------------------------|-----------|-------------------------|----------------|
| Independent variables                                                 | β         | R <sup>2</sup> adjusted | F(df)          |
| IBRS-6                                                                | 0.24***   | 0.28                    | 26.74***(4275) |
| Social Identification                                                 | 0.01 (ns) |                         |                |
| Information Bias                                                      | 0.11*     |                         |                |
| Homophily                                                             | 0.21***   |                         |                |

\* p < 0.05; \*\*\* p < 0.001.

range: 0.82-0.89). Additionally, using CFA, the three-factor model fit was tested, yielding good findings comparable to previous studies (Kaakinen et al. 2020; Polanco-Levicán et al. 2022; Savolainen et al. 2020).

In the context of this validation study, the observed positive correlations between the IBRS-6 total score, its subscales, and the measures of Preference for Online Social Interaction (POSI), number of social media profiles, and time spent on social media provide strong evidence for the convergent validity of the scale. These correlations align with theoretical expectations and prior research, suggesting that the dimensions of identity bubbles—such as homophily, information bias, and social identification—are closely tied to adolescents’ online preferences and behaviors. The correlation with POSI indicates that individuals who prefer online interactions over face-to-face communication are more likely to experience identity bubble reinforcement. This is consistent with the notion that such individuals may find the curated and controlled nature of online interactions particularly appealing, leading to an increased likelihood of engaging with like-minded individuals and reinforcing trust in shared content. This relationship is critical for the scale’s validity, as it demonstrates that the IBRS-6 captures a construct inherently linked to online interaction preferences, as reported in foundational studies on POSI (Caplan 2003, 2010). Similarly, the positive correlations with both the number of social media profiles (i.e., social media breadth) and time spent on social media (i.e., social media intensity) highlight distinct but complementary aspects of online engagement that contribute to the reinforcement of identity bubbles. A broader presence across multiple platforms increases the likelihood of encountering homogenous content and communities, while greater intensity of use enhances the frequency of exposure and interaction. Both mechanisms increase opportunities for engagement with like-minded individuals and repeated exposure to congruent content, which are central to the consolidation of perceived trust and belonging within identity bubbles. This is consistent with existing literature suggesting that social media platforms foster environments where repeated interactions reinforce individuals’ sense of affiliation and validation within their online networks (Mikal et al. 2016).

Compared to previous validation studies (Kaakinen et al. 2020; Polanco-Levicán et al. 2022; Savolainen et al. 2020), the present study is the first to demonstrate the criterion validity of the IBRS-6 by examining its relationship with digital ecology. The results showed that both the total score of the IBRS-6 and the Information Bias and Homophily subscales significantly and positively predict adolescents’ perception of the online environment as emotionally safe, socially inclusive and trustworthy. This underpins the relevance of digital ecology as an external criterion that reflects how social-cognitive processes in social media are related to broader assessments of the online relationship climate. These findings are consistent with theoretical perspectives that view digital ecology as a subjective evaluation of online spaces, emphasizing perceived safety, trust, and emotional predictability (Best et al. 2014). Adolescents who tend to interact with like-minded peers (homophily) and trust the information shared in their networks (information bias) may experience digital contexts as more coherent and manageable, which in turn promotes a more positive perception of the online environment.

By contrast, the Social Identification subscale was not significantly associated with digital ecology. This finding may indicate that while identification with an online group fosters a sense of belonging or shared identity, it does not necessarily translate into a positive perception of the online environment as emotionally safe, inclusive, or trustworthy. Prior literature suggests that identification processes may promote symbolic attachment or ideological alignment rather than fostering interpersonal trust (Obst et al. 2002; Postmes et al. 2005). Indeed, social identification can occur even in hostile or polarized online spaces, where group cohesion is maintained at the expense of openness or perceived safety (Tucker et al. 2018). Moreover, group identity alone may be insufficient to foster meaningful engagement with others or content credibility, particularly in adolescence, when peer norms and cognitive biases may amplify in-group conformity without enhancing evaluative processing of digital interactions (Nesi et al. 2018). Especially in digital contexts, group identity alone may be insufficient to build trust or critical engagement, which depend more on interpersonal dynamics and content cues (Lewandowsky et al. 2012). This distinction highlights that while social identification is important for establishing group belonging, it does not necessarily improve the perceived emotional climate of the digital environment.

Although previous validations of the IBRS-6 did not include Digital Ecology as a criterion variable, our results are consistent with findings from large-scale European surveys (e.g., Livingstone et al. 2019; Smahel et al. 2020), which show that young people’s feelings of online safety are closely linked to their trust in others and the emotional tone of their digital interactions. Taken together, these findings reinforce the conceptual coherence and empirical utility of digital ecology as a criterion for validating instruments such as the IBRS-6. Rather than focusing on identity

processes per se, our approach emphasizes the role of specific social-cognitive mechanisms—such as selective exposure, informational trust, and peer similarity—in shaping adolescents' perceptions of safety and cohesion in the digital environment.

Overall, our results underline the reliability, validity and potential usability of the IBRS-6 for the Italian context, especially in early adolescents. Our findings are in line with previous literature on social media and group identity processes (Kaakinen et al. 2020; Oksanen et al. 2021; Polanco-Levicán et al. 2022; Savolainen et al. 2020; Sirola et al. 2021).

### Strengths and Limitations

The study has significant strengths. One of its strengths is its comprehensive methodological approach, which includes a preliminary item analysis, a dimensionality assessment, a reliability analysis and an examination of convergent and criterion validity. The results indicate not only the convergent validity of the IBRS-6, which is in line with other studies (Kaakinen et al. 2020; Polanco-Levicán et al. 2022; Savolainen et al. 2020), but also its criterion validity, which has not been previously investigated.

Furthermore, the study demonstrated high internal consistency for both the overall IBRS-6 and its three subscales—Social Identification, Homophily, and Information Bias. This robustness ensures the scale's utility for clinical and scientific research purposes, allowing for the computation of both a general score and individual subscale scores, depending on the research objectives. An additional strength of the study is the analysis of different forms of validity (i.e., convergent and criterion) further underscores the scale's applicability to adolescent populations, confirming its relevance in capturing constructs that are crucial for understanding online behavior in this demographic. These findings not only validate the IBRS-6 for use with early adolescents but also highlight the importance of continuing to explore how digital interactions influence their social and psychological development.

In addition, the agility and brevity make it particularly suitable for use with young people and early adolescents as well as for structured surveys on internet and social media use. The study makes an interesting contribution both empirically and in terms of application. Given the importance of assessing the impact of social media use on the daily lives of adolescents (OFCOM 2023; Rideout and Robb 2023), this study provides a valid and reliable instrument that captures the tendency to establish relationships with like-minded people on social networks and thereby strengthen one's identity. Given the small number of items that make up the scale, it is an instrument that can easily be used both to identify possible risk factors associated with compulsive internet use or internet addiction and to design preventive measures on this topic and promote conscious internet and social use (Kaakinen et al. 2020; Savolainen et al. 2020). This possibility is all the more valuable when one considers that this study was the first to test the validity of the scale with a sample of early adolescents under the age of 15. As a result, the scale can be used to assess social-cognitive dynamics that may indirectly support identity-related processes in early adolescence, such as the reinforcement of shared beliefs, perceived group belonging, and trust in information within online environments (Marengo et al. 2021; Muzi et al. 2021). These mechanisms, while not equivalent to formal identity construction, are relevant for understanding how adolescents navigate digital spaces and may contribute to risk or protective pathways associated with online behavior (Marengo et al. 2021). The scale thus represents a tool that enables prevention through interventions targeting the first cycle of secondary education and thus early adolescence - a privileged population group for the design of interventions, especially in the school context (Finkelhor et al. 2021; Paat and Markham 2021).

The study is not without limitations. Firstly, the results must be interpreted taking into account the cultural context and the dynamic and rapidly changing characteristics of the internet phenomenon, particularly for this age group (Schemer et al. 2021). Secondly, the reliance on voluntary participation may have led to a bias, favoring early adolescents who are more willing to share their experiences in social media environments. Future studies could address this limitation by adopting strategies such as more representative sampling methods to ensure broader participation. Thirdly, the sample, primarily composed of middle school students from northern Italy, limits the generalizability of the findings to the broader population of Italian early adolescents. Expanding future research to include a more diverse geographic and age range would enhance representativeness. However, the scale could be retested in future studies by extending the sample to the entire Italian territory and widening the age range. Furthermore, the reliability of the scale was only assessed in terms of internal consistency. Given that each subscale includes only two items, both Cronbach's alphas and McDonald's omega coefficients should be interpreted with caution, as they may be inflated and reflect item redundancy. Future studies could revise this aspect by also testing the test-retest validity to examine the temporal stability of the IBRS-6 and its subdimensions.

Future studies could revise this aspect by also testing the test-retest validity. Another limitation is that the scale is a self-report instrument, which limits the possibility of measuring this construct using other indicators or other informants. Future lines of research could measure gender invariance, taking into account the differences found in the literature between male and female adolescents in terms of Internet and social media use (Liang et al. 2016; Pujazon-Zazik and Park 2010). Now that the factorial structure of the original scale has been confirmed (Kaakinen et al. 2020), future lines of research could investigate possible relationships with other constructs related to the school context. It might be interesting to assess the effect of the IBRS-6 on cyberbullying, prosocial behavior, or Internet addiction in continuity with what has been studied in the literature for adults and young adults (Kaakinen et al. 2020; Polanco-Levicán et al. 2022; Savolainen et al. 2020).

### Conclusion

The widespread use of social media among early adolescents meets important developmental needs such as peer social interaction and the search for self-relevant content and values (Branje et al. 2021; Davis 2012, 2013; Rideout and Robb 2023). However, the literature points out that social media limits the diversity of social contacts, including through algorithms, by promoting relationships with similar people and thus favoring so-called "psychosocial bubbles" (Pariser 2011; Zollo et al. 2017). The theoretical Identity Bubble Reinforcement Model (IBRM) by Keipi et al. (2017), which analyzes the phenomenon of social media from a social psychological perspective, describes three key elements: social identification, homophily and informational bias, which underlie the Identity Bubble Reinforcement Scale (IBRS; Kaakinen et al. 2020).

In this study, the six-item version of the IBRS-6 was adapted and validated on a sample of Italian middle school students, confirming the three-dimensional structure and its reliability in the Italian context. Convergent validity confirms that all dimensions of the identity bubbles are correlated with increasing preference for online social interactions and social media use (Mikal et al. 2016), as reported in the literature (Caplan 2003, 2010). Furthermore, criterion validity, assessed for the first time for this scale, predicts the Digital Ecology in a way that is consistent with what has been reported in the literature regarding adolescents'

perceived online safety in terms of characteristics such as the presence of users considered to be “friends” and the trustworthiness of shared messages or content (Smahel et al. 2020). Overall, these findings contribute to a more comprehensive understanding of how filtering technologies and social selectivity—core features of digital media platforms—influence the online relational climate of adolescents (Martinez et al. 2024; Soliman 2024). The IBRS-6 emerges as a reliable and valid instrument for assessing these psychosocial mechanisms in the Italian context. Thanks to its brevity and clarity, it is well-suited for use in school-based screening and preventive interventions aimed at reducing digital vulnerability and fostering critical media literacy.

## Data Availability

The dataset generated during the current study is not publicly available due to ethical and legal restrictions. Participants were minors, and informed consent did not include authorization for data sharing beyond the research team. Additional methodological details are available from the corresponding author upon reasonable request and subject to ethical compliance.

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### Author contributions

Study conception and design: ADL, CDG, FG, EC, ER. Data collection: ADL, ER. Methodology: ADL, CDG. Data Curation: ADL, CDG. Analysis and interpretation of results: ADL, CDG, ER. Writing – Original Draft: ADL, CDG, FG, EC, ER. Writing – Review & Editing: ADL, CDG, FG, EC, MK, AO, ER. All authors reviewed the results and approved the final version of the manuscript.

### Competing interests

The authors declare no competing interests.

### Ethical Approval

Ethical approval for this study was obtained from the Bioethics Committee of the University of Turin, acting as the Institutional Review Board (Approval No. 202854 approved on 29.3.2021). The approval covered the administration of an anonymous online questionnaire to secondary school students and included procedures for participant recruitment, parental consent, data management, and secure storage. All procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee, the 1964 Declaration of Helsinki and its subsequent amendments, and applicable national regulations governing research involving minors and data protection.

### Informed Consent

Because the study involved minors, written informed consent was obtained from parents or legal guardians prior to participation, and written assent was obtained from the students. Consent forms were distributed to families through the participating schools and collected in September 2023, before students were granted access to the online questionnaire. Participants and their families received detailed information about the aims of the study, the voluntary nature of participation, the anonymous handling of data, and their right to withdraw at any time without consequences. Data were collected and stored in accordance with institutional data protection policies.

### Additional information

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