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Technology has worked its way into our everyday lives in such a manner that it even revolutionized human interaction. It has enabled individuals to communicate and connect with each other all over the world allowing to maintain and to build relationships that would otherwise be impossible. The invention of social media platforms and social networking sites (SNSs) has facilitated many different aspects of life, such as staying in touch with people independent of physical distance, exchanging ideas and opinions, working together on projects, helping businesses to reach their customers and getting entertained through only a few clicks.

Social networking sites and social media are terms that are often used interchangeably, yet they are not the same. SNSs are defined as web-based applications that enable users to create a profile, connect with others and share their connections within the system (Boyd & Ellison, 2007). Examples of well-known social networking sites are Facebook, Instagram (IG) and Twitter. Social media is a broader term that comprises the use of a variety of tools and platforms allowing users to generate and share content, such as posts and images (Meshi et al., 2015). Users can consume the content, respond, comment and share it with others. In contrast to SNSs, social media includes applications, such as YouTube and Reddit. While both, SNSs and social media, enable users to interact and share content, social networking sites refer more on relationships and connecting with others. Also, whereas social media relates more to a broad audience without targeting a specific crowd, SNSs are very specific on targeting the crowd.

There has been a huge interest in research on how social networking sites influence adolescents' psychosocial development in recent years. Not only do these studies present that SNSs usage can have a positive impact on several aspects of psychosocial development, such as social competence and friendship closeness (Koutamanis et al., 2013), but also do some studies stress the negative effects, like self-esteem or loneliness (Blomfield Neira & Barber, 2014; Van der Aa et al., 2009). SNSs have greatly impacted how individuals interact in their daily lives and shaped how they communicate with each other. Spending time and interacting on these platforms have become an essential way of social communication. These platforms are altering traditional types of face-to-face interpersonal relationships, especially among young adults (Konrath et al., 2011). These modifications influence the way in which adolescents modulate their own and others' emotions (Konrath et al., 2011), their need to present themselves (Ljepava et al., 2013), their self-view and self-evaluation due to increased

comparisons with others (De Vries & Kühne, 2015). Some studies even suggest a shift in personal relationships pointing out that there is a beginning of a new era without knowing the long-term consequences (Konrath, 2012; Twenge et al., 2014).

It is theorized that people use social networking sites in different ways based on their personality traits (Blachnio et al., 2016). For example, people who are empathic may use these applications to not only connect and build relationships with others, but also to better understand how others are feeling and to provide support for those in need. On the other hand, personality traits may be shaped by certain types of usage over time (Woods & Scott, 2016). By providing a digital environment, in which self-promotional behavior receives positive feedback through "likes" and comments from others, narcissistic tendencies may be reinforced. The personality traits of empathy (Brewer & Kerslake, 2015) and narcissism (Brailovskaia & Bierhoff, 2016) seem to be relevant not only in overall SNSs usage, but especially regarding the way in which these platforms are used. Both personality traits have a huge impact on social presentation and social relationships maintained on social networking sites (Skues et al., 2012).

Adolescents Use of Social Networking Sites and Its Impact

Since its establishment, social media caused huge engagement into an increasingly popular form of entertainment across the world, with users seeking various gratifications through social media usage, from connectivity and communication to social affirmation and information sharing (Quan-Hasse & Young, 2010; Quinn, 2016). The number of members of social networking sites has grown faster than on any other digital media. These platforms therefore evolved into one of the most impressive developments in the present century starting with 970 million users in 2010 and reaching currently 4.76 billion users with an increasing number every day (Kemp, 2023). In addition, the number of the social media platforms increased, which expanded into a large variety of applications highlighting a change in how these sites are viewed. Social networking sites are an essential category of social media platforms referring to the creation of business and personal relationships and maintaining an interactive environment with the goal of building a network (Boyd & Ellison, 2007). Many studies that have been published did not differentiate between the various types of online activities. For example, social networking sites were not mentioned at all in the work of Caplan (2003), a social media researcher. This is problematic, since those online activities are contemporary the most used ones among adolescents (Kemp, 2023). According to Kemp (2023), adolescents use social media approximately three hours daily across the globe. Social networking sites give individuals the opportunity to present themselves in their

preferred way and manage their social relationships online. There is a multitude of SNSs like Facebook, Instagram or TikTok to research and collect data, whether for recipes, restaurant reviews or video gaming.

The expansion of SNSs is re-shaping the way individuals communicate in the 21st century. Research focusing on social networking sites usage of adolescents is increasing due to its popularity (Valkenburg & Peter, 2008). According to Valkenburg and Peter (2009), using social networking sites or internet in general, has many social benefits for adolescents, including improved social connectedness, well-being, and friendship quality. Teens who actively use Facebook have more opportunities to socialize, demonstrate more virtual empathy and promote healthy relationships (Rosen, 2011). Moreover, Rosen states that several platforms like Facebook provide several tools, helping young students to engage in education in various ways. Also, the researcher argues that SNSs have enabled adolescents, who are more introverted, to learn to communicate and socialize behind a safe screen.

Although social networking sites have allowed for sharing personal information, maintaining social connections and much more, concerns have been raised about its impact on mental health and well-being (Andreassen et al., 2017). Socializing behind a safe screen provides anonymity that makes it easier for adolescents to be involved in cyberbullying activities, which has the potential to lead to a more harmful impact on the victim in comparison to bullying offline (Hinduja & Patchin, 2019). Cyberbullying refers to showing repeatedly aggressive acts towards others through an online platform with the intention of producing harm and distress (Hinduja & Patchin, 2019). Cyberbullying is rapidly increasing over time and is linked to low self-esteem, suicidal thoughts, anger, frustration, and a variety of other emotional and psychological problems (Brighi et al., 2012; Hinduja & Patchin, 2019). Rosen (2011) stressed the negative impacts related with SNSs usage including mental health issues such as inflated levels of narcissism, lack of empathy, increased aggression, depression and schizophrenia. Furthermore, he indicated that daily overuse of social media and technology has a negative impact on teens health making them more vulnerable to future health problems. Moreover, Rosen mentioned that Facebook can be distracting and can have a negative impact on learning. He found in his study that adolescents achieved lower grades when checking Facebook at least once during a 15-minute study period. Steiner-Adair (2013) stated that digital screen time may lead to re-routing brain development confronting the issue that many children and adolescents overuse SNSs. With digital devices, such as mobile phones or iPads, parents often attempt to quiet their children (Steiner-Adair, 2013). Furthermore, he indicated that adolescents have entered a digital world of chaos and moral

indifference, while their judgment and emotional attributes are not fully developed. According to the American Academy of Pediatrics (2013), face-to-face communication and social activities have been reduced in contrast to spending time online. Peer Pressure and low capacity to monitor themselves lead to risks in the way and to the extent how teens use social networking sites. Parents often fail to monitor their children as recommended by the American Academy of Pediatrics (2013). Also, Small (2008) reported about how SNSs are changing the adolescent's brain. This change would raise difficulties for the teens to recognize and share emotions of happiness, sadness or anger. Therefore, this can have a negative impact on the development of their empathic skills. Turkle (2011) emphasized that children and adolescents need time to discover themselves and to manage their emotions in order to develop empathy. SNSs would have made it difficult for self-reflection and therefore the researcher advocates communication through digital devices to be short, simplistic and without sensory feedback. The social media researcher further stated that increased connections with friends on these platforms, does not necessarily result into deep feelings of intimacy. Therefore, he questioned if true intimacy feelings can be reached via text messages. Face-to-face communication would be more intimating than to show one's personal feelings behind a screen. Turkle (2011) confirmed through a meta-analysis that most individuals of western societies spend a large part of their time connecting with others online.

The new digital world crosses generational divides, since communication through digital devices via text messages are a common function for not only adolescents, but older people and parents as well. Although adolescents are closely connected via SNSs, they are alone and distant from each other and may suffer from diminished personal interactions. Turkle (2011) advocated further research about the psychological effects of SNSs and texting culture. Whereas the fundamental positive impacts of social networking sites on human interaction are well known, there is a lack of understanding about the possible negative effects of its usage. Because individuals, especially adolescents, are more and more engaged with their devices, it is of high importance that attention is given to research regarding social networking sites and its impact on the psychosocial development of its users.

Instagram

Social networking sites are becoming increasingly popular. The most used SNS, Facebook, was found in 2004 and has been widely considered as the most popular platform with almost 3 billion monthly active users across the world (Kemp, 2023). Therefore, most of the previous research in this field has focused on Facebook users.

However, since its establishment the SNSs industry has consistently continued to grow and adapt to its users. Because of the multitude of SNSs nowadays, they have become diverse and complicated with members utilizing them with different goals and patterns of use depending on which platform they use. Furthermore, with the improvement of camera technology, social networking sites have become increasingly visual and picture based. Although all SNSs have similar functions and purposes, they cause social interactions to be easier and less complicated. Distinct patterns of these platforms differ in various aspects. Consequently, it is not possible to generalize from one application to another (Meshi et al., 2015). Ryan et al. (2014) advocated that it would be more practical to focus on one specific SNS rather than on all platforms in general. The reasons why this generalization of social networking sites is problematic becomes obvious when considering the relatively new social networking site Instagram.

Instagram was launched in 2010 and is currently the second most used social networking site with two billion monthly active users globally (Kemp, 2023). Among all SNSs, adolescents from all over the world rated IG as their favorite platform (Kemp, 2023). In the beginning of this year, Instagram had approximately three million active monthly users in Austria, which is actually one-third of the country's population. This application offers an extraordinary digital environment, which differs considerably regarding characteristics, such as information format, text length, and behavioral norms, from other applications as for example Facebook, where most attention lies on interpersonal interactions, or from Twitter, which emphasis on microblogging (Meshi et al., 2015). Increasing the number of followers is now the focus, in contrast to actual networking to create personal connections (Limniou et al., 2021). Followers refer to the people that follow a specific user. Followings advert to the list of users a specific user follows. Huang and Su (2018) stated that Instagram refers more on expressing one own's personal identity rather than on relational identity as other social networking sites.

Due to the unique attributes of each platform, these applications lead to substantial differences in how they use it and in how the users interact with one another. These differences are also noticeable when focusing on the motives why individuals use a specific social networking site. For instance, individuals are mostly motivated to use Instagram to post or share photos or videos, which states the highest key motivation for them to use this platform (Lee et al., 2015). Instagram differs from other SNSs through being almost entirely focused on photos and videos rather than on text. This photo and video sharing application allows members to share their content accompanied by a textual caption with their followers

or with the public (Limniou et al., 2021). Furthermore, this platform gives the members the possibility to edit photos and videos using various of inbuilt filters and effects allowing them to modify the colors and resolutions of the media before posting it to their profile. Likewise, referring to the "Instagram stories" feature, users can share edited pictures or short videos, which disappear after 24 hours. Others can interact with these posts by "liking", commenting or sharing the content (Faelens et al., 2021). In addition, the "hashtag" feature is a way to label and categorize the content of the user and reach a broader audience. The visual nature of Instagram provides a transparent and simple system for communication. However, IG has evolved from pictures being posted for a memory of a fun time to a presentation of one's beauty or status and been nowadays deliberately selected showing merely the best parts of one's life (Sheldon, 2016). This could result in individuals falsely believing that the users are presenting their typical everyday life instead of their ideal selves. Moreover, "likes" on a picture or video have become a statement of one's acceptance and the number of followers a user possesses, has become a status symbol (Sheldon & Bryant, 2016).

Instagram's unique digital environment and its novelty makes it a social networking site with possible psychological consequences, although most research done in the past has been focused on Facebook (Kemp, 2023). Therefore, IG is scarcely represented in most reviews and meta-analyses (Faelens et al., 2021). The importance of research on Instagram is shown for instance by a study, in which the researchers found significantly more problematic usage of its users regarding psychological issues in comparison to Facebook users (Limniou et al., 2021). In addition, these researchers revealed that age correlated negatively with problematic use, indicating that young people are particular at risk. Instagram's features allow the members the possibility to engage in a variety of problematic behaviors, which promote a culture of exaggerated self-presentation encouraging the users to present their lives in a more positive light than they naturally are (Sheldon & Bryant, 2016). The unique editing feature enables members to glamorize and carefully select their portrayal of themselves, the "hashtag" feature gives the users the opportunity to expand to a worldwide audience and get more reach, and the "liking" and commenting features may lead to a dependence on validation from others, as well as causing body image issues and low self-esteem (Dumas et al., 2020). This behavior complies with grandiose narcissism traits, such as attention-seeking, vanity, self-promotion and exhibitionism. Instagram has enabled a digital environment that makes it very appealing for highly narcissistic individuals, because they tend to not focus on deep relationships even with their desire for social contact.

However, the literature is still in the beginning stages leading up to an extensive understanding of the application. Nonetheless, despite Instagram's worldwide usage and its facilitation towards narcissism related behaviors, there is a dearth of research on IG and how it relates to narcissism. On the other hand, this application gives the users the opportunity to connect with each other and engage in various ways of interactions, which may be related with empathic behavior. Yet, this relation has not been investigated. Instagram offers different ways on how to use it, which may relate correspondingly to their narcissism and empathic levels. Due to the underlying reasons mentioned above, the necessity for future research to fill this gap is significant. There is a growing need for understanding how personality traits and mental health can be impacted or be predicted by the way Instagram is used.

Empathy

Empathy, which is an essential element of psychosocial development, and how it relates to social networking sites has received surprisingly little attention in research. Whereas most people have an idea of what empathy is, there is no generally accepted consensus regarding the definition of this concept between researchers (Reniers et al., 2011). The research field comprising empathy suffers, due to this definitional issue. The widespread debate is about whether empathy includes sharing someone's emotional state or overtaking someones's perspective, or both. David (1983), who invented the most used questionnaire to measure empathy, the Interpersonal Reactivity Index, stated that empathy can be divided into affective and cognitive empathy. Affective empathy comprises the recognition of another person's emotional condition, including facial expressions, body gestures and vocal attributes, and is followed by an emotional response (Davis, 1983). According to Mehabrian & Epstein (1972), its affective component refers to sharing or resonating of someone else's emotions. Similarly, Reniers et al. (2011) defined this construct as the ability to be sensitive to and vicariously experience the feelings of others. On the other hand, cognitive empathy refers mainly to information-processing in the mind rather than experiencing emotion (Reniers et al. 2011). According to Davis (1983), this involves a representation of someone´s emotional state, which can occur on an explicit or even on an implicit level of metarepresentation. Dymond (1949) indicated that this construct refers to the ability to imaginatively take on the role of another by predicting and understanding another person's thoughts and feelings. Furthermore, Preston & Hofelich (2012) argued that it not only involves the ability to understand, but more specific to find a rational explanation for what another person is feeling and to construct a working model of the emotional state of others.

Empathy allows us to relate and connect to other people and therefore plays a crucial role in personal development facilitating social integration and cohesion within a community (Allemand et al., 2014). Hence, empathy is a key factor for adolescents to develop a sense of self and to learn how to interact with others. Children begin to develop the skills regarding empathy at a time, when parenting plays an important role in this regard (McDonald & Messenger, 2011). Parents foster the development of the empathic skills of their children and secure attachment relationships through social learning (Barnett, 1987). This secure attachment relationship satisfies the child's emotional needs and enables the child to develop true empathetic behavior (Laible et al., 2004). By preschool, they can already interpret other people's emotions and respond accordingly with facial expressions and supportive behaviors (McDonald & Messenger, 2011). Also, while their linguistic skills improve, their cognitive empathy increases as well, which leads to a better understanding of other people's feelings (McDonald & Messenger, 2011). Parents may lay the foundation for their children in order for them to become warm and empathic (Laible et al., 2004). There are various ways how parents can help to improve their children's empathy, like for instance through modeling (Laible et al., 2004). Parents can help to model empathy by responding with sensitivity and compassion towards the emotional response of their children, as well as the emotional response of others. Through observing their parents' empathic responses, children learn to cultivate their empathy (Laible et al., 2004). Social interactions help to cultivate and fine-tune mental representations of emotions, which are needed to understand and feel the emotions of others (Preston & de Waal, 2002). The perception of an emotion in someone else activates one's own representations of that emotion, which is called "state-matching" (Preston, 2007). Therefore, their natural tendency to empathize is improved through social interactions, which leads to more available representations of emotions.

In the period of adolescence the teens form strong connections with peers, when it is important to develop prosocial skills like empathy (Laible, et al., 2004). While becoming increasingly reliant on their peer groups regarding their needs, they become less dependent on their parents (Laible et al., 2004). Moreover, the development of interpersonal relationships and self-identity depends highly on the adolescent's peer group (Davis, 2013). They contribute to help shape, understand and establish their friend's identity through intimate conversations (Davis, 2013). The intimacy within peer relationships allows adolescents to improve their cognitive and affective empathy by understanding and sharing someone else's perspective (Choudhury et al., 2006). Furthermore, showing empathic

responses, is an efficient way for making new friends or maintaining old relationships (Allemand et al., 2014).

Previous research has shown that high levels of empathy is positively correlated with prosocial behavior (Carlo et al., 2012), and negatively to aggressive behavior (Jolliffe & Farrington, 2004). Since empathy plays an essential role in social functioning of adolescents, the development of it is crucial for allowing them to become better socially adjusted. Notably, at the end of adolescence empathy reaches its greatest level of development (Allemand et al., 2014). Considering the importance of the development of empathic levels until late adolescents and the enormous change in human interaction through computer mediated communication, the present study focuses on the relation between empathy and social networking sites among late adolescents.

Empathy and Social Networking Sites in Late Adolescence

Empathy is highly related to how we communicate with others. Considering this, the empathic levels of late adolescents may well be affected, since their relationships with others rely to a large extent on social networking sites. Therefore, research about the relationship between SNSs usage and empathy is of essential importance. There have been concerns that young people are becoming less empathic (e.g., Konrath, 2012; Twenge et al., 2014). These concerns have received initial support in a cross-temporal meta-analysis showing a decline in empathy scores among American college students over the last 30 years (Konrath et al., 2011). These researchers reported a decline in empathy among approximately 14.000 college students based on a 30-year meta-analysis, which involved 72 different studies and focused on the time period between 1979 to 2009. The results showed not only that those students became 40% less empathic over the whole time period, but as well that the biggest drop occurred during the emerging growth of SNSs. Konrath et al. (2011) stressed that a potential cause for this huge decline in empathy is the concurrent rise of SNSs. Because especially adolescents spend several hours a day online on these applications engaging in superficial interactions with others (Sonck et al., 2013), the question whether empathy is affected by it has become ever more opportune. In the aforementioned meta-analysis and in a book chapter entitled “The Empathy Paradox” by Konrath (2012), it was argued why this new way of communication might negatively influence empathy. For instance, it was emphasized that spending time online replaces the time spent with people offline, which could reduce social skills and further empathic ability. Furthermore, it was mentioned that the visual anonymity induced through texting behind screens may reduce social behavior and lead to deindividuation. Moreover, it was indicated that the elements of non-verbal communication,

which are important to reading emotions, such as facial expressions, gestures, body posture and touch, are missing when using text messages and social networking conversations. Likewise, Small and Vorgan (2008) argued that being online reduces an adolescent's capacity for empathy, because the elements of non-verbal communication, which are essential to reading emotions, are left out. In sum, according to these researchers, neglecting face-to-face conversations, deindividuation and the absence of elements of non-verbal communication may cause people to ignore the feelings of others and become less empathic.

The negative view of the cues filtered out theories received little empirical support, in contrast to theories with a more positive view in this context. One of these theories is called hyperpersonal communication theory by Walther (1996). According to this theory, computer-mediated communication, which comprises SNSs, enables individuals to present themselves in optimal ways in which they can precisely shape their self-presentation in comparison to face-to-face communication. Instead of visual and auditive cues, impressions of their conversational partners are created, which may lead to idealize them. Therefore, this kind of communication can become "hyperpersonal", which means that individuals experience more intimacy and share more information than in face-to-face communication. The results of several studies among adolescents support this positive view showing that it fosters social connectedness (Rosen, 2011), self-disclosure and a deeper relationship between adolescents (Valkenburg & Peter, 2009). Social networking sites have made it possible for adolescents to engage with their peers at any time just through a few clicks and therefore have become an essential way to connect with others and cultivate peer relationships (Davis, 2012). According to Davis (2012), this connection enables them to be more empathetic and compassionate individuals. Adolescents have reported that these platforms give them the opportunity to have a better sense of control and comfort about what information to present (Peter et al., 2007). Caplan and Turner (2007) mentioned that electronic communication environments could support or even increase empathy through the easy and frequent access to other people. Moreover, it was argued that there are no differences in the intensity of expressing emotions between online and face-to-face communications (Derks et al., 2008). Likewise, Valkenburg & Peter (2011) stated that there is often a large overlap between the online and offline world. Vossen and Valkenburg (2016) pointed out that when using social networking sites with a large audience, cognitive and affective empathy can be improved. In the same study they revealed that adolescents who used social media often had an improved ability to experience and understand the feelings of others compared to their peers, who do

not use it. In the study of Alloway et al. (2014) a positive link between empathy and Facebook activities such as chatting was found.

Relationships among adolescents rely to a large extent on social networking sites, such as Facebook or Instagram. Given that the studies in this field have contrary findings and conclusions, it is important that more research is addressed regarding this debate. Since each SNS offers different environments and functions, which can affect empathy, research should focus on a specific social networking site with its various possibilities for users to engage with others. Because of the lack of research about the relationship between empathy and Instagram usage, the current study focuses to examine this link by specifically targeting different types of IG usage.

Narcissism

Another factor that might be related to social networking sites, especially regarding Instagram use, is narcissism. Narcissism is a personality trait that refers to a grandiose and inflated self-concept, feelings of entitlement, a high level of self-importance, and a desire to be praised (Buffardi & Campbell, 2008). The trait is characterized by an unrealistic positive self-view, especially regarding physical appearance, intelligence and status (Campbell et al., 2002). Individuals that have high levels of narcissism generally think that they are better and more special than other people (Sheldon, 2016). Not only do they utilize interpersonal strategies, which are linked to self-promotional behaviors, such as affiliating with high-status (Horton & Sedikides, 2009) and bragging (Buss & Chiodo, 1991), but also do they use intrapersonal strategies like self-serving characteristics to maintain great self-esteem (Rhodewalt & Morf, 1998) and downward social comparison (Campbell et al., 2000).

Growing evidence suggests that narcissism can be divided into a heterogenous construct comprised of grandiose and vulnerable elements (Cain et al., 2008). Vulnerable narcissism is linked to introversion, worry, and defensiveness, whereas grandiose narcissism refers to traits, such as extraversion, dominance, and the ability to manipulate. However, most of the research on narcissism has focused on the latter (e.g., Carpenter, 2012; Singh et al., 2018). According to Ackerman et al. (2011) narcissism comprises three dimensions: Firstly, Leadership/Authority, which involves the believe of high self-perceived leadership capacity, social power and assertive control over others; secondly, Grandiose Exhibitionism, which is linked to self-absorption, vanity, superiority, exhibitionistic behavior, and the urge to be permanently the center of attention; thirdly, Entitlement/Exploitativeness, which includes demanding exaggerated respect and having the motivation to manipulate and take advantage of other individuals. To delineate narcissism’s multidimensional construct, this

three-factor model was found by repeatedly analyzing the most used questionnaire regarding measuring narcissism (Narcissistic Personality Inventory; Raskin & Terry, 1988).

Narcissism is thought to exist on a continuum (Foster & Campbell, 2007) and is of increasing interest to psychologists, especially clinical psychologists. Narcissism as a clinical disorder (narcissistic personality disorder) was described as a “pervasive pattern of grandiosity (in fantasy or behavior), need for admiration, and lack of empathy, beginning by early adulthood and present in a variety of contexts" (American Psychiatric Association, 2000, p. 714). In contrast to the narcissistic personality disorder, trait narcissism exists across the nonpathological population and is linked to both negative and positive attributes. The negative characteristics include among other things aggressiveness (Bushman & Baumeister, 1998) and low commitment (Campbell & Foster, 2002), whereas positive qualities encompass successful leadership (Rosenthal & Pittinsky, 2006) and subjective well-being (Sedikides et al., 2004).

A study by Twenge et al. (2008) using a cross-temporal meta-analysis indicated an immoderate positive trend of narcissism. These researchers found an increase in mean scores of the Narcissistic Personality Inventory (Raskin & Hall, 1979; Raskin & Hall, 1981; Raskin & Terry, 1988) among students from USA in 85 independent samples in the time period between 1982 to 2006. Twenge and Campbell (2009) called this trend a narcissism epidemic, which will continue to rise in the USA and Western Europe. According to Hamamura et al. (2020), the society evolved from a low-tech community with dependent relationships to a high-tech society with short-term independent social contacts. This change would be the cause for this positive trend. In this independent and individualized society, narcissistic tendencies offer advantages and are amplified (Greenfield, 2016). Twenge (2013) argued that the rise of the narcissism levels in young adults is caused by cultural changes in parenting, education, media and social media, which all together emphasize individuality in a way that promotes narcissistic behavior. Also, it is emphasized that the rise of SNSs credit the positive trend of narcissism (Diller, 2015; Staff, 2015), although there is no substantial empirical evidence.

Narcissism and Social Networking Sites in Late Adolescence

Narcissists prefer online communities consisting of shallow relationships, because in those environments they have complete control over their self-presentation, which means that they can present themselves in an unlimited number of ways (Sheldon, 2016). Social networking sites are an adequate environment for narcissists, because these sites give them the opportunity to display themselves before a huge number of people, although their

relationship with those may be purely superficial (Buffardi & Campbell, 2008). Most studies in this regard are about Facebook and are presented in the following. Subsequently, narcissists as a term is used as a shorthand for those who score higher on questionnaires, which measure their narcissism levels.

In a study by Buffardi and Campbell (2008) it was found that among 156 American college students narcissism predicted higher levels of social activity in the online community and more self-promoting content. Similarly, research including 100 participants from Canada, aged from 18 to 25, revealed that narcissists showed greater online activity on Facebook as well as displayed more self-promotional content (Mehdizadeh, 2010). Likewise in the study of Carpenter (2012), which focused mostly on American college students ($N = 300$), it was found that narcissism is one of the most powerful predictors of self-promotional content on Facebook. This includes self-presentation to as large an audience as possible by status updates, photos, and attaining huge numbers of friends. Mendelson and Papacharissi (2010) discovered in their study that most of the photos posted on Facebook included self-portrait photographs (selfies) and that comments on the pictures were linked to as a form of reinforcement regarding group cohesiveness. The study by Ong et al. (2011) included 360 adolescents from Singapore and found that narcissists rated their own Facebook profile picture more physically attractive, fashionable, glamorous and cool, and updated their Facebook status more frequently.

A study from Germany by Kapidzic (2013) among 288 undergraduate students revealed that narcissism was a significant predictor of the motivation for selecting profile pictures that emphasize attractiveness and personality.

However, few studies have investigated whether social networking sites other than Facebook are related to narcissism. Regarding previous research on social networking sites like Instagram, it is argued that narcissistic tendencies, such as attention-seeking and exhibitionism, may be facilitated by IG usage due to its specific image-based applications and functions (Faelens et al., 2021). Therefore, further research in this field is recommended. As stated above, Instagram's unique environment offers individuals to engage in various features, which may be related with narcissistic behavior. Sheldon and Bryant (2015) showed among 239 American college students that the motives for narcissists to use this application include to appear cool and for surveillance of others. Yet, Paramboukis et al., (2016) found among 200 Australian participants ($M = 22.41$ years) weak evidence for any relationship between narcissism and Instagram usage. In their study the researchers created a questionnaire (Instagram Usage, Behaviours and Emotional Reactions Questionnaire) to

measure the participants IG usage without mentioning any psychometric properties of it. Establishing, using and then presenting a questionnaire without mentioning its psychometric properties is inadequate, because psychometric properties provide an indication of the quality of the instrument. Information about the reliability and validity of a questionnaire is essential to understand how sufficient it measures the intended construct. Without this information it is difficult to determine how reliable or valid a test is, making it difficult to interpret the results. In another study from Korea with 212 participants with a mean age of 29 years, it was found that narcissists posted more selfies, spent more time on IG and updated their profile picture more often as compared to their counterparts (Moon et al., 2016). Also, the same research indicated that narcissists rated their Instagram profile pictures as more physically attractive. Yet, despite the indication of a relationship, their study did not focus on late adolescents.

In conclusion, despite the lack of research and mixed results, a relationship between SNSs usage and narcissism can be seen. Whereas the Facebook related studies show a clearer association among late adolescents in this regard, the research on Instagram is insufficient. Together with the positive trend of narcissism of adolescents, it is crucial to understand how it is linked to a social networking site such as IG.

The Aim of the Present Study

Empathy is positively related to prosocial behavior (Carlo et al., 2012) and negatively to aggressive behavior (Jolliffe & Farrington, 2004). Consequently, to assess the possible influence of Instagram on adolescents' empathy may provide essential understanding regarding how the second most used social networking site shapes adolescents' psychosocial development. The current study aims to explore the relationship between IG use and empathy among late adolescents for the first research question. To the author's best knowledge there have not yet been a study in this field, which targeted Instagram. There have been only a few studies in this regard, of which the focus was mainly on the relationship between empathy and Facebook (Alloway et al., 2014) or electronic communication environments in general (Rosen, 2011; Caplan & Turner, 2007). These studies tend to show a positive link between empathy and SNSs, whereas on the other hand it is argued that the decrease in empathy levels among adolescents is largely caused by those applications (Konrath et al., 2011). Firstly, each social networking site is different with diverse goals and patterns of use and therefore it is impractical to generalize from one application to another (Boyd & Ellison, 2007). Secondly, there might be some patterns of use within one SNS, which correspondingly foster empathy levels, while others decrease them. Consequently, when researching in this field, it is of vital importance to differentiate between the various types a social networking site can be used.

Considering this and the lack of research, different types of Instagram behavior, which are found to be most frequently utilized by adolescents (Yang, 2016), in relationship with empathy are analyzed in this study. Notably, these three types of IG behavior include interacting (interactive), browsing (passive) and broadcasting (active). In the current study, it is hypothesized that interacting with others on Instagram is positively related to empathy, and that being primarily passive through browsing is negatively associated with empathy.

RQ_1: Is there a correlation between IG use and empathy?

H_1: IG Interacting correlates positively with empathy

H_2: IG Browsing correlates negatively with empathy

Considering all features of Instagram described above, this platform enables members the possibility to engage in narcissistic behavior, which mainly promote a culture of exaggerated self-presentation (Sheldon & Bryant, 2016). IG facilitates narcissistic tendencies, such as attention-seeking and exhibitionism (Faelens et al., 2021), encouraging users to present themselves online in a more positive light than they naturally are (Sheldon, 2016). The positive trend of narcissism among adolescents has coincided with the introduction, uptake, and widespread use of social networking sites (Twenge et al., 2008). Whereas most research in this field has been on Facebook, the focus should be targeted on Instagram, since it refers more on one's personal identity rather than on relational identity as Facebook does (Huang & Su, 2018). A growing body of personality research suggests that narcissism is considerably related to self-promotional content via SNSs (Carpenter, 2012). Previous research has consistently shown that narcissism predicted self-promotional content on Facebook among adolescents (Buffardi & Campbell, 2008; Mehdizadeh, 2010; Carpenter, 2012). Regarding Instagram there is a lack of research in this field. Research revealed that approximately half of the photos posted and shared on IG are selfies or self-presented photos with friends (Hu et al., 2014). Paramboukis et al., (2016) found weak an indication for any association between narcissism and Instagram usage utilizing a questionnaire to measure the participants IG related data without mentioning its psychometric properties. In a Korean study it was found that self-reported narcissists posted more selfies than their counterparts (Moon et al., 2016). However, their study did not focus on late adolescents. Due to the lack of research, the second aim of the present study is to identify, whether there is a relationship between posting and narcissism among late adolescents.

RQ_2: Is there a correlation between IG use and narcissism?

H_3: IG Broadcasting correlates positively with narcissism

H_4: The number of selfies correlates positively with narcissism

Methods

Research Design

In this study a correlational research design was conducted using online surveys to investigate the relationships among Instagram usage, empathy and narcissism regarding late adolescents. A G-Power analysis indicated that a total sample of 84 people would be required for a statistical correlation test to detect a medium effect size (r = .3) with 80% power and an alpha-level of .05. The effect size was based on similar studies on this topic (e.g., Vries & Kühne, 2015). In total, the data of 95 independent participants were analyzed. The additional participants were recruited to account for possible dropouts or exclusions.

Participants

All 95 participants were recruited through posts on various forums on social networking sites, specifically via Instagram and Facebook. Participation in this study was not compensated in any form. As the purpose of this study was to analyze the strength of the relationship among IG activity, empathy and narcissism, only active Instagram users who used the application at least once per week were included. This research focused on late adolescents, specifically on the age period between 18 and 25 years. Because the survey was administered in English, a proficiency level of B2 or higher was required. Moreover, only individuals without a history of neurological diseases, psychiatric diseases or severe chronic organic diseases were included. This exclusion criterion was used to minimize the danger of confounding variables related to the participants health.

Sociodemographic characteristics of the sample are visually presented in Table 1. The original sample consisted of 107 participants. Of those 107, twelve participants were excluded, because they did not meet the criteria regarding health, the specified age range and actively using IG. Eventually, 95 participants completed the survey and were considered for further analysis. Of these, 65% were female, 34% male and 1% diverse. The mean age was 22 years, ranging from 18 to 25 years (SD = 2.4). Most of the participants were Germans with 42%, followed by Austrians with 32% and Americans with 6%. The remaining other participants comprised 20% and included countries such as Argentina, Burundi, Canada, Croatia, Egypt, England, Ghana, Hungary, Peru, Russia, Slovakia, Sri Lanka, Tunisia and Vietnam. In reference to their current class standings, 16% were not students, 13% were in

Highschool, 41% were bachelor students, 29% were master students, and the remaining 1% referred to a doctorate student.

Table 1

Sociodemographic Characteristics of Participants

Assessed Characteristics	Proportion	
	n	%
Gender		
Male	32	34
Female	62	65
Diverse	1	1
Nationality		
German	41	42
Austrian	31	32
American	6	6
Other [a]	17	20
Educational status		
Not student	15	16
Highschool	12	13
Undergraduate	39	41
Graduate	28	29
Doctoral	1	1

Note. n = 95. Participants were on average 22 years old (*SD* = 2.4). [a] Other countries included Argentina (*n* = 1), Burundi (*n* = 1), Canada (*n* = 1), Croatia (*n* = 2), Egypt (*n* = 1), England (*n* = 2), Ghana (*n* = 1), Hungary (*n* = 1), Peru (*n* = 1), Russia (*n* = 1), Slovakia (*n* = 1), Sri Lanka (*n* = 1), Tunisia (*n* = 2) and Vietnam (*n* = 1).

Procedure

All participants were asked to complete a short survey, which took about 10-15 minutes, to help to understand more about the link between Instagram use and personality traits. This survey was conducted via an online platform, Labvanced (Finger et al., 2017), which combined the online study design and data recording. At the beginning of the survey, informed consent and information concerning anonymous processing of the data was

provided to the participants. Secondly, to collect general demographic information of the participants, several questions were asked concerning age, gender, nationality and current educational level. Referring to the inclusion criteria, they were asked if they used IG at least once per week, if they had an English Proficiency level B2 or higher and if they had a history of neurological, psychiatric or severe organic disease. Only active Instagram users with an English Proficiency Level B2 or higher and without a history of the described diseases were considered in this study. If participants did not fulfill the criteria, they were excluded. Thirdly, questionnaires regarding IG usage, empathy and narcissism were displayed. These questionnaires are presented in the following section. At the end of the online survey, the researcher's contact details were provided with an invitation to contact the researcher with possible questions or comments.

Measures

This study utilized three questionnaires. The participant's Instagram usage was investigated through several Instagram related questions, including the three scales IG Interacting, IG Browsing and IG Broadcasting (Yang, 2016). The respondent's empathy was analyzed via the Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011). Lastly, to find out about their narcissism levels, the Narcissistic Personality Inventory-16 (NPI-16; Ames et al., 2006) was used.

Instagram Usage

Previous research discovered that Instagram use can be divided into three categories: interacting, browsing and broadcasting (Yang, 2016). These three subscales and the corresponding items are the result of an exploratory factor analysis, which was performed with principal factor axis being the extraction method and promax the rotation method (Yang, 2016). Factor loadings of those items ranged from 0.62 to 0.98, and items with low loadings on all factors (loadings <.30) or with close loadings on multiple factors were eliminated. In conclusion, the authors found three types of IG usage. Interacting (Cronbach's $\alpha = .79$), refers to directly communicating with another person on Instagram. On the other hand, browsing (Cronbach's $\alpha = .77$) refers to solely looking and scrolling on this app. Broadcasting (Cronbach's $\alpha = .60$) comprises posting personal content on IG like pictures and/or updates without direct communication. Each of those three blocks include two statements. IG Interacting is measured with the items "Comment on or reply to others' posts" and "Tag others in your posts or comments". IG Browsing includes the statements "Browse the home page/newsfeed without leaving comments" and "Check out others' profiles without leaving comments". IG Broadcasting comprises the statements "Post/upload on your profile without

tagging anyone" and "Post something that is not directed to specific people". These three subscales correspond to the interactive, passive and active (but noninteractive) SNS use previously identified in literature (Gerson et al., 2017). All participants were asked to rank each of these items on a Likert scale from 1 (Never) to 5 (A lot). Both items of a subscale were averaged and combined a mean score. The higher the score, the greater the participant's Instagram behavior. This questionnaire had high reliability.

Furthermore, additional questions regarding the IG activity of the participants were asked. In the beginning of this section of the online survey it was noted that it might be useful to check their Instagram account to answer the questions correctly. Firstly, participants were asked how many days per week they use IG through a scale ranged from 0 (never) to 7 (seven days per week). The second item was an open question about how long they use Instagram daily. The next three items were answered by filling in the according numbers. The questions included how many selfies they post on their profile or in their story in a usual month and lastly how many followers and followings a user has. Followers refer to the people that follow a specific user. Followings advert to the list of users a specific user follows.

Empathy

The Questionnaire of Cognitive and Affective Empathy (Reniers et al., 2011) was administered to participants in this study as a measure of their empathy levels. The QCAE consists of 31 items comprising five subscales that assess cognitive and affective components of empathy. The items of this questionnaire were derived from the Empathy Quotient (Baron-Cohen & Wheelwright, 2004), the Hogan Empathy Scale (Hogan, 1969), the Empathy subscale of the Impulsiveness Venturesomeness Empathy Inventory (Eysenck & Eysenck, 1978) and the Interpersonal Reactivity Index (Davis, 1983). Cognitive empathy refers to the ability to construct a working model of emotional states of others (Reniers et al., 2011). The cognitive empathy scale consists of two subscales: perspective-taking and online simulation. Perspective-taking assesses the extent to which respondents can take another′s perspective or see things from another′s point-of-view. As an example, one item is "I can easily work out what another person might want to talk about". Online simulation assesses the extent to which respondents make an effort to understand and mentally represent another‘s emotional state. It is assessed with statements like "Before criticizing somebody, I try to imagine how I would feel if I was in their place". The other three subscales assess affective empathy. Affective empathy is defined as the ability to be sensitive to and vicariously experience someone else′s feelings (Reniers et al., 2011). It is comprised of the following subscales:

emotion contagion, proximal responsivity, and peripheral responsivity. Emotion contagion reflects the extent to which a respondent engages in self-oriented emotional state-matching from observing the affective states of others. An example item would be “I am happy when I am with a cheerful group and sad when the others are glum”. Proximal responsivity assesses one′s emotional responsiveness to the moods of others with whom they are emotionally or physically close, like friends. An example item would be “I am happy when I am with a cheerful group and sad when the others are glum”. Peripheral responsivity assesses one′s emotional responsiveness to the moods of others in a detached social context, like characters in movies. “I usually stay emotionally detached when watching a film” would be one example item. Participants used a 4-point Likert scale to indicate how much they agree with each item′s statement. The answers ranged from 1 (strongly disagree) to 4 (strongly agree). The scores of the items of the cognitive subscales were summed up to assess cognitive empathy of the participants. Likewise, the scores regarding affective empathy were added up to calculate affective empathy. Summing up both generated a total empathy score. Higher scores on each component of the QCAE are associated with greater cognitive and affective empathy.

The questionnaire was developed using exploratory and confirmatory factor analyses and was found to be a valid tool for assessing cognitive and affective empathy (Reniers et al., 2011). Reliability and factor structure were verified. It possesses good convergent validity when correlated with the Basic Empathy Scale (Jolliffe & Farrington, 2006) showing $r = .62$ for cognitive empathy and $r = .76$ for affective empathy. The required values for construct validity could be met by identifying moderate and strong correlations with several relevant constructs. Cronbach’s alpha of the subscales ranged from $\alpha = .65$ to $\alpha = .85$ (Reniers et al., 2011).

Narcissism

The NPI-16 (Ames et al., 2006), a short form of the Narcissism Personality Inventory (NPI-40; Raskin & Terry, 1988), was used to investigate the narcissism levels of the participants. The NPI-16 generates a general narcissism score that has been shown to produce a pattern of results consistent with those generated by the NPI-40. The shorter version NPI-16 is used in this study, because of the efficiency regarding effort and time and for the good psychometric properties. This measurement reflects the multiple facets of narcissism such as self-ascribed authority, superiority, entitlement, and self-absorption. The NPI-16 asks participants to choose the most appropriate statement from a dichotomous response format with narcissism-consistent responses coded as “1” and narcissism-inconsistent responses

coded as “0”. Example items include “I am more capable than other people” and “There is a lot that I can learn from other people”. The final NPI-16 score was computed as the mean across the 16 items. Higher scores indicate higher levels of narcissism.

The 16-item forced-choice format personality questionnaire has great validity (Ames et al., 2006). The NPI-16 has a Cronbach’s $\alpha = .72$, whereas the 40-item measure showed a Cronbach’s $\alpha = .84$. However, the two questionnaires are highly correlated at $r = .90$ ($p < .001$). In conclusion, the NPI-16 has been shown to be valid and reliable and therefore practical to measure a broad range of different aspects of narcissism.

Data Analysis

Data analysis was conducted using SPSS software (IBM Corp., 2021). First, descriptive statistics of the participants and variables of interest were examined. Afterwards, Pearson correlations were conducted to examine the strength of the correlation between Instagram use and empathy for the first research question and between Instagram use and narcissism for the second research question. The independent variable for this study is IG usage, while the dependent variables are empathy and narcissism.

Results

Descriptive Analysis

The participants ranked each statement of the three categories of Instagram behavior (interacting, browsing and broadcasting) in a Likert scale of 1 to 5. The lowest average score of the participants regarding the three categories of Instagram behavior was the IG Interaction scale with 2.51 (*SD* = 1.26). The highest average score was found in the IG Browsing Scale with 3.91 (*SD* = 1.34). The average score of the IG Broadcasting scale was 3.01 (*SD* = 1.48). Furthermore, additional questions of IG activity were analyzed. All analyzed descriptive data regarding Instagram usage are presented in Table 2. The respondents stated on a scale ranged from 0 (Never) to 7 (7 days per week) how many days per week they use Instagram. The answers ranged from 1 to 7. All participants, who answered with 0, were not considered in this study, because only active Instagram users are further analyzed in this study. The average was 5.84 days per week (*SD* = 1.96). The participants also responded on how many minutes per day they use IG. The average was 90.41 minutes per day (*SD* = 79.21) with a minimum of 5 minutes and a maximum of 360 minutes Instagram usage per day. The average number of selfies was 3.19 per month (*SD* = 5.52). The number of selfies posted per month varied from a minimum of 0 selfies up to 30 selfies. The average number of followers was 583.54 (*SD* = 583.54) with a broad range of 0 followers to 6203 followers. The average number of followings was 348.47 (*SD* = 348.47) with a range from 0 to 1502.

Table 2

Descriptive Statistics of Instagram Usage

Variable	*M*	*SD*	Min	Max
IG Interaction [a]	2.51	1.26	1	5
IG Browsing [a]	3.91	1.34	1	5
IG Broadcasting [a]	3.01	1.48	1	5
Days per week	5.84	1.96	1	7
Time per day [b]	90.41	79.21	5	360
Selfies [c]	3.19	5.52	0	30
Followers [d]	583.54	583.54	0	6203
Followings [e]	348.47	348.47	0	1502

Note. n = 95. [a] The three scales IG Interaction, IG Browsing and IG Broadcasting highlight the different Instagram behaviors implemented by Yang (2016). [b] Time per day were analyzed per minutes. [c] The number of selfies posted per *month* is considered. [d] Followers on Instagram are the people that follow a specific user. [e] Followings refer to the list of users that a specific user follow.

The average total empathy score was 88.64 (*SD* = 20.79) with a minimum score of 37 and a maximum score of 124. Referring to the cognitive empathy subscale, the participants average score was 56.09 (*SD* = 14.62) with scores ranged from 19 to 76. The average score regarding affective empathy was 32.55 (*SD* = 7.23) with scores ranged from 15 to 48. In Table 3 means, standard deviations, minimum and maximum scores of each component are presented for descriptive statistical purposes.

Table 3

Descriptive Statistics of Empathy

Variable	*M*	*SD*	Min	Max
QCAE-total	88.64	20.79	37	124
QCAE-cognitive	56.09	14.62	19	76
QCAE-affective	32.55	7.23	15	48

Note. n = 95. QCAE = Questionnaire for Affective and Cognitive Empathy.

The Narcissistic Personality Inventory-16 was administered to participants as a measure of narcissism. The NPI-16 score was computed as the mean across the 16 items. Table 4 illustrates means, standard deviations and minimum and maximum scores across all participants. The average score was .36 (*SD* = .26). The scores varied from 0 to .94.

Table 4

Descriptive Statistics of Narcissism

Variable	*M*	*SD*	Min	Max
NPI-16	.36	.26	0	.94

Note. n = 95. NPI-16 = Narcissistic Personality Inventory-16.

Correlational Analysis

Correlational analyses were calculated, and the results are presented in Table 5. Pearson's correlation coefficients (*r*) range from -1 to +1 and provide information regarding the relationship between two variables. For the purpose of interpreting the strength of a correlation, Cohen (1988) implemented specific effect sizes: small (*r* = .10), medium (*r* = .30) and large (*r* = .50). The alpha level was set to .05. All hypotheses were tested two-sided.

Table 5

Correlational Analysis of Instagram Usage, Empathy and Narcissism

Variable	1	2	3	4	5	6
1. IG Interaction	-	-.52**	-.25*	-.19	.24*	-.07
2. IG Browsing	-.52**	-	-.45**	.18	-.11	.11
3. IG Broadcasting	-.25*	-.45**	-	.35**	-.18	.22*
4. Selfies	-.19	.18	.35**	-	-.47**	.47**
5. QCAE-total	.24*	-.11	-.18	-.47**	-	-.64**
6. NPI-16	-.07	.11	.22*	.47**	-.64**	-

Note. n = 95. QCAE-total = Questionnaire for Affective and Cognitive Empathy General Empathy Score. NPI-16 = Narcissistic Personality Inventory-16.

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

Exploratory Analysis

Additional exploratory analyses were conducted to examine whether the scores of the participants regarding Instagram usage, empathy and narcissism were different based on their gender. Since the number of participants who stated diverse as their gender is too small (n = 1), the respondent won't be considered for this analysis. Several independent-samples t-tests were calculated for this purpose. The data fulfill the requirements for these tests, because the dependent variables are approximately normally distributed, the level of measurement of the dependent variables are metric and there are two distinct independent variables (males and females) in each group. Also, the homogeneity of variances is a requirement for samples independent t-tests. This assumption of homogeneity of variance was tested using Levene's Test of Equality of Variances. The results are presented in Table 6.

The mean scores of males and females were compared in each of the following Instagram related variables: IG Interacting, IG Browsing, IG Broadcasting, time spent on Instagram, selfies, followers and followings. There was no significant difference between the average scores of males and females in the IG Interaction scale $t(92) = 0.458$, $p = .648$. However, the average score of males on the IG Browsing scale ($M = 3.39$, $SD = 1.50$) was significantly lower in relation to the average score of females ($M = 4.19$, $SD = 1.19$), $t(51.663) = -2.602$, $p = .012$. Also, the average score of males ($M = 2.52$, $SD = 1.43$) were significantly lower than the average score of females ($M = 3.23$, $SD = 1.45$) on the IG Broadcasting scale $t(92) = -2.258$, $p = .026$. There was no significant difference between male and female in time spent on the app $t(92) = 1.639$, $p = 0.105$ and posting selfies in a month $t(92) = -0.012$, $p = .990$. Also, no significant difference regarding followers $t(92) = -0.862$, $p = .391$ and followings $t(92) = -1.037$, $p = .303$ was found.

Finally, a comparison between the mean scores of males and females of the empathy and narcissism questionnaires were computed. The average score of males on the QCAE ($M = 82.59$, $SD = 23.86$) was not significantly different from the average score of females ($M = 91.66$, $SD = 18.65$), $t(51.064) = -1.874$, $p = .067$. Also, the average score of males on the NPI-16 ($M = .41$, $SD = .27$) was not significantly different from the average score of females ($M = .33$, $SD = .25$), $t(92) = 1.479$, $p = .143$.

Table 6

Averages for Each Variable Based on Gender

Variable	Males	Females	*t*	*p*
IG Interaction	2.61 (1.44)	2.48 (1.16)	0.458	.648
IG Browsing	3.39 (1.50)	4.19 (1.19)	-2.602	.012*
IG Broadcasting	2.52 (1.43)	3.23 (1.45)	-2.258	.026*
Time per day	109.44 (94.51)	81.32 (69.45)	1.639	.105
Selfies	3.22 (6.44)	3.23 (5.07)	-0.012	.990
Followers	485.9 (609.6)	643 (932.5)	-0.862	.391
Followings	311.8 (250.6)	373 (280.8)	1.037	.303
QCAE-Total	82.59 (23.86)	91.66 (18.65)	-1.874	.067
NPI-16	.41 (.27)	.33 (.25)	1.479	.143

Note. Gender = males (n = 32), females (n = 62); diverse (n = 1) excluded. Standard deviations are presented in parentheses.

*$p < .05$.

Discussion

The present study investigated whether Instagram usage are related with empathy and narcissism among late Adolescents. IG use was divided into three categories (interacting, browsing, broadcasting) to examine the participants specific Instagram usage. Empathy was measured with the QCAE, whereas narcissism was assessed by the NPI-16. The finalized research questions and hypotheses are presented in the following.

RQ_1: Is there a correlation between Instagram use and empathy?

H_1 states that "IG Interacting correlates positively with empathy". To test this hypothesis, a possible correlation between the data of the IG Interaction scale and the score of the QCAE of the participants were analyzed. A significant correlation of r = .24 (p = .02) between both was found.

H_2 points out that "IG Browsing correlates negatively with empathy". A possible correlation between the data of the IG Browsing scale and the score of the QCAE were examined to test this hypothesis. No significant correlation of r = -.11 (p = .31) was found in this regard.

RQ_2: Is there a correlation between Instagram use and narcissism?

H_3 states that "IG Broadcasting correlates positively with narcissism". To test this hypothesis, a possible correlation between the data of the IG Broadcasting scale and the score of the NPI-16 of the subjects were investigated. A significant correlation of $r = .22$ ($p = .03$) was found in this regard.

H_4 indicates that "The number of selfies correlates positively with narcissism". A possible correlation between the data of the number of selfies and the score of the NPI-16 were analyzed to test this hypothesis. A significant correlation of $r = .47$ ($p = <.001$) was found between both.

Interpretation of Findings

Empathy is highly related to how we communicate with others. Since the interaction of late adolescents rely to a large extent on social networking sites, their empathic levels may be affected. In order to develop empathic skills, Konrath et al. (2011) emphasized that this interaction needs to be done via face-to-face communication, rather than on SNSs. Furthermore, Konrath et al. (2011) and Small and Vorgan (2008) indicated a risk that adolescents' use of SNSs would lead to a decrease in their empathic levels. These researchers argued that elements of non-verbal communication, which are crucial to reading emotions are left out in social networking conversations. Despite their rationales regarding their pessimistic view of the cues-filtered out theories, concrete empirical evidence for a relation between SNSs use and empathy is largely missing and even show opposing results. In accordance with Walther's (1996) positive view of computer-mediated communication on empathic skills, a study by Alloway et al. (2014) revealed a positive rather than a negative relation between Facebook use and empathy among young adults. This is in line with research indicating that SNSs enable the possibility for adolescents to practice and improve their social skills such as self-presentation and self-disclosure (Valkenburg et al., 2011), while strengthening social connectedness (Rosen, 2011). Moreover, it was argued that these skills are transferable to offline interactions (Valkenburg & Peter, 2008) and that there are no differences in the intensity of expressing emotions between online and face-to-face communications (Derks et al., 2008). Based on these theories and empirical findings, there seems to be more reason to expect that these platforms provide adolescents the possibility to practice understanding and sharing the emotions of others, which could enhance their empathic skills. Therefore, it was assumed in the present study that a specific behavior, which refers to interacting, regarding the second most used social networking site Instagram has a

positive relationship with empathy among late adolescents (H_1). The results of the current study align with the positive view in this field. Hereby, a small effect size of $r = .24$ was found. Interacting on this platform can give young adults the opportunity to connect with others, share their personal stories and further develop a feeling and understanding regarding the emotions of other users. This may help to form positive relationships and increase empathy. Yet, the current study found a positive relationship, which cannot be interpreted as a causation. Through this finding together with previous findings, it can be assumed that interacting on social networking sites are positively related. However, based on the negative view of SNSs on empathy, it was assumed in the present study that the passive activity (browsing) on Instagram has a negative association with empathy (H_2). No association was found. Similarly as the first finding of the present study, the second finding lines up with the positive view in this field suggesting no negative association between IG usage and empathy. It was suggested that browsing may lead to a disconnection with others and limit one's ability to share and understand the emotions of others. Nonetheless, both findings support the fact that users have different types of possibilities in terms of how they engage with these applications and that one specific behavior can lead to different results when examining personality traits, such as empathy. Therefore, research need to differentiate between the various types of usage.

Previous research has found a positive trend in narcissism levels among adolescents (Twenge et al., 2008). Several researcher stress that this increase in narcissism may be caused by adolescents' SNSs use (Diller, 2015; Staff, 2015). Many researchers have found a positive link between narcissism and self-promoting content on Facebook (Buffardi & Campbell, 2008; Mehdizadeh, 2010; Carpenter, 2012). The results in this field point towards a relationship between narcissism and these platforms. Yet, the majority of research targets Facebook and scarcely any study have examined whether Instagram is related to narcissism. Compared to Facebook, Instagram's digital environment offers users the possibility to engage in more narcissistic related functions as described above (Faelens et al., 2021). Paramboukis et al., (2016) found only weak evidence for any relationship between narcissism and IG usage among late adolescents. Notably, as stated above it is questionable if their used method possesses sufficient psychometric properties. Another study from Korea by Moon et al., (2016) found a positive link between narcissism and selfies among adults (not adolescents). Because most of the previous studies found a positive link between these platforms and narcissism especially when focusing on self-promotional content, the current study assumed that there is a positive relationship between Instagram use and narcissism among late

adolescents. Therefore, it was assumed that broadcasting (H_3) and selfies posted (H_4) are positively associated with narcissism. A small effect size of $r = .22$ ($p = .03$) for H_3 and a medium effect size of $r = .47$ ($p = <.001$) for H_4 was found. The results of the current study are in line with most of the research described above. Furthermore, a study by Hu et al., (2014) revealed that nearly half of the photos posted on Instagram are either selfies or self-presented photos with friends indicating that this application is mostly used to self-promote. Thus, it is reasonable that the effect size regarding selfies posted is higher than the effect size for broadcasting photos in general. Selfies are a form of self-presentation and are often used to promote oneself. Posting selfies may reinforce a person's self-centered attitude and their need for admiration and attention from others, which can be linked to narcissistic characteristics. Broadcasting posts in general can be more varied and can involve topics other than oneself, which can be less indicative of narcissistic tendencies. The results of the present study show that posting selfies is not only associated with narcissism levels among adults (Moon et al., 2016), but as well among late adolescents. Moreover, the results also reveal the importance of differentiating between the different types of IG use.

Exploratory analysis of the current study revealed various gender differences among the late adolescents. Firstly, males browsed, $t(51.663) = -2.602$, $p = .012$, and broadcasted, $t(92) = -2.258$, $p = .026$, significantly less on Instagram than females. Yang (2016) indicated that browsing and broadcasting may be related with risky behavior when using social networking sites. Females may browse as a source of inspiration, motivation, or entertainment. They may be more interested in exploring new content of friends, brands, influencers or other users, whereas males may be less interested in the content that is often posted on the platform, such as fashion, beauty, and lifestyle-related posts. However, there is a huge gap of research of the different types of usage shown on SNSs and especially on Instagram. Future studies should focus on gender differences in this regard to examine the possible motives for their different type of behavior using IG and other platforms. Secondly, despite that males ($M = 82.59$, $SD = 23.86$) scored lower in the QCAE than females ($M = 91.66$, $SD = 18.65$), this result is not significant, $t(51.064) = -1.874$, $p = .067$. This trend aligns with a huge number of research on late adolescents (Reniers et al., 2011; Hegazi & Wilson, 2013; Quince et al., 2011; Triffaux, 2019), yet they found significant results in this regard. Thirdly, the scores obtained with the NPI-16, have shown that males ($M = .41$, $SD = .27$) have scored insignificantly higher than females ($M = .33$, $SD = .25$), $t(92) = 1.479$, $p = .143$. This tendency is consistent with the studies of Ames et al., (2006) and Foster and Campbell (2007) except that they found significant results in this regard. Also, a meta-

analysis on 355 studies found that males tended to be more narcissistic than females. In addition, Grijalva et al., (2015) argued that females have less pronounced narcissistic tendencies than males. There could be various reasons for this difference. Men may be more likely to engage in behaviors that are associated with narcissism, such as risk-taking, bragging, competitive behavior. Moreover, the traditional gender roles may still have an influence on men in a way that they see themselves superior to women, which may be linked to their narcissistic tendencies. The possible reasons for the significant and surprisingly not significant results in the present study may be due to the low number of males (n = 32) in comparison to the number of females (n = 62).

The descriptive analysis of the current study indicated that all participants mostly browsed (M = 3.91, SD = 1.34) on Instagram, rather than broadcasted (M = 3.01, SD = 1.48) or interacted with others (M = 2.51, SD = 1.26). This result aligns with the findings of Yang (2016). When opening this application, the user gets directly forwarded to its homepage, in which the member can start browsing through the visually engaging content. This simplicity together with the platform's appealing format may lead to this predominant type of behavior. In addition, the score of the IG Interaction scale was the lowest in comparison to the other types of usage. Huang & Su (2018) argue that Instagram refers more on expressing one own's personal identity rather than on relational identity. This application may not primarily invite its members to interact with each other such as other platforms. Future research should focus on the differences between various applications in this regard. The scores of all subjects of the present study on the QCAE (M = 88.64, SD = 20.79) and the NPI-16 (M = .36, SD = .26) are approximately the same results as in the studies of Reniers et al., (2011) and Ames et al., (2006), in which they established these questionnaires.

Limitations & Future Studies

Some limitations are associated with the sample of the present study. Firstly, there is not sufficient diversity in ethnicity among the participants. The majority was German and Austrian, who comprised 74% of all participants. This distribution makes it difficult to draw conclusions for a broader population. Secondly, the fact that most participants are mainly female (65%), limits the potential of transferring conclusions upon the general population as well. Thirdly, this study excluded individuals, who did not use IG and therefore only differences within Instagram users were investigated. Including non-Instagram users would have created the possibility to focus on the differences between those two groups and as a result to investigate, if the empathy and narcissism levels are significantly different between those two groups.

Another limitation is that the current study is a purely correlational cross-sectional study, which makes it impossible to draw causal conclusions. Experimental interventions such as a pre and post-test design, would have made it possible to expose individuals to IG and measure if the empathy and narcissism levels significantly differ in the pre and post-tests. In addition, a longitudinal study would have made it easier to clarify the influence of Instagram use on empathy and narcissism. Even though empathy and narcissism can be seen as traits that are mainly stable, research stated that these constructs are flexible rather than unchanging (Singer & Lamm, 2009). Consequently, the use of a longitudinal design would have been appropriate in this regard. Other tests could have been additionally utilized to understand the link between these variables further: a mediation analysis to examine the relationship between an independent and dependent variable through a mediator variable, a regression analysis to examine the influence of a constant variable on a dependent variable, or an ANOVA to analyze differences between the means of the variables. The present study focused on the relationship of personality traits regarding Instagram use as no other study. The results of the relatively new research field can be seen as a motivation for researchers to further investigate in this field.

Data collection was also a limitation, since this research was dependent on online questionnaire responses of the subjects. This fact promotes the risk for some possible confounding variables. There could have been participants, who did not comprehend or paid attention to the instructions presented to them. Furthermore, although it was recommended to the participants to check their Instagram activity to answer the questions correctly, their responses could have been biased by trying to estimate the correct answer. For instance, when asked how many selfies they usually post in a month, they may could have only recalled a regular pattern and then use that as a base to estimate it for the whole month. Therefore, retrieval questions capture a risk for bias.

Also worth mentioning is that alternative strategies to assess IG related variables, could have been applied. Instead of simple questionnaires, the Instagram profiles could have been examined to research about the pictures posted, “likes”, chats, joined groups etc. of the subjects. Moreover, this platform provides a feature of which it is possible to find large amounts of data in the user’s account section. The variety of possibilities how and what to use within Instagram is extensive. The fact that the present study used self-report questionnaires was not very innovative, yet most studies use this type of method in this field. Notably, research regarding this social networking site suffers from deficits among conceptualizations, operationalization and measurements. Consequently, the research

community do not have a coherent standardized examination, which makes it difficult to compare different studies. The number of Instagram members is constantly growing, but investigations and research is not increasing proportionally. Future studies should aim to standardize and operationalize methodologies in this research field and use IG as their research platform. The popularity and variety of social networking sites are continuing to grow. Future studies should also include other applications, such as the social networking site TikTok, which was used globally more than any other SNSs in 2022 among Android users with 23.5 hours usage per month (Kemp, 2023). Furthermore, it is worth noting that the current study is limited by the implementation of the shorter questionnaire to measure narcissism, the NPI-16. Future research should also employ the longer version with 40-items (NPI-40; Raskin & Terry, 1988), although it has similar sufficient psychometric properties.

Implications

Research has found an increase in adolescent's SNSs usage (Kemp, 2023) and a decrease in empathy levels among them (Konrath et al., 2011). It was emphasized that the uptake of these applications is the reason for this reduction in empathy levels (Konrath et al., 2011). The importance of empathy cannot be stressed enough. It enables individuals to relate and connect with others and is essential for psychosocial development. It is crucial for making and maintaining friends (Allemand et al., 2014), correlates positively with prosocial behavior (Carlo et al., 2012), and negatively with aggressive behavior (Jolliffe & Farrington, 2004). Maguire et al. (2000) stated that there is an extraordinary process of re-mapping in the brain in the period of adolescents, where a lot of neurons which are less used are eliminated, whereas the more stimulated ones gain stronger connections. Also, in this time period empathy reaches its greatest level of development (Allemand et al., 2014). Therefore, to understand how this new way of communication via digital environments between adolescents influence this trait is vital. The results of the current study revealed that empathy is associated with the use of the second most used social networking site. Further, empathy solely relates with interacting on this platform. This finding indicates that the risk of SNSs use Konrath et al., (2011) warned about, is somewhat overstated. In addition, the results build a foundation for researchers to understand that not only is there a link between empathy and IG, but also the relation between the personality trait and the different types of usage. With these results researchers can be motivated to even utilize sophisticated methodologies, such as longitudinal studies, in this regard to further investigate in what extent empathy and Instagram use are related to each other.

Besides the decrease in empathy levels, an increase in narcissism levels among adolescents were found (Twenge et al., 2008). Narcissists typically think that they are better than other people (Sheldon, 2016) and use strategies, which are linked to self-promotional behaviors such as associating with high status (Horton & Sedikides, 2009) and bragging (Buss & Chiodo, 1991). This trait is referred to negative attributes, which include aggressive behavior (Bushman & Baumeister, 1998) and low commitment (Campbell & Foster, 2002). Many researchers warn that SNSs use credit the positive trend of narcissism (Diller, 2015; Staff, 2015; Twenge, 2013), although there is no empirical evidence for that assumption. As described above, plenty studies revealed a relationship between narcissism and Facebook usage. The social networking site Instagram tends to be more attractive for narcissists and even facilitates narcissistic behavior since its focus is on images and videos rather than interpersonal connections. The results of the present study show that there is an association between IG use and narcissism. Thus, future researcher may aim to utilize methods, such as longitudinal studies to understand more specifically how narcissism and Instagram use are linked to each other. Thereby, it would be clearer to see the influential effects of widely used SNSs like IG on narcissism levels among adolescents. The findings of the current study may contribute to the area of clinical psychology to treat narcissism related cases. Knowing that there is a positive link between narcissism and SNSs may help them to identify the cause and appropriate treatment. Leaders of SNSs may also find interest in these findings to improve their applications making them part of the solution. With the uptake and widespread use of these platforms, responsible authorities may aim to support their users by creating solutions, such as in-App screen-time tracker.

This study provided essential data about the relationship between Instagram use, empathy and narcissism among late adolescents. It also showed the importance of differentiating between the different types of usage. Greater awareness enables users, mental health professionals and SNSs owners to be more conscious about the positive and negative effects regarding the usage of these platforms. The findings of this study, along with future research, could contribute to more treatments for mental health issues and interventions for poor SNSs habits.

Conclusion

Taking together the results of the current study, it can be assumed that empathy and narcissism are both linked to different types of usage of Instagram among late adolescents. Although narcissism and empathy are often seen as opposed personality traits, they can both be related positively to the same social networking site depending on what type of usage is

considered. The widespread introduction of social networking sites as part of modern culture changed the style of interpersonal communication to a large extent. These applications allow the users the opportunity of keeping in touch with family members, friends, colleagues, or even establishing new friends. The platforms invite its members to the consolidation and development of social relations in a new modern fashion. Whereas most of the positive impact of being able to connect with others just by a few clicks are well-known, the possible negative consequences are still investigated. For instance, even if individuals feel better socially connected, they may have increased stress and decreased relaxation levels (Zhan et al., 2015). Moreover, SNSs may facilitate the users' narcissistic behaviors in a problematic spiral that promotes the degree of their narcissism. Alternatively, it may be that narcissistic behavior is more of a by-product of a society that is becoming increasingly more self-centered and thereby provide another stage in which narcissistic tendencies can be displayed. Therefore, these platforms will become increasingly relevant in psychology research over the decades to come. Notably, each social networking site is diverse with different goals and patterns of use regarding its members (Meshi et al., 2015). Consequently, it is not possible to generalize from one application to another. IG is currently the second most used SNS with an increasing number of active users (Kemp, 2023). Despite that most previous research has been done on Facebook, Instagram with its unique digital environment and its novelty makes it essential for further research and to investigate its possible psychological consequences. This platform makes it very appealing for highly narcissistic individuals, because they tend not to focus on deep relationships even with their desire for social contact.

The results of the present study showed that empathy is positively associated with interacting on IG and that narcissism is positively related with broadcasting in general and posting selfies among the late adolescents. Longitudinal studies with replications and with different cultures will be necessary to reach a degree of consensus of the psychosocial effects of different types of SNSs usage on adolescents. Future studies should aim to develop valid and reliable measurements or improve existing ones. Instagram and other social networking sites are part of an unstoppable and rapidly growing technology, which need to be investigated further.

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List of Tables

List of Abbreviations

Appendix

Abstract

There has been a huge interest in research on how social networking sites influence adolescents' psychosocial development in recent years. Although social networking sites have allowed for sharing personal information, maintaining social connections and much more, concerns have been raised about its impact on their psychosocial development. The present study investigated whether different types of Instagram usage are related with empathy and narcissism among late adolescents. Therefore, a correlational research design was conducted to analyze the data of 95 participants between 18 and 25 years of age, who completed an online survey. The results showed that empathy correlated positively with interacting (r = .24; p = .02) on Instagram and that narcissism correlated positively with broadcasting (r = .22; p = .03) and posting selfies (r = .47; p = <.001) among the late adolescents. No significant correlation between empathy and browsing was found. Exploratory analysis of the current study revealed that females browsed and broadcasted significantly more on Instagram than males. The study generated relevant new findings and recommendations for future research. Despite that narcissism and empathy are often seen as opposed personality traits, they can both be related positively to the same social networking site such as Instagram depending on what type of usage is considered. The findings of this study, along with future research, could contribute to a better understanding of the positive and negative effects regarding the way this and other platforms are used.

Keywords: Instagram usage, social networking sites, empathy, narcissism, late adolescents

Zusammenfassung

In den letzten Jahren hat es ein großes Interesse an Forschungen gegeben, wie soziale Netzwerke den psychosozialen Entwicklungsprozess von Jugendlichen beeinflussen. Obwohl soziale Netzwerke es ermöglichen, persönliche Informationen zu teilen, soziale Bindungen aufrechtzuerhalten und vieles mehr, wurden Bedenken hinsichtlich ihres Einflusses auf deren psychosoziale Entwicklung geäußert. In der vorliegenden Studie wurde untersucht, ob unterschiedliche Arten der Nutzung von Instagram mit Empathie und Narzissmus im späten Jugendalter in Zusammenhang stehen. Daher wurde ein korrelatives Forschungsdesign durchgeführt, um die Daten von 95 Teilnehmern zwischen 18 und 25 Jahren, welche eine Online-Umfrage ausgefüllt haben, zu analysieren. Die Ergebnisse zeigten, dass Empathie positiv mit dem Interagieren auf Instagram korrelierte und dass Narzissmus positiv mit dem Posten von allgemeinen Medien und Posten von Selfies korrelierte. Es wurde keine signifikante Korrelation zwischen Empathie und scrollen gefunden. Eine explorative Analyse der vorliegenden Studie ergab, dass Frauen signifikant mehr auf Instagram scrollen und allgemeine Medien posten als Männer. Die Studie lieferte relevante neue Erkenntnisse und Empfehlungen für zukünftige Forschungen. Obwohl Narzissmus und Empathie oft als entgegengesetzte Persönlichkeitsmerkmale angesehen werden, können beide sich je nach Art der Nutzung positiv auf dasselbe soziale Netzwerk, wie Instagram, beziehen. Die Ergebnisse dieser Studie, zusammen mit zukünftigen Forschungen, könnten zu einem besseren Verständnis der positiven und negativen Auswirkungen hinsichtlich der Art und Weise beitragen, wie diese und andere Plattformen genutzt werden.

Schlagwörter: Instagram Benutzung, Soziale Netzwerke, Empathie, Narzissmus, Spätes Jugendalter