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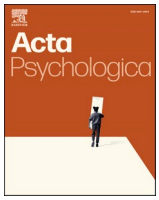

# Interaction through social media: Development and validation of a social network site self-efficacy scale (SNS-SES)

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ABSTRACT

Today, more than ever before, awareness of our ability to interact with others through and use social network sites (SNSs) is of fundamental importance, in light of the fact that we are connected to the Web 24 h a day, 7 days a week. Studies of social media in recent decades have shown that self-efficacy is one of the key variables affecting individual online behavior. The general aim of the studies presented here was to develop and validate a new self-report scale measuring self-efficacy in SNS use (an SNS self-efficacy scale, or SNS-SES). Across two studies, a total of 1295 Italian adolescents and adults (ages 15 to 89; $M = 38.21$, $SD = 15.6$) participated. The SNS-SES consists of 24 items assessing four factors of self-efficacy in SNS use: task-oriented/technological, task-oriented/social, interpersonal, and emotional. Exploratory and confirmatory factor analyses showed a clear factorial validity of this stable four-factor solution.

## 1. Introduction

In the last two decades, social network sites (SNSs) and mobile technologies have transformed how people learn, work and play together. Particularly over the past few years, the use of SNSs has increased, becoming a compelling topic for both popular media and academic research analysis. During the recent COVID-19 pandemic, this growth has proved even more significant, with both positive and negative effects on public health and the well-being of citizens (Ögel-Balaban, 2022; Ruggieri, Bonfanti, Ingoglia, et al., 2021).

A critical component of SNS use is the individual's ability to successfully interact by means of these new technologies. Some researchers have suggested self-efficacy to be a key variable in the development of SNS-specific social communication skills (e.g., Hocevar et al., 2014; Rohatgi et al., 2016; Wu et al., 2012; Zhang, 2022; Ruggieri, Bonfanti, Passanisi, et al., 2021). In brief, self-efficacy comprises an individual's set of "beliefs in their capability to exercise some measure of control over their own functioning and over environmental events" (Bandura, 2001, p. 10). Recognized as one of the most central mechanisms of human agency, self-efficacy influences motivation, personal achievement, and fulfillment (Bandura, 1982, 1997). Despite the extent of self-efficacy studies in other research areas, there is a lack of reliable and generalizable measures to detect self-efficacy specifically in the SNS context.

Starting from this point, the aim of the studies presented here is to construct and validate a SNS self-efficacy scale (SNS-SES) that measures how effective people believe they are when they use SNSs. In essence, we want to create a new questionnaire that is able to test self-efficacy, not as a unitary and one-dimensional construct (Bandura, 1997) referring exclusively to technological skills (i.e., task-related), but as a fully complex subjective perception comprising multiple emotional and interpersonal features.

### 1.1. Social network site self-efficacy

According to one of the best-known descriptions, SNSs are "a networked communication platform in which participants 1) have uniquely identifiable profiles that consist of user-supplied content, content provided by other users, and/or system-provided data; 2) can publicly articulate connections that can be viewed and traversed by others; and 3) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site" (Ellison & Boyd, 2013, p. 158). Following the Social Online Self-Regulation Theory (Ozimek & Förster, 2021), SNSs can be a means to achieve

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goals that can be sub-goals to higher-order desired end states. Goals (i.e., attracting friends) are represented in memory with means on the more concrete level (i.e., posting an impressive photo) and desired end states at the more abstract level (i.e., feeling good). Goal hierarchies also contain sub-goals. For example, raising self-esteem could be obtained by drawing more e-friends, which can be achieved writing funny messages, sharing interesting information or take part in virtual teams.

From a psychosocial point of view, SNSs can be considered *digital places* that allow users to manage their social identities and relationship networks (Appel et al., 2018; Kaakinen et al., 2018; Kim, 2018; Ruggieri et al., 2013; Yang, 2019). The innovative perspectives offered by these digital places allow the dissemination of ideas, opinions, reactions, interests, and activities between users. In addition to aggregating updates and comments from other people (i.e., "friends" on Facebook or "followers" on Instagram), SNSs offer users opportunities to share and comment on photographs, memes, videos, news, advertisements, and information related to special interest groups. Each user has a personal level of knowledge and ability in relation to these new online services. Determinants associated with the different ways to use SNSs include personality traits (Özgüven & Burcu, 2013; Whitty et al., 2018), cognitive styles (Adeyemi et al., 2017) and skills (Thompson, 2017; Wang et al., 2012).

Recent research has shown that self-efficacy is one of the key variables affecting individual behavior related to the use of social media (Alber et al., 2016; Hocevar et al., 2014; Korkmaz & Altun, 2014; Rohatgi et al., 2016; Wu et al., 2012; Ruggieri, Bonfanti, Passanisi, et al., 2021; Liu et al., 2022; Chen & Gao, 2023).

Self-efficacy theory allows us to understand the relationship between our beliefs about our competence in specific behavioral domains, which influence our choices, and how well we perform. Self-efficacy consists of a person's beliefs in their own ability to organize and execute a requested action and get what they want by drawing on motivation and personal effort. These beliefs include expectations of how well one will perform (Bandura, 1997, 2001). On this basis, an individual forms a perceived level of self-confidence in a specific field of knowledge, which produces effects on the individual's development and consequent behavior. Particularly, this self-confidence influences whether the individual approaches or avoids the domain, and their tendency to persevere in completing a related task. Accordingly, such beliefs may influence our emotional processes, such as outcomes linked with adaptive or maladaptive emotional functioning.

It follows, as Bandura (1990) suggests, that self-efficacy influences the selection of behavior: we do not choose certain activities if we believe we will fail at them. This idea might be especially resonant in the SNS context. SNS self-efficacy can be defined as one's level of perceived self-confidence in one's ability to use SNSs, and is an important construct that influences the confidence with which each of us interacts with various online social communication tools such as Facebook, Instagram, and Twitter. An individual's level of SNS self-efficacy affects how they engage in their typical behavior on SNSs and how often: one will more frequently post, reply, share, install, etc., the more one feels effective when performing these actions.

The studies conducted in this area show the importance of strong social self-efficacy to SNS engagement. In an online community, individuals who possess the confidence to interact with each other make new friends and establish a strong sense of social trust among those with whom they interact. It has been observed, in fact, that an individual's social self-efficacy will elicit positive feedback in a virtual internet community, particularly in regard to emotional connectedness and intellectual exchange. In other words, when an individual expresses their social self-efficacy, the entire group gains social capital from the resulting interactions (Wu et al., 2012). Other studies observed the relevant role of SNS-specific self-efficacy in predicting electronic surveillance (Ruggieri, Bonfanti, Passanisi, et al., 2021), identification of fake news (Hopp, 2022), and predicting online verbal aggression (Ferreira et al., 2021).

It is interesting to note that when trying to conceptualize SNS self-efficacy, many researchers considered it to be a part of computer self-efficacy. John (2013) notes that basic computer knowledge and previous computer experience positively influence an individual's computer self-efficacy as well as their intention to use social networking platforms. Although there is no doubt that competence in performing a specific task is important, we do not think that we can speak of a real overlap between these two and thereby reduce SNS self-efficacy to a mere question of technological skills.

Self-efficacy itself, far from being reducible to a unitary construct, as many have thought, is not so simple. Bandura (2006) suggests that the efficacy belief system is not a global trait, but a differentiated set of self-beliefs linked to different domains of functioning. By focusing our attention on just one dimension of self-efficacy (e.g., task-related), we gain only a partial understanding of the self-regulatory systems we are trying to analyze. Therefore, it is important to understand how self-efficacy beliefs intermingle and how individuals organize these beliefs in a unitary way.

The adoption of this multidimensional perspective illuminates at least three different areas of competence: task-related, emotional, and interpersonal (Bandura, 1997; Goleman, 1995, 2006). Thus, an individual may feel perfectly capable of creating their personal profile on a new SNS, but may then have difficulty interacting with the people on the platform. By contrast, another individual could feel comfortable, from an emotional point of view, with entering into a relationship with others and then have technical difficulties in the configuration of their account.

Multidimensional approaches to assessing self-efficacy have been adopted in various psychological fields (e.g., education, development, and personality; Barbaranelli et al., 2018), but not in the social media context. Within educational, developmental, and personality psychology literature, scholars have highlighted the importance of analyzing self-efficacy to manage emotions and interpersonal relationships (Bandura, 1997; Erber & Erber, 2000; Gross, 2014). Likewise, we believe that an approach using a more complex model that integrates task-related aspects with emotional and interpersonal characteristics may also be important for understanding the role of self-efficacy on SNSs.

#### 1.1.1. Task-related self-efficacy

Until now, most of the research that has addressed self-efficacy on social media has highlighted the central importance of the task-related component, referring mainly to the technological dimension of self-efficacy (Alber et al., 2016; Hocevar et al., 2014; Korkmaz & Altun, 2014; Rohatgi et al., 2016; Wu et al., 2012). This position closely follows a similar approach to internet self-efficacy (Eastin & LaRose, 2000; Kim & Glasman, 2013; Li et al., 2018) and computer self-efficacy (Compeau & Higgins, 1995; Malliari, 2012), in which technological skills are considered a fundamental element in predicting whether an individual will feel effective using computers and the internet.

Technological skills also play an important role on SNSs. It has already been established that self-perception as having ample computer knowledge and previous computer experience significantly influences one's self-efficacy (John, 2013). Being a technology expert predisposes one to have an initial positive attitude toward SNSs, whose use is mediated by new technologies, which indeed represent a prerequisite thereto. Thus, individuals with high computer self-efficacy commonly use several computer applications such as SNSs (Hocevar et al., 2014; John, 2013). On the other hand, over the last few years, the simplification of operating systems (on both fixed and mobile devices) and the general increase in computer skills, even among older people, have made technological competence less important. In fact, these applications have evolved to provide more and more personalized and user-friendly features for easier communication, such as convenient photo uploading, real-time chatting, and instant messaging services. On the basis of the foregoing, the role of task-related skills, albeit attenuated, is still very important in our view of self-efficacy on SNSs.

#### 1.1.2. Interpersonal self-efficacy

The technological component, although fundamental, is not the only factor that allows us to understand the role of self-efficacy in SNS use. Even within internet self-efficacy, for example, in the task-related component (like a direct search for new information using search engines), other dimensions of a more interpersonal nature also play a key role (e.g., communicating with others using internet-based applications like e-mail; Kim & Glasman, 2013).

Personality and developmental psychology studies have frequently investigated the interpersonal dimension in self-efficacy (Barbaranelli et al., 2018), with a particularly extensive focus on social self-efficacy. This parameter refers to beliefs regarding one's ability to seek and build social relationships and be assertive (Bandura, 2006; Kim & Timmerman, 2016). Social self-efficacy captures the extent to which people sense their own agency to influence their social environment through their actions (Ferris et al., 2007). This feeling of agency—combined with the conviction of being able to effectively manage one's interpersonal relationships by knowing how to establish and maintain positive social relations of friendship, mutual acceptance, and collaboration—constitutes a protective element for one's own well-being and psychological and social development. Friendship relationships offer multiple opportunities to learn about the strategies that others use to solve problems, to learn social norms and rules, to test one's social skills, and to experiment with forms of solidarity, understanding, and acceptance (Fan & Mak, 1998).

On SNSs, interpersonal self-efficacy is particularly important, as can easily be understood from the definition given by Ellison and Boyd (2013). Knowing how to maintain social relationships and to interact using correct and detailed language are fundamental skills for all those who interact through social media. These skills elicit positive feedback that increases one's sense of perceived self-efficacy. By contrast, individuals with low levels of social self-efficacy on SNSs will deem themselves less able to maintain social relations through these technological tools, and, as in a sort of self-fulfilling prophecy, it is highly probable that such individuals will avoid engaging with those tools.

#### 1.1.3. Emotional self-efficacy

The emotional dimension plays a very important role in self-efficacy studies. As Bandura (1997, 2001) stated, emotional arousal is our level of anxiety caused by the positive or negative emotions that arise when we consider the action we are about to take. In this sense, emotional reactions can affect one's performance. For example, Caprara et al. (2008) measured emotional self-efficacy in relation to a person's perception of faith in their own ability to regulate negative emotions experienced during adverse or stressful events.

In social media, too, the emotional dimension of self-efficacy plays a key role (Song et al., 2016) when it is considered as one's perceived emotional state and ability to control one's reactions when participating on SNSs. Are we relaxed when we take our smartphone in hand, or are we in a state of tension due to the technical problems we perceive? Do the answers to one of our posts on Facebook make us angry? Does the amount of “likes” we receive in response to our image make us happy? Are we satisfied with the number of Retweets that our last Tweet received? All these phenomena affect our emotional states experienced in the use of SNSs and, consequently, our self-efficacy.

### 1.2. The current research

This study consists of validation of a self-report measure we have termed the SNS self-efficacy scale (SNS-SES). We designed the SNS-SES as a measure of how well and with what degree of trust people feel they are able to interact with each other on SNSs and to what degree they feel able to act in this virtual world in response to certain task performance demands.

We divided the studies into three steps: first, in accordance with the theoretical background, we generated an initial set of items, which were rated and refined by an expert panel in line with the three dimensions outlined above. The format of the individual items and the general instructions for administration followed the guidelines provided by Bandura (2001). Subsequently, we conducted an exploratory factor analysis (EFA) to develop the initial scale and examine the underlying factor structure. Finally, we performed a confirmatory factor analysis (CFA) to cross-validate the results of the previous phase and examine each scale's internal consistency.

## 2. Study 1

### 2.1. Aims of the study

The first goal of the study was to investigate the SNS-SES's factorial validity. In alignment with Bandura's (1997) framework, we hypothesized the existence of three separate domains: task-oriented self-efficacy, interpersonal self-efficacy, and emotional self-efficacy. The second aim was to examine the reliability of the SNS-SES, in terms of its internal consistency.

### 2.2. Method

#### 2.2.1. Participants and procedure

Participants were 657 Italian adolescents and adults (males = 28 %) aged between 15 and 87 years ($M = 38.6$, $SD = 15.3$). With regard to educational status, 3 % did not declare the level of education or had no educational qualification, 6 % had an elementary school education, 14.3 % had a middle school education, 40 % had a high school education, and 42.6 % had a college or postgraduate education.

The sample was selected using a snowball sampling method. We distributed an online link to the questionnaire to university students and asked them to take home about seven questionnaires each to submit to friends, relatives, and acquaintances. The only criteria specified to students were that their questionnaire recipients must use SNSs daily.

#### 2.2.2. Item creation process

The process of creating items took place in two steps. First, we analyzed studies that cited or used the self-efficacy SNS construct (i.e., Alber et al., 2016; John, 2013; Hocevar et al., 2014; Korkmaz & Altun, 2014; Rohatgi et al., 2016; Wu et al., 2012; Ruggieri, Bonfanti, Passanisi, et al., 2021). Some of these studies realized ad hoc items to evaluate specific aspects without, however, proceeding to conduct a true validation of the scale. Very often, these studies referred to a single social media platform, generally Facebook. Other research used items that shared some features with SNS self-efficacy: computer and internet self-efficacy. In fact, several scales presented some factors and items connected with self-efficacy on social media.

The second step was to analyze all the items examined up to that point; searching for the dimensions would be most useful for the determination of SNS self-efficacy. In our attempt to identify the theoretical reference matrix, we broadly considered the literature on self-efficacy (i.e., Bandura, 1982, 1997, 2001), as well as the idea of a multidimensional approach to assessing self-efficacy (Bandura, 1997; Barbaranelli et al., 2018; Erber & Erber, 2000; Gross, 2014). Finally, the creation of the items followed the theoretical and practical recommendations of Bandura (2006) for the creation of self-efficacy scales.

The item selection process aligned with the three-topic area described above and was addressed to all SNSs and not to one in particular (e.g., we referred to personal profile creation, typical of all SNSs), avoiding items on specific functionality (e.g., we avoided referring to the features of Instagram stories, which are specific only to Instagram). For this reason, it was important to find evidence on the most popular SNSs, which we studied to understand which types of items were suitable for describing general and common functionalities.

An introductory paragraph preceding the body of the questionnaire asked participants to think about the SNSs they used, then to rate their

degree of confidence in their abilities by recording a number from 1 to 5. Items of the scale are reported in Table 1.

### 2.3. Results

#### 2.3.1. Descriptive statistics and Pearson correlation coefficients

Means, standard deviations, skewness, and kurtosis of the SNS-SES items are reported in Table 2. Data had a normal univariate distribution, with the skewness and kurtosis values being approximately in the range from −1.0 to +1.0 (Muthén & Kaplan, 1985). Pearson correlation coefficients are reported in Table 3.

#### 2.3.2. Exploratory factor analysis of the SNS-SES

In order to explore the factorial structure of the scale, we ran an exploratory factor analysis (EFA) using the robust maximum-likelihood (MLR) estimation method. To statistically evaluate the closeness of the hypothetical model to the empirical data, we used multiple goodness-of-fit indexes, including the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The chi-square test of model fit was not used as an evaluation of absolute fit because of its sensitivity to sample size. CFI values of 0.90 or more and RMSEA and SRMR values of 0.08 or less were interpreted as evidence of acceptable models (Kline, 2005). We performed the analyses by using Mplus 7 (Muthen & Muthen, 2012).

The goodness-of-fit indexes of the tested models are reported in Table 4. Results showed that the best-fitting model was a four-factor model. Standardized factor loadings are reported in Table 5. Factor correlations ranged from 0.38 to 0.77. The factor determinacies were 0.97, 0.97, 0.96, and 0.94, for task-oriented/technological self-efficacy, task-oriented/social self-efficacy, social self-efficacy, and emotional self-efficacy, respectively.

#### 2.3.3. Reliability analysis of the SNS-SES

To examine the SNS-SES's reliability, we computed McDonald's omega and corrected item-total correlation coefficients. Omega values were 0.93, 0.93, 0.91, and 0.87 for factor 1 (task-oriented/technological self-efficacy), factor 2 (task-oriented/social self-efficacy), factor 3 (interpersonal self-efficacy), and factor 4 (emotional self-efficacy), respectively. Item-total correlation coefficients were higher than 0.60, ranging from 0.65 to 0.87.

**Table 1**
The SNS-SES items.
"Rate your degree of confidence from 1 to 5".

| |
|---|
| Task-oriented/technological self-efficacy |
| 1. Use SNSs |
| 2. Solve technological problems that arise when using SNSs on your own |
| 3. Surf SNSs from a smartphone |
| 4. Surf SNSs from a personal computer |
| 5. Configure a SNS |
| 6. Edit and manage one or more profiles on SNSs |
| 7. Check if the information on SNSs is correct and reliable |
| Task-oriented/social self-efficacy |
| 8. Search for friends on SNSs and follow them |
| 9. Respond to friends' comments on SNSs |
| 10. Share other people's posts on SNSs (when applicable) |
| 11. Post content on your wall/timeline |
| 12. Use SNSs to find information on topics that are important to you |
| Interpersonal self-efficacy |
| 13. Get you and your friends involved in discussions about SNSs |
| 14. Extend new knowledge gained from SNSs to everyday life |
| 15. Post to your virtual groups on SNSs |
| 16. Maintain ties with people you can't see daily through SNSs |
| 17. Use SNSs to receive support from and be close with virtual friends |
| 18. Take pleasure in helping people seeking advice on SNSs |
| Emotional self-efficacy |
| 19. Feel happy when others appreciate what you write on SNSs |
| 20. Have fun sharing posts and/or photos with your friends on SNSs |
| 21. Feel satisfied when you solve a seemingly insurmountable SNS problem |
| 22. Overcome daily frustrations and feel relaxed when using SNSs |
| 23. Enjoy reading other users' posts on SNSs |
| 24. Relax while watching funny videos featuring friends and family on SNSs |

**Table 2**
Means, standard deviations, skewness and kurtosis of the SNS-SES items (Study 1, n = 657).

| | *M* | *SD* | *S* | *K* |
|---|---|---|---|---|
| SNS-SES1 | 3.78 | 1.06 | −0.60 | −0.27 |
| SNS-SES2 | 3.21 | 1.21 | −0.21 | −0.83 |
| SNS-SES3 | 4.17 | 1.01 | −1.20 | 0.86 |
| SNS-SES4 | 3.78 | 1.28 | −0.84 | −0.37 |
| SNS-SES5 | 3.21 | 1.39 | −0.23 | −1.17 |
| SNS-SES6 | 3.37 | 1.36 | −0.32 | −1.14 |
| SNS-SES7 | 3.64 | 1.17 | −0.61 | −0.41 |
| SNS-SES8 | 4.17 | 1.12 | −1.28 | 0.77 |
| SNS-SES9 | 4.31 | 1.05 | −1.50 | 1.53 |
| SNS-SES10 | 4.18 | 1.16 | −1.38 | 0.95 |
| SNS-SES11 | 4.25 | 1.17 | −1.54 | 1.37 |
| SNS-SES12 | 4.17 | 1.03 | −1.33 | 1.28 |
| SNS-SES13 | 3.24 | 1.25 | −0.21 | −0.92 |
| SNS-SES14 | 3.18 | 1.24 | −0.23 | −0.88 |
| SNS-SES15 | 3.11 | 1.23 | −0.18 | −0.89 |
| SNS-SES16 | 3.59 | 1.18 | −0.53 | −0.53 |
| SNS-SES17 | 3.14 | 1.26 | −0.18 | −0.92 |
| SNS-SES18 | 3.33 | 1.27 | −0.38 | −0.83 |
| SNS-SES19 | 3.64 | 1.22 | −0.60 | −0.53 |
| SNS-SES20 | 3.61 | 1.27 | −0.60 | −0.64 |
| SNS-SES21 | 3.75 | 1.19 | −0.75 | −0.28 |
| SNS-SES22 | 3.20 | 1.25 | −0.16 | −0.85 |
| SNS-SES23 | 3.39 | 1.09 | −0.39 | −0.29 |
| SNS-SES24 | 3.87 | 1.07 | −0.76 | −0.04 |

### 2.4. Discussion

The results of Study 1 were satisfactory and in line with expectations. All the dimensions initially hypothesized in the theoretical model of self-efficacy proposed by Bandura (1997; Goleman, 1995, 2006) emerged. However, the factorial solution was more complex because the best solution had four dimensions. In particular, the dimension of task-oriented self-efficacy, initially hypothesized as a single factor, was split in two factors, although correlated with each other. This is not surprising, however, as it confirms, once again, the dual nature of SNS-specific self-efficacy: users' sense of task-oriented self-efficacy was strictly connected with the technological component (i.e., the ability to configure, manage profiles, or navigate) and their self-efficacy aimed at technical skills more of a social nature (ability to search for friends, reply to posts, or share posts from others).

Therefore, the final model includes the following four factors: task-oriented/technological self-efficacy, task-oriented/social self-efficacy, interpersonal self-efficacy, and emotional self-efficacy. The scale also has good levels of reliability in terms of internal consistency.

## 3. Study 2

### 3.1. Aims of the study

The first aim of the study was to test the SNS-SES factorial structure of the previous study on an independent sample. We tested three competing models: (a) the one-factor model, (b) the three-correlated factors model we initially hypothesized, which defined task-oriented self-efficacy as a single dimension, and (c) the four-correlated-factors model found in Study 1, which differentiated task-oriented self-efficacy in two separate dimensions: task-oriented/technological self-efficacy and task-oriented/social self-efficacy. The second aim was to examine the scale's reliability. Finally, the third aim was to examine the

**Table 3**
Pearson correlation coefficients of the SNS-SES items (Study 1, n = 657).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SNS-SES 1 | – | | | | | | | | | | | | | | | | | | | | | | | |
| SNS-SES 2 | 0.75 | – | | | | | | | | | | | | | | | | | | | | | | |
| SNS-SES 3 | 0.75 | 0.64 | – | | | | | | | | | | | | | | | | | | | | | |
| SNS-SES 4 | 0.68 | 0.67 | 0.72 | – | | | | | | | | | | | | | | | | | | | | |
| SNS-SES 5 | 0.67 | 0.75 | 0.61 | 0.68 | – | | | | | | | | | | | | | | | | | | | |
| SNS-SES 6 | 0.74 | 0.72 | 0.66 | 0.71 | 0.78 | – | | | | | | | | | | | | | | | | | | |
| SNS-SES 7 | 0.59 | 0.58 | 0.58 | 0.60 | 0.54 | 0.60 | – | | | | | | | | | | | | | | | | | |
| SNS-SES 8 | 0.67 | 0.55 | 0.70 | 0.60 | 0.57 | 0.67 | 0.56 | – | | | | | | | | | | | | | | | | |
| SNS-SES 9 | 0.61 | 0.51 | 0.69 | 0.59 | 0.53 | 0.60 | 0.53 | 0.81 | – | | | | | | | | | | | | | | | |
| SNS-SES 10 | 0.63 | 0.51 | 0.66 | 0.58 | 0.53 | 0.62 | 0.53 | 0.74 | 0.80 | – | | | | | | | | | | | | | | |
| SNS-SES 11 | 0.62 | 0.50 | 0.68 | 0.55 | 0.53 | 0.60 | 0.48 | 0.75 | 0.81 | 0.79 | – | | | | | | | | | | | | | |
| SNS-SES 12 | 0.63 | 0.52 | 0.66 | 0.59 | 0.51 | 0.59 | 0.66 | 0.68 | 0.66 | 0.67 | 0.64 | – | | | | | | | | | | | | |
| SNS-SES 13 | 0.54 | 0.46 | 0.49 | 0.41 | 0.44 | 0.49 | 0.47 | 0.46 | 0.48 | 0.48 | 0.47 | 0.49 | – | | | | | | | | | | | |
| SNS-SES 14 | 0.50 | 0.46 | 0.46 | 0.43 | 0.42 | 0.49 | 0.46 | 0.47 | 0.44 | 0.48 | 0.46 | 0.46 | 0.68 | – | | | | | | | | | | |
| SNS-SES 15 | 0.53 | 0.52 | 0.45 | 0.44 | 0.45 | 0.51 | 0.50 | 0.47 | 0.43 | 0.46 | 0.43 | 0.48 | 0.68 | 0.70 | – | | | | | | | | | |
| SNS-SES 16 | 0.44 | 0.34 | 0.45 | 0.35 | 0.30 | 0.37 | 0.36 | 0.44 | 0.44 | 0.45 | 0.43 | 0.49 | 0.58 | 0.58 | 0.55 | – | | | | | | | | |
| SNS-SES 17 | 0.44 | 0.36 | 0.40 | 0.38 | 0.35 | 0.40 | 0.38 | 0.40 | 0.37 | 0.42 | 0.39 | 0.42 | 0.61 | 0.66 | 0.62 | 0.69 | – | | | | | | | |
| SNS-SES 18 | 0.45 | 0.39 | 0.41 | 0.36 | 0.33 | 0.40 | 0.41 | 0.42 | 0.42 | 0.42 | 0.40 | 0.43 | 0.62 | 0.58 | 0.62 | 0.58 | 0.67 | – | | | | | | |
| SNS-SES 19 | 0.43 | 0.32 | 0.41 | 0.32 | 0.29 | 0.37 | 0.29 | 0.46 | 0.45 | 0.47 | 0.45 | 0.40 | 0.56 | 0.54 | 0.55 | 0.56 | 0.61 | 0.63 | – | | | | | |
| SNS-SES 20 | 0.46 | 0.36 | 0.45 | 0.32 | 0.35 | 0.41 | 0.37 | 0.51 | 0.48 | 0.50 | 0.54 | 0.45 | 0.59 | 0.56 | 0.55 | 0.53 | 0.55 | 0.55 | 0.71 | – | | | | |
| SNS-SES 21 | 0.43 | 0.34 | 0.40 | 0.30 | 0.30 | 0.37 | 0.34 | 0.45 | 0.43 | 0.46 | 0.42 | 0.42 | 0.54 | 0.51 | 0.54 | 0.46 | 0.54 | 0.57 | 0.70 | 0.59 | – | | | |
| SNS-SES 22 | 0.39 | 0.28 | 0.37 | 0.26 | 0.23 | 0.31 | 0.31 | 0.36 | 0.34 | 0.35 | 0.33 | 0.39 | 0.52 | 0.53 | 0.47 | 0.48 | 0.49 | 0.46 | 0.53 | 0.54 | 0.55 | – | | |
| SNS-SES 23 | 0.34 | 0.26 | 0.35 | 0.25 | 0.24 | 0.29 | 0.30 | 0.38 | 0.35 | 0.39 | 0.36 | 0.40 | 0.50 | 0.49 | 0.46 | 0.47 | 0.49 | 0.51 | 0.51 | 0.57 | 0.52 | 0.51 | – | |
| SNS-SES 24 | 0.34 | 0.25 | 0.35 | 0.25 | 0.22 | 0.22 | 0.24 | 0.32 | 0.33 | 0.31 | 0.30 | 0.39 | 0.38 | 0.37 | 0.33 | 0.43 | 0.32 | 0.35 | 0.42 | 0.49 | 0.39 | 0.45 | 0.51 | – |

**Table 4**
Goodness of fit indexes of EFA models (Study 1, n = 657).

| EFA models | SB$\chi^2$ | df | CFI | RMSEA | 90 % RMSEA C.I. | SRMR |
|---|---|---|---|---|---|---|
| 1-Factor model | 4015.32*** | 252 | 0.702 | 0.151 | 0.147–0.155 | 0.102 |
| 2-Factors model | 1945.96*** | 229 | 0.864 | 0.107 | 0.102–0.111 | 0.044 |
| 3-Factors model | 937.75*** | 207 | 0.942 | 0.073 | 0.069–0.078 | 0.027 |
| 4-Factors model | 729.82*** | 186 | 0.957 | 0.067 | 0.062–0.072 | 0.022 |

Note. SB$\chi^2$=Satorra-Bentler chi square; df=degree of freedom; CFI=Comparative Fit Index; RMSEA=Root Mean Square Error Approximation; SRMS=Standardized Root Mean Square ***p<.001

construct validity of the SNS-SES by exploring its association with the internet and social self-efficacy scales, responsiveness, and attitude toward SNSs.

### 3.2. Method

#### 3.2.1. Participants and procedure

Participants were 638 Italian adolescents and adults aged between 15 and 89 years (male = 34 %; *M* = 39.6, *SD* = 15.8). Related to educational status, 3.5 % had an elementary school education or had no educational qualifications, 12.4 % had a middle school education, 36.8 % had a high school education, and 47.3 % had a college or postgraduate education. As in the previous study, university students submitted seven questionnaires each to friends, relatives, and acquaintances who were daily SNS users.

#### 3.2.2. Measures

*3.2.2.1. Socio-demographic data.* The study collected the following socio-demographic information: gender, age and educational level.

*3.2.2.2. SNS Self-Efficacy Scale (SNS-SES).* Participants were asked to respond, on a 5-point Likert scale ranging from 1 (*cannot do at all*) to 5 (*highly certain can do*) to the 24 items of the four-dimension SNS-SES developed and discussed in Study 1.

*3.2.2.3. Internet Self-Efficacy Scale.* We assessed respondents' internet self-efficacy with the Internet Self-Efficacy Scale (ISS; Kim & Glasman, 2013), developed in response to new directions in the evolution of the internet over the last few decades (Eastin & LaRose, 2000; Li et al., 2018). The ISS is a fundamental construct for understanding a wide range of online activities. ISS measures individuals' self-efficacy in attempting, pursuing, and bringing to fruition internet-based goal-oriented problems/projects at different levels of complexity. We assessed the participants by asking them to define their level of agreement with 12 statements on a 5-point Likert scale (1 = *strongly disagree*, to 5 = *strongly agree*). As an example, one item statement was “I can use the internet to answer other people's questions in a productive way” (α = 0.94).

*3.2.2.4. Scale of Perceived Social Self-Efficacy.* We measured participants' levels of social self-efficacy by using the Scale of Perceived Social Self-Efficacy (PSSE; Smith & Betz, 2000). This scale measures the beliefs that people have about their ability to develop and maintain adult social relationships and affirm their opinions and their rights. It also measures perceived confidence in a variety of social situations, including such areas as assertiveness and social influence. The participants were asked to decide how much confidence they had in performing certain activities successfully, by responding to 15 items (α = 0.94) on a 5-point Likert scale (1 = *no confidence at all*, 5 = *completely confident*). As an example,

**Table 5**
Rotated factor loadings of the EFA model with 4 factors (Study 1, n = 657).

| | Task oriented/ technological self-efficacy | Task oriented/ social self-efficacy | Social self-efficacy | Emotional self-efficacy |
|---|---|---|---|---|
| SNS-SES 1 | 0.70 | | | |
| SNS-SES 2 | 0.92 | | | |
| SNS-SES 3 | 0.48 | | | |
| SNS-SES 4 | 0.67 | | | |
| SNS-SES 5 | 0.87 | | | |
| SNS-SES 6 | 0.76 | | | |
| SNS-SES 7 | 0.44 | | | |
| SNS-SES 8 | | 0.72 | | |
| SNS-SES 9 | | 0.93 | | |
| SNS-SES 10 | | 0.80 | | |
| SNS-SES 11 | | 0.84 | | |
| SNS-SES 12 | | 0.51 | | |
| SNS-SES 13 | | | 0.63 | |
| SNS-SES 14 | | | 0.75 | |
| SNS-SES 15 | | | 0.70 | |
| SNS-SES 16 | | | 0.66 | |
| SNS-SES 17 | | | 0.81 | |
| SNS-SES 18 | | | 0.62 | |
| SNS-SES 19 | | | | 0.71 |
| SNS-SES 20 | | | | 0.69 |
| SNS-SES 21 | | | | 0.66 |
| SNS-SES 22 | | | | 0.52 |
| SNS-SES 23 | | | | 0.50 |
| SNS-SES 24 | | | | 0.59 |

one item/activity was "Start a conversation with someone you don't know very well."

*3.2.2.5. Responsiveness.* Three items assessed the responsiveness of participants on SNSs, analyzing their "reactivity" and speed of interaction with communication partners (as an example "How often do you check the notifications coming from the social network sites you are subscribed to?"). Respondents rated the items on a 5-point Likert scale ranging from 1 (*hardly ever*) to 5 (*constantly*).

*3.2.2.6. Attitude toward SNSs.* Three items detected respondents' general attitudes toward SNSs: "How frustrating are technological changes for you?" "What is your opinion of social networking sites?" and "Do you think that the use of social networking sites has been good in your life?" Items were rated on a 5-point Likert scale ranging from 1 (*absolutely agree*) to 5 (*absolutely disagree*).

### 3.3. Results

#### 3.3.1. Confirmatory factor analysis of the SNS-SES

In order to test the SNS-SES's factorial structure, we ran a confirmatory factor analysis (CFA), testing (a) the one-factor model, (b) the three-correlated-factors model initially hypothesized, which defined task-oriented self-efficacy as a single dimension, and (c) the four-correlated-factors model found in Study 1, which differentiated task-oriented self-efficacy in two separate dimensions: task-oriented/ technological self-efficacy and task-oriented/social self-efficacy. We used the MLR estimation method and performed the analysis using Mplus 7 (Muthen & Muthen, 2012). We evaluated the models, allowing each item to load on the hypothesized factor and setting all other factor loadings at zero. Factor covariances were free parameters to be estimated; to establish the measurement scale of each factor, we fixed their variance at 1.0. Goodness-of-fit indexes are reported in Table 6. Results showed that the four-correlated-factors model was the best-fitting model. The standardized solution is reported in Fig. 1. All factor loadings were high and significant.

#### 3.3.2. Reliability of the SNS-SES

To examine the SNS-SES's reliability, we computed McDonald's omega and corrected item-total correlation coefficients. Omega values were 0.94, 0.95, 0.91, and 0.89 for task-oriented/technological self-efficacy, task-oriented/social self-efficacy, social self-efficacy, and emotional self-efficacy, respectively. Item-total correlation coefficients were higher than 0.60, ranging from 0.64 to 0.88.

#### 3.3.3. Relation of the SNS-SES factors to other study variables

In order to examine the associations of the SNS-SES factors with internet self-efficacy, social self-efficacy, attitude toward SNSs, and responsiveness, we computed Pearson correlation coefficients. Results are reported in Table 7. All dimensions of the SNS-SES were positively and significantly correlated with internet self-efficacy, social self-efficacy, responsiveness to SNSs, and positive attitudes toward SNSs.

**Table 6**
Goodness of fit indexes of CFA models (Study 2, n = 638).

| CFA models | SB$\chi^2$ | df | CFI | RMSEA | 90 % RMSEA C.I. | SRMR |
|---|---|---|---|---|---|---|
| 1-Factor model | 2893.21*** | 252 | 0.734 | 0.128 | 0.124–0.132 | 0.100 |
| 3-Factors model | 1376.75*** | 249 | 0.886 | 0.084 | 0.080–0.089 | 0.050 |
| 4-Factors model | 874.52*** | 246 | 0.937 | 0.063 | 0.059–0.068 | 0.046 |

Note. SB$\chi^2$=Satorra-Bentler chi square; df=degree of freedom; CFI=Comparative Fit Index; RMSEA=Root Mean Square Error Approximation; SRMS=Standardized Root Mean Square ***p<.001

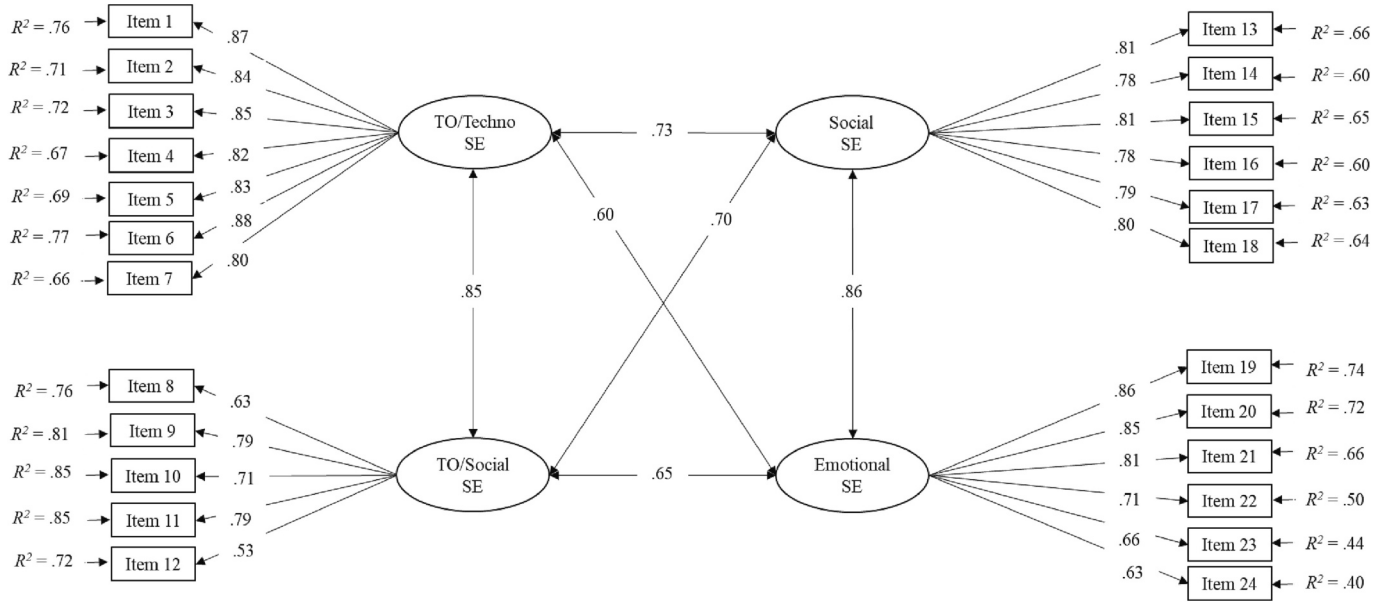


**Fig. 1.** CFA model of the SNS-SES (Study 2, n = 638).

**Table 7**
Correlations between factors of the SNS-SES and attitude toward SNSs and responsiveness (Study 2, n = 638) **p ≤ .01. ***p ≤ .001.

| | Task oriented/ technological self-efficacy | Task oriented/ social self-efficacy | Social self-efficacy | Emotional self-efficacy |
|---|---|---|---|---|
| Internet self-efficacy | 0.55*** | 0.56*** | 0.64*** | 0.62*** |
| Social self-efficacy | 0.48*** | 0.42*** | 0.55*** | 0.45*** |
| How often do you check the notifications coming from the SNSs you are subscribed to? | 0.51*** | 0.55*** | 0.55*** | 0.56*** |
| How often is your computer or smartphone connected to the web? | 0.52*** | 0.55*** | 0.41*** | 0.42*** |
| How much time do you spend looking at other people's posts/ photos/videos/ profiles? | 0.41*** | 0.43*** | 0.48*** | 0.50*** |
| How frustrating are technological changes to you? | −0.34*** | −0.22*** | −0.13** | 0.01 |
| What is your opinion of SNSs? | 0.35*** | 0.35*** | 0.49*** | 0.49*** |
| Do you think that using SNSs has been a good influence in your life? | 0.33*** | 0.34*** | 0.44*** | 0.48*** |

### 3.4. Discussion

The main results of Study 2 showed that the four-factor model provided the best consistent answers. The results of this study also show convergent validity through the relation between SNS-SES subscales and the measures of internet self-efficacy (ISS; Kim & Glasman, 2013) and social self-efficacy (PSSE; Smith & Betz, 2000). As we can see in Table 6, the ISS correlates with all of the factors. Present-day internet use comprises technological, interpersonal and emotional aspects; hence, the levels of correlation were comparably elevated across all four factors. A higher correlation level was expected for factors one and two relative to task-oriented self-efficacy (technological and social), but this did not occur. This further demonstrates the importance of the interpersonal and emotional components in both scales, regardless of the specific technological component. Moreover, we noted that PSSE presented moderate levels of correlation with most of the factors, but mainly with the third factor, interpersonal self-efficacy, as was reasonably expected.

It is also interesting to note that higher levels of responsiveness are associated with higher levels of task-oriented self-efficacy and that more favorable attitudes toward SNSs are associated with the interpersonal and emotional dimensions.

## 4. Conclusions

The main objective of these studies was to develop a reliable and valid scale to measure SNS users' self-efficacy. As we have seen, the literature was lacking in scales to measure this pervasive feature of our everyday lives. As social media use has become increasingly ubiquitous, a growing body of evidence suggests that users' self-efficacy on SNSs plays a fundamental role in predicting success in their use of these new technologies.

The overall analysis generated a four-factor solution model of the SNS-SES. The factor structure proved to be robust, its subscales were internally consistent, and the scores were stable. The first factor, task-oriented/technological self-efficacy, focuses on the SNS user's perceived ability to solve technological problems that go beyond the basic use of SNSs. Thus, those who adeptly address problems associated with installations, surfing, or with the configurations and customizations of these tools tend to have higher levels of technological self-efficacy. The second factor, task-oriented/social self-efficacy, is also associated with the technological dimension, but from a more social point of view, regarding users' ability to search for friends, respond to their comments, share content, etc. Although there is a technological component in this factor, the social dimension is fundamental. The third factor, interpersonal self-efficacy, is related to online behaviors such as social involvement, maintaining connections, contributing to the growth of SNS groups, and so on. Achieving a high score in the items that relate to this factor indicates users' perceived capability to carry out a series of

activities that can be considered basic on SNSs. The fourth factor, emotional self-efficacy, is associated with the emotional states that arise from the use of SNSs, such as happiness, relaxation, and satisfaction.

## 5. Limitations and future research

Although these studies provide a useful contribution via the creation and validation of a novel scale, they have certain limitations that must be considered. Here, we discuss two.

The first is related to the nature of the sample. Specifically, we are referring to the use of a convenience sample of SNS users extracted from a specific population that was limited to certain geographical areas. Despite being common practice across various domains in the literature available online, this approach is not without problems. In the present studies, we created a sample of Italian-speaking participants aged between 15 and 89, which may or may not be a representative sample of all SNS users. Although we do not expect that the sample used in these studies will differ significantly from other samples, the present findings should be cautiously interpreted with regard to a broader population. In any case, future validation of this tool for different samples in different cultures and across different languages should prove fruitful.

The second limitation, a difficult issue to overcome, concerns the use of self-report instruments that may be affected by response biases such as social desirability and short-term recall. Furthermore, some subjects could have answered according to their perception of what the experimenter wants to hear. Future research could try to analyze the factors identified above by reducing the contribution of self-report measures and seeking to use the many behaviors and traces that each person leaves through their own SNS use (e.g., "likes," emotional states, and frequency of posts). As described, we built the scale for use on all existing SNSs, taking into consideration the prevailing characteristics that these tools present. Future research could test the scale on a single social media platform by assessing the specificity of its use and interactions with users' self-efficacy levels.

Despite these limitations, the current findings provide preliminary support for the creation and validation of a SNS self-efficacy scale (SNS-SES). Research has shown that self-efficacy has a strong influence on the activities that people choose to engage in and in their commitment to such activities (e.g., Bucy & Tao, 2007). For this reason, self-efficacy can support users' abilities to navigate social media, facilitate their interaction with SNS features, and shed light on their fidelity to the most-used social platforms.

Altogether, the results obtained in these studies support the multidimensional perspective of self-efficacy on SNSs. The presence of the four components of self-efficacy specific to the SNS context—task-related (technological and social), interpersonal and emotional (Bandura, 1997; Goleman, 1995, 2006)—clearly demonstrates that self-efficacy is a construct that must be studied in all its complexity. Future research should confirm the dimensionality structure of our scale using a larger and more heterogeneous sample.

Overall, the construct of SNS self-efficacy may be very helpful for future research on SNSs and contribute to the theoretical development of related field studies. In this sense, our findings are useful for both applied and research contexts and can increase our understanding of how we all use social media.

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## CRediT authorship contribution statement

**Stefano Ruggieri:** Conceptualization, Methodology, Data curation, Writing - original draft. **Melissa Gagliano:** Data curation, Visualization, Investigation. **Rubinia Celeste Bonfanti:** Methodology, Writing. **Nicla Cucinella:** Data curation, Writing. **Sonia Ingoglia:** Conceptualization, Data curation, Writing, Supervision.

## Declaration of competing interest

All authors declare that they have no conflicts of interest.

## Data availability

Data will be made available on request.

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