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Maladaptive Instagram Use Among Young Adults: The Mediating Role of Basic Psychological Needs on Body Dissatisfaction

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Abstract

Instagram is an image-sharing social networking service (SNS) particularly enjoyed by young adults. It excessive and problematic use impacts users' body image (BI). Individuals with negative BI feel dissatisfied with their appearance and body, and perceive a discrepancy between their current and ideal image. Instagram, in contrast to other SNS, focused uniquely on image-based content. As such, it is likely that Instagram differs from other social media in term of mediating processes linking its use to BI, reflecting the need to understanding the relationship between maladaptive Instagram use and body dissatisfaction. The main purpose of this study is to investigate, through a self-determination theory (SDT) framework, the mediating role of basic psychological needs (BPN) satisfaction/frustration and needs-supportive/needs-thwarting interpersonal behaviors on the relationship between maladaptive Instagram use and body dissatisfaction. The results showed the role of BPN satisfaction/frustration (autonomy, competence and relatedness) in the relationship between maladaptive Instagram use and body dissatisfaction. The sample comprised 525 young adults from several Italian university. This study extends the knowledge of the factors that can be related to the BI of young adults, with important application implications.

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1. Introduction

Instagram is a social networking service (SNS) that was launched in 2010. It is considered the faster-growing image-sharing SNS, and it is particularly enjoyed by young adults (18-30 years) (Lup, Trub, & Rosenthal, 2015; Shane-Simpson, Manago, Gaggi, & Gillespie-Lynch, 2018). According to the literature, 71% of young adults use Instagram, and they are also the more active Instagram users compared to older adults (Smith & Anderson, 2018). This preference might be due to the relative novelty of Instagram and particularly to the visual communication approach that characterizes it. In fact, young adults identified the primary reason for their preference as the visual imagery available on a SNS, and Instagram is the major SNS that offers this kind of content (Shane-Simpson et al., 2018). Gullberg (2016) underscores that young adults may rely on visual communication more than older people do, probably because they were born into a visual era and intuitively understand and use the language of image-sharing that characterizes Instagram (Lissitsa & Laor, 2021). Thus, Instagram is a source of information and a source of social relationships, and it accomplishes this in a brief, visual format (the sharing of images and videos) that is especially aligned with the language of young adult users (Kwak, Lee, Park, & Moon, 2010; Laor, 2022).

Another factor that may attract young adults to Instagram is the possibility of obtaining validation (via visual imagery) regarding their physical appearance a particular idealized appearance that society encourages them to seek (Lee, 2019). Previous research has found that young adults have a strong desire to gain like on SNSs and engage in a variety of behaviors to ensure they receive them (Dumas, Maxwell-Smith, David, & Giulietti, 2017). Some of these behaviors are deceptive in nature and include digitally modifying one's physical features in photos, buying followers, or purchasing likes or liking others' posts solely for the purpose of having the favor returned (like-for-likes). Sixty percent of young adults tend to be involved in this deceptive behavior (Dumas et al., 2017). The users' ability to edit and enhance the images they post and to follow similarly "perfected" images of other users makes Instagram a worrying platform when it comes to body image (BI) (Engeln, Loach, Imundo, & Zola, 2020).

BI refers to mental representations of the physical self, including feelings, thoughts, behaviors, and beliefs that individuals have about their body (Cash, 2004; Faelens et al., 2021), experienced on a continuum from positive to negative. People with negative BI feel dissatisfied with their appearance and body, and perceive a discrepancy between their current and ideal image (Grogan, 2006; Bucchianeri & Neumark-Sztainer, 2014). The more dissatisfied an individual feels about his or her body, the higher their risk of experiencing low self-esteem, depression,

and poor quality of life (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006; Wynee, Comiskey, & McGilloway, 2016). Social media feeds are usually populated by curated, posed, filtered and edited photos of "perfected" images featuring sociocultural beauty ideals, which promotes opportunities of social comparisons (Engeln et al., 2020). These social comparison processes drive the association between social media use and BI concerns (Fardouly & Vartanian, 2016), in particular when a user perceives herself or himself as falling short of the beauty ideals presented in these "perfected" images (Tiggemann & Miller, 2010). Young adults engaging in negative activities on SNSs (negative body talk, seeking reassurance, engaging in appearance-related comparisons, or self- objectification) or who are exposed to idealized images of celebrities, peers, and fitness ("fitspiration") may be more susceptible to developing a negative BI of themselves (Hendrickse et al., 2017; Sherlock & Wagstaff, 2019; Rounsefell et al., 2020). Instagram use may lead to body dissatisfaction, in particular when individuals fail to meet social standards of physical beauty or feel less attractive than other users (Thompson et al., 1999; Van den Berg et al., 2002; Kim, 2021). These factors can lead to a BI disturbance, including body dissatisfaction, a drive for thinness, body surveillance, and a desire for cosmetic surgery (Cohen, Newton-John, & Slater, 2017; Fardouly, Pinkus, & Vartanian, 2017; Hendrickse et al., 2017; Walker, Krumhuber, Dayan, & Furnham, 2019). Based on previous studies, a relationship between Instagram use and body dissatisfaction is evident. The use of this SNS can become maladaptive not only in reference to the time spent on the social network but also on the basis of the published contents and the behaviors that accompany its use (Kachanoff, Wohl, Koestner, & Taylor, 2020). For this reason, it is important to highlight the concept of maladaptive Instagram use. Maladaptive Instagram use refers to a passive use of SNS, such as scrolling through other's feeds without liking or commenting on posts, viewing user's Instagram stories, and browsing others' profiles without letting know them know they have been "seen" (Yael, 2021). It also refers to an active Instagram use (Chang, Li, Loh, & Chua, 2019; Lamp, et al., 2019; Wagner, Aguirre, & Sumner, 2016) that includes selfie-taking (users taking more selfies before posting) and selfie-editing (users strategically presenting themselves by editing or manipulating selfies), and to the intensity of Instagram use, such as long time spent daily on the app, an excessive concern for social media, an inability to control behavior, and a high frequency in checking the app (Faelens, Hoorelbeke et al., 2021). Indeed, greater photo-based activities (sharing photo and reels, viewing photos, and commenting or receiving comments on photos) are associated with higher levels of body dissatisfaction and risk of BI-related disorders (Arroyo & Brunner, 2016; Holland & Tiggemann, 2016; Slater, Varsani & Diedrichs, 2017; Griffiths et al., 2018; Wick & Kelly, 2020). Therefore, SNS are particularly important in the daily life of

individual and, exactly as other social environments, it has the capacity to bolster or thwart individual basic psychological needs (BPN). In accordance with self-determination theory (SDT; Ryan & Deci, 2017), the interpersonal context may or may not support the individual, depending on whether it contributes to the satisfaction or, conversely, the frustration or thwarting of BPN (Deci & Ryan, 2000; Vansteenkiste, Niemiec, & Soenens, 2010). In particular, is important refers to the dual-process model (Jang, Kim, & Reeve, 2016; Vansteenkiste & Ryan, 2013) which make a distinction between the bright side aspects and dark side aspects of BPN satisfaction/frustration. These two sides underscore how the absence of autonomy support does not necessarily lead to the presence of thwarting, just as the absence of thwarting does not necessarily lead to the presence of autonomy support.

Human beings' innate BPN for autonomy, competence, and relatedness are critical to authentic body acceptance and body satisfaction (Legault & Sago, 2022). Autonomy, denotes an experience of volition and self-endorsement in thinking, being, and behavior. Autonomous people feel connected to their inner values and desires, and they experience agency. Individuals do not feel autonomous when they conform to external expectations while forsaking their inner values. Competence denotes the perceptions of having the necessary skills and abilities to interact effectively with the environment and perform successful social interactions. Relatedness denotes the perceptions of being accepted and connected to others and the need to establish positive emotional attachments (Vansteenkiste, & Ryan, 2013). Relatedness needs frustration is related to feelings of loneliness and exclusion (Cordeiro, Paixão, Lens, Lacante, & Sheldon, 2016), and the individual is unable to derive enough satisfaction from his or her social interactions (Moller, Deci, & Elliot, 2010). Relatedness needs satisfaction is associated with feelings of belongingness within supportive relations (Baumeister & Leary, 1995).

Vansteenkiste & Ryan (2013) stated that some factors, such as the satisfaction of the individuals' BPN, may have a protective function against sociocultural messages of what constitutes "perfect" BI (Pelletier, Dion, & Lèvesque, 2004; Tylka, & Kroon Van Diest, 2015) and may promote an optimal psychological well-being (Ryan, & Deci, 2017). Applying this concept to body satisfaction, individuals are influenced by the supportive versus thwarting aspect of SNSs (image-sharing and the use of the platform) and interpersonal context, which have the capacity to bolster or thwart feelings of autonomy, relatedness, and competence. Indeed, the belief of individuals that other people accept their appearance and perceive them as autonomous is important to a positive BI (Avalos & Tylka, 2006; Tylka & Wood-Barcalow, 2015; Karahanna, Xu, Xu, & Zhang, 2018). According to the literature, there are two pathways through which

BPN satisfaction may be protective. First of all, the fulfilment of BPN may promote greater overall body satisfaction because self-evaluations are based on personal preference rather than social BI (Vansteenkiste & Ryan, 2013), which is predictive of less body dissatisfaction (Thøgersen-Ntoumani, Ntoumanis, & Nikitaras, 2010). Conversely, people who state that their BPN are unsatisfied because of pressure, control, or an unsupportive environment experience greater body dissatisfaction (Edwards, Tod, Molnar, & Markland, 2016). Another way in which BPN satisfaction offers a protective function is the reduction of the impact of external threats to BI (viewing idealized images). In particular, perceiving BPN as satisfied promotes a definition of an individual's self-worth in term of stable internal factors rather than socially ideal images (Pelletier et al., 2004; Ponnusamy, Iranmanesh, Foroughi, & Hyun, 2020). This can lead young adults to selectively disregard information that is incongruent with their values and shift attention toward more important personal qualities. Mask and Blanchard (2011) emphasize that young adults with high general self-determination are protected against the negative effects on body satisfaction of viewing the thin-ideal BI.

Moreover, there are discordant opinions regarding the role of the three BPN satisfaction in the body satisfaction/dissatisfaction. Thøgersen-Ntoumani and Ntoumanis (2007) noted how autonomy and competence positively predicts body satisfaction, while relatedness does not emerge as a significant predictor. Stice and colleague (2001) stressed that relatedness may be more important for BI satisfaction during adolescence than adulthood because adolescents' BI is more strongly influenced by family and peers. Conversely, Chen and Liu (2021) argued that a defensive use of SNSs (i.e., unilaterally reading status updates, loggings in without posting/publishing or commenting) can occur when people feel disconnected from others. This phenomenon can be explained based on the compensatory patterns of needs frustration, in which for the relatedness-frustrated individual, SNS use is motivated by the desire for belongingness within supportive relations and social closeness (Grieve, Indian, Witteveen, Tolan, & Marrington, 2013). Similarly, social support is a buffer against body dissatisfaction (Stice et al., 2001). Indeed, the interpersonal context can foster individual relationships through behaviors such as acknowledgment, caring, and support (relatedness supportive) or, conversely, can hinder individual relationship through behaviors of disinterest and a lack of empathy (relatedness thwarting) (Bartholomew, Ntoumanis, & Thorgenson-Ntoumani, 2009; Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017; Sheldon & Filak, 2008; Buzzai et al., 2021). Supportive interpersonal behaviors are positively related to BPN satisfaction; conversely, interpersonal behaviors that thwart promote PBN frustration (Rocchi et al., 2017; Buzzai et al., 2022).

Therefore, feeling self-determined and supported are conditions that arise out of satisfying needs for autonomy, competence, and relatedness (Vansteenkiste & Ryan, 2013), and thus BPN fulfillment may be an underlying factor that protects against the harmful effects of viewing BI ideals and body dissatisfaction.

1.1 The present study

Previous studies have shown that SNSs (e.g., Facebook and Snapchat) impacts users' psychological well-being, leads to a low body satisfaction (Hendrickse et al., 2017; Kuss & Griffiths, 2017; Ho et al., 2017; Sherlock & Wagstaff, 2019), and are associated with a higher risk of body image-related disorders (Holland & Tiggemann, 2016; Slater et al., 2017; Griffiths, 2018; Wick & Kelly, 2020). Despite emerging evidence linking SNSs to BI and the implications of negative BI on health and well-being, there is limited evidence to date that explores the relationship between maladaptive use of a particular SNS like Instagram and body dissatisfaction among young adults, who are the most active Instagram users. Moreover, to the best of our knowledge, there are not studies that explore the link between maladaptive Instagram use, BPN satisfaction/frustration, needs-supportive/needs-thwarting interpersonal behaviors, and body dissatisfaction.

In order to gain a better understanding of how maladaptive Instagram use is related to body dissatisfaction, it has been suggested to take the potential mediating variables into account. Previous research on the relation between SNSs (e.g., Facebook and Snapchat) and BI have provided indications for several key psychological variables that may be involved in the relationship between SNSs and body dissatisfaction, such as individual's basic psychological needs (Pelletier et al., 2004; Tylka, & Kroon Van Diest, 2015; Barron, Krumrei-Mancuso, & Harriger, 2021).

To the best of our knowledge, no study has investigated, specifically, the mediating role of individual's basic psychological needs in accordance with a dual-process model (Jang, Kim, & Reeve, 2016; Vansteenkiste & Ryan, 2013).

Moreover, no previous studies have ever investigated the role of needs-supportive/needs-thwarting interpersonal behaviors in the relationship among maladaptive Instagram use and body dissatisfaction. In particular, the interpersonal context can encourage individual's self-direction, support his/her competence using positive feedback, and foster his/her relationship through caring and supportive behaviors (needs-supportive interpersonal behaviors) or, conversely, exercise personal control, hinder individual's competence through behaviors that lead he/she to doubt about their competence and capacity, and manifest behaviors of disinterest

and lack of empathy (needs-thwarting interpersonal behaviors) (Bartholomew, Ntoumanis, & Thorgenson-Ntoumani, 2009; Rocchi, Pelletier, Cheung, Baxter, & Beaudry, 2017; Sheldon & Filak, 2008; Buzzai, Filippello, Caparello, & Sorrenti, 2022).

These variables, understood in a self-determination framework, may protect against sociocultural message of perfect body image on SNSs. Instagram, in contrast to other SNSs, is uniquely focuses on image-based content. As such, it is likely that Instagram differs from other social media in term of mediating processes linking maladaptive Instagram use to BI-related problems, reflecting the need for a study on the relationship between maladaptive Instagram use and body dissatisfaction.

In light of these considerations, the main purpose of this study is to investigate the mediating role of BPN satisfaction/frustration and needs-supportive/needs-thwarting interpersonal behaviors on the relationship between young adults' maladaptive Instagram use and body dissatisfaction. It is hypothesized that maladaptive Instagram use is positively associated with BPN frustration and needs-thwarting interpersonal behaviors and, in turn, with high body dissatisfaction, while maladaptive Instagram use is negatively associated with BPN satisfaction and needs-supportive interpersonal behaviors and, in turn, with low body dissatisfaction. Furthermore, it is hypothesized that there are connections between the examined variables: Maladaptive Instagram use could be indirectly related to body dissatisfaction through BPN satisfaction/frustration and needs-supportive/needs-thwarting interpersonal behaviors; that is, maladaptive Instagram use could be positively related to BPN frustration and needs-thwarting interpersonal behavior and thus be positively related to body dissatisfaction. Moreover, maladaptive Instagram use is negatively related to BPN satisfaction and needs-supportive interpersonal behaviors and thus negatively related to body dissatisfaction.

2. Method

2.1 Participants

At the present study participates a total of 525 young adults from several university located in different Italian city. The mean age was 22.7 years (SD = 2.88), 93 are males (17.7%) and 432 are females (82.3%). Of this sample, 175 students (33.3%) are enrolled at the first academic years, 167 student (31.8%) at the second academic years, 87 students (16.6%) at the third academic years, 21 students (4%) at the fourth academic years and, 75 students (14.3%) are enrolled at the fifth academic years. Of this sample, 86.1% (452) is in course and 13.9% (73) is off course. Regarding students' socioeconomic status (SES) 28% of individuals belonged to a low SES (one or both parents held a lower secondary education diploma), 45.5% belonged to a

medium SES (one or both parents held a high school diploma), 26.5% belonged to a high SES (one or both parents held a university degree). Individuals with intellectual disabilities or special educational needs did not participate in the research.

All the participants have an Instagram account and they spend an average of 2.42 hour on Instagram daily (SD =.89) and publish an average of 1.24 post/stories daily (SD =.46). In the table 1 and 2 are reported respectively frequency, percentages total and cumulative of hours spent on Instagram daily and, number of post/stories published on Instagram daily.

Table 1. Frequency, percentages total and cumulative of the hours spent on Instagram daily

Hours spent on Instagram daily	Frequency	% of Total	% Cumulative
1	72	13.7 %	13.7 %
2	228	43.4 %	57.1 %
3	167	31.8 %	89.0 %
4	49	9.3 %	98.3 %
≥ 5	9	1.7 %	100.0 %

Table 2. Frequency, percentages total and cumulative of number of post/stories published on Instagram daily

Number of post/stories published on Instagram daily	Frequency	% of Total	% Cumulative
1	406	77.3 %	77.3 %
2	110	21.0 %	98.3 %
≥ 3	9	1.7 %	100.0 %

2.2 Instruments

A demographic questionnaire collected the participants' basic demographic information, including their age, gender, nationality, educational level, socioeconomic status (SES), hours spent on Instagram daily and number of post/stories published on Instagram per daily.

Instagram Maladaptive Use was measured using the modified version of the Bergen Facebook Addiction Scale (BFAS; Andreassen, Torsheim, Brunborg, & Pallesen, 2012). The modification was made by simply changing the word "Facebook" to "Instagram" (Yurdagül, Kircaburun, Emirtekin, Wang, & Griffiths, 2021). The questionnaire consisted of six items (e.g., "You use

Instagram so much that its use has had a negative impact on your work or about your studies??") on a 5-point Likert scale from "very rarely" to "very often" with scores ranging from 6 to 36. Indicating "often" or "very frequently" on at least 4 of the 6 items could be an indicator of greater risk of Instagram addiction. The BFAS has been widely used and adapted to assess problematic (i.e., addictive) use of different social media applications (Andreassen et al., 2012; Andreassen et al. 2016; Bányai, Zsila, Király, Maraz, Elekes, Griffiths, Andreassen, & Demetrovics, 2017). The reliability and validity of the BFAS have been demonstrated in previous study (Soraci, Ferrari, Barberis, Luvarà, Urso, Del Fante, & Griffiths, 2020). In this study, the scale has good internal reliabilities.

The Basic Psychological Need Satisfaction and Frustration Scale (PBNSF; Chen, et al., 2015) is used in order to assess the satisfaction and frustration of the three psychological needs in one's life in general: Autonomy Satisfaction (4 items; e.g. "I feel that my choices express who I really am"), Competence Satisfaction (4 items, e.g. "I feel capable in what I do"), Relatedness Satisfaction (4 items; e.g. "I feel that people I care about, really care about me "), Autonomy Frustration (4 items; e.g., "I feel forced to do many things I wouldn't choose to do"), Competence Frustration (4 items; e.g., "I have serious doubts about whether I can do things well"), and Relatedness Frustration (4 items; e.g., "I feel that people who are important to me are cold and distant towards me").This scale is made up of 24 items on a 5-point Likert response scale (1 = Not at all agree; 5 = Strongly agree). The reliability and validity of the BPNSF have been demonstrated in previous study (Costa, et al., 2018). In the present study Cronbach's alphas is good for all the subscales.

The Interpersonal Behaviours Questionnaire (IBQ; Rocchi et al., 2017), was used to evaluate the extent of participants who perceived other people's interpersonal behaviors as need-supportive or need-thwarting: Autonomy-Supportive (4 items; e.g., "Support my decisions"), Autonomy-Thwarting (4 items; e.g., "Impose their opinions on me"), Competence-Supportive (4 items; e.g., "Provide valuable feedback"), Competence-Thwarting (4 items; e.g., "Doubt my capacity to improve"), Relatedness-Supportive (4 items; e.g., "Is interested in what I do"), and Relatedness-Thwarting (4 items; e.g., "Do not connect with me"). The questionnaire consisted of 24 items divided into the previous six subscale. Participants were asked to indicate to what extent they agreed that "The people in my life…" displayed these behaviors, using a 7-point scale ranging (1=Do not agree at all, 7= Completely agree). The reliability and validity of the IBQ have been demonstrated in previous study (Buzzai, Sorrenti, Orecchio, Marino, & Filippello, 2020). In the present study Cronbach's alphas is good for all the subscales.

The Questionario sul Dismorfismo Corporeo (QDC; Cerea, Bottesi, Granziol, & Ghisi, 2017) was used to assessing extreme body dissatisfaction and BDD symptoms. Furthermore, it is the only one Italian self-report questionnaire specifically assessing BDD phenomenology currently available (Cerea et al., 2017). It is developed and validated on a no clinical Italian sample (Cerea et al., 2017). It is a self-report inventory made up of 40 items. Participants were asked to indicate the extent to which each statement applies to them on a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree). The questionnaire assesses the presence of behaviors associated with extreme body dissatisfaction and BDD (repetitive behaviors, mental acts, and avoidance behaviors), it also evaluates the request for cosmetic and surgical procedures and the presence of suicidal thoughts due to body image concerns. The QDC also showed high specificity and sensitivity with a cut-off point of 130, that might indicate the presence of extreme body dissatisfaction/BDD symptoms or may be at risk of developing BDD. In this study, the scale has good internal reliabilities.

2.3 Procedure

This study was performed following the recommendations of the *Ethical Code* of the *Italian Association of Psychology* (AIP) and all subjects were given written informed consent following the Declaration of Helsinki (2013). The protocol was approved by the Ethics Committee of the Centre for Research and Psychological Intervention (CERIP) of the University of Messina (protocol number: 30465). The participant provided the authorization to participate in a research project and obtained informed consent. Only participants that had informed consent signed were allowed to participate in this study. Subsequently, the participants completed the questionnaires in a single session before giving their personal informed consent. The privacy and anonymity of their answers were guaranteed. Participation required between 30 and 40 minutes.

2.4 Data Analysis

The jamovi project (The Jamovi, 2022) was used to conduct descriptive statistics, Cronbach's alpha, and correlations. RStudio (Rstudio Team, 2015) with the lavaan package (Rosseel, 2012) was used to carry out structural equation 10odelling (SEM) with latent variables. A SEM approach reduces the probability of type I errors and is superior to traditional univariate and multivariate approaches (Iacobucci, Saldanha, & Deng, 2007; Kline, 2015). Moreover, such an approach provides the possibily of specifying latent variables rather than measured variables because measured variables are assumed to be measured without error (Coffman & MacCallum,

2005). SEM with latent variables treats constructs measured by questionnaire as latent variables, and multiple indicators for all the constructs that are valuated are required. Each latent constructs' parcel consisted of the aggregated mean of group items from the questionnaire items to which participants responded based on a common scale. Parcels (groups) of items for all the constructs of the present research were used as indicators.

A parceling procedure is a measurement practice commonly used in multivariate approaches to psychometrics, particularly for use with latent variable analysis techniques (e.g., SEM). A parcel can be defined as an aggregate-level indicator comprised of the sum or average of two or more responses or items (Little, Cunningham, Shahar & Widerman, 2002). A parceling procedure has psychometric merits relative to the items. Compared with aggregate-level data, item-level data contain some disadvantages: lower reliability, lower communality, a smaller ratio of common-to-unique factor variance, and a greater likelihood of distributional violations. Moreover, items have fewer, larger, and less equal intervals between scale points than parcels do (Bagozzi & Heatherton, 1994; Kishton & Widaman, 1994; McCallum, Widaman, Zhang, & Hong, 1999; Hau & Marsh, 2004). Moreover, because fewer parameters are needed to define a construct when parcels are used, they are preferred, particularly when sample sizes are relatively small (Bagozzi & Edwards, 1998; Bagozzi & Heatherton, 1994).

Regarding the model fit, the indexes of model fit are usually more acceptable when parcels, rather than items, are modeled because of the psychometric and estimation advantages of parcels. Compared with item-level data, models based on parceled data are more parsimonious (i.e., have fewer estimated parameters both locally in defining a construct and globally in representing an entire model); have fewer chances for residuals to be correlated or dual loadings to emerge (both because fewer indicators are used and because unique variances are smaller); and lead to reductions in various sources of sampling error (MacCallum et al., 1999). Therefore, in a parceling procedure, item indicators are tools that allow one to build a measurement model for a desired and clear latent construct (Little et al., 2002). Moreover, the use of parceling procedure improves the communality across indicators, reduce random errors, increase modelling efficiency, and shows normalized distributions compared to the employ of individual items and of total scale scores (Coffman & MacCallum, 2005; Little et al., 2002; Matsunaga, 2008).

In this study we used confidence intervals of the direct and indirect effects with 5,000 bootstrap replication samples. A 95% bias-corrected CI was applied, in accordance with the recommendations of Wu and Jia (2013), Preacher and Hayes (2008), and Shrout and Bolger

(2002). Several indexes of fit were examined: the Chi-square (χ^2) value; $\chi 2/df$; the comparative fit index (CFI); the root mean square error of approximation (RMSEA) with its 90 % confidence interval (CI) (for a description of these indices, see Hair et al. 1998). The cut-off for a good model fit is achieved when the CFI values are > 0.90, and the RMSEA are < 0.08 (Kline, 2015). Gender and age were also included in this model as control variables.

3. Results

3.1 Descriptive statistics, reliability, and correlation

The means, standard deviations, skewness and, kurtosis for all measures considered in this study are indicated in Table 3. The descriptive analysis showed that scales had good symmetry and kurtosis scores. Moreover, table 3 shown means and standard deviation obtained from participants in the Questionario sul Dismorfismo Corporeo (QDC; Cerea et al., 2017). Participants' score is lower than cut-off point of 130 (Cerea et al., 2017), as such indicate the absence of extreme body dissatisfaction/BDD symptoms or the risk of developing BDD.

Table 3. Descriptive analysis. Means, standard deviations, skewness and, Kurtosis for all measures considered

					Skewness		Kurtosis	
	Means	SD	Min	Max	Skewness	SE	Kurtosis	SE
Age	22.77	2.888	18	32	0.760	0.107	0.15451	0.213
Academic Year Enrolled	2.34	1.354	1	5	0.852	0.107	-0.43303	0.213
Number of exams	1.63	0.483	1	2	-0.542	0.107	-1.71257	0.213
Academic Achievement	25.67	4.660	0	30	-4.129	0.107	20.25981	0.213
Hour spent on Instagram daily	2.42	0.899	1	5	0.418	0.107	0.00298	0.213
Number of post/stories published daily	1.24	0.468	1	3	1.690	0.107	1.93076	0.213
Autonomy Satisfaction	3.92	0.769	1.00	5.00	-0.629	0.107	0.12622	0.213
Relatedness Satisfaction	4.27	0.716	1.00	5.00	-1.202	0.107	1.64309	0.213
Competence Satisfaction	3.49	0.607	1.60	5.00	-0.442	0.107	-0.00184	0.213
Autonomy Frustration	2.38	0.985	1.00	5.00	0.743	0.107	-0.17972	0.213
Relatedness Frustration	1.79	0.859	1.00	5.00	1.312	0.107	1.34934	0.213
Competence Frustration	2.42	1.067	1.00	5.00	0.613	0.107	-0.36296	0.213
Autonomy- Supportive Interpersonal Behaviour	5.67	1.177	1.25	7.00	-0.959	0.107	0.80311	0.213

					Skewness		Kurtosis	
	Means	SD	Min	Max	Skewness	SE	Kurtosis	SE
Relatedness- Supportive Interpersonal Behaviour	5.45	1.279	1.00	7.00	-0.859	0.107	0.63484	0.213
Competence- Supportive Interpersonal Behaviour	5.46	1.170	1.00	7.00	-0.843	0.107	0.63713	0.213
Autonomy- Thwarting Interpersonal Behaviour	2.43	1.389	1.00	7.00	1.065	0.107	0.58845	0.213
Relatedness- Thwarting Interpersonal Behaviour	2.33	1.366	1.00	7.00	1.196	0.107	1.05670	0.213
Competence- Thwarting Interpersonal Behaviour	1.85	1.292	1.00	7.00	1.926	0.107	3.41659	0.213
Maladaptive Instagram Use	2.04	0.889	1.00	4.83	0.997	0.107	0.38115	0.213
Body Dissatisfaction-Means	2.78	1.159	1.02	6.80	0.701	0.107	-0.30209	0.213
Body Dissatisfaction-Total	111.02	46.344	41	272	0.701	0.107	-0.30209	0.213

Note. N= 525.

Cronbach's alpha values and correlations for all measures considered in this study are indicated in Table 4. The internal reliability for all measures ranged from .80 to .95. The correlations showed that all three dimensions of basic psychological needs satisfaction (autonomy, competence and relatedness) are positively correlated with all three dimensions of needs-supportive interpersonal behaviors (autonomy, competence and relatedness). Instead, both of the three basic psychological needs satisfaction and needs-supportive interpersonal behaviors, are negatively correlated with all three needs-thwarting interpersonal behaviors, maladaptive Instagram use, and body dissatisfaction.

Both the basic psychological needs frustration and needs-thwarting interpersonal behaviors, are positively related to maladaptive Instagram use and body dissatisfaction. The hours spent on Instagram daily are negatively correlated with autonomy-thwarting interpersonal behaviors. Instead, there is a positive relationship between hours spent on Instagram daily and, maladaptive Instagram use and body dissatisfaction. Moreover, there is a positive relationship between the number of post/stories published daily and autonomy need satisfaction, relatedness need-supportive interpersonal behavior, maladaptive Instagram use and hours spent on Instagram daily. Instead, there is a negative relationship between the number of post/stories published daily and competence need frustration.

Table 4. Correlations and internal reliability of all measures considered

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Autonomy Satisfaction	α= .80														
2. Relatedness Satisfaction	.34 ***	α= .83													
3. Competence Satisfaction	.43 ***	.27 ***	α= .92												
4. Autonomy Frustration	-.46 ***	-.22 ***	-.26 ***	α= .84											
5. Relatedness Frustration	-.31 ***	-.54 ***	-.25 ***	.40 ***	α= .85										
6. Competence Frustration	-.43 ***	-.29 ***	-.49 ***	.49 ***	.50 ***	α= .87									
7. Autonomy- Supportive Interpersonal Behaviour	.46 ***	.45 ***	.29 ***	-.46 ***	-.41 ***	-.40 ***	α= .91								
8. Relatedness- Supportive Interpersonal Behaviour	.37 ***	.53 ***	.28 ***	-.28 ***	-.50 ***	-.32 ***	.56 ***	α= .92							
9. Competence- Supportive Interpersonal Behaviour	.42 ***	.42 ***	.35 ***	-.33 ***	-.35 ***	-.38 ***	.63 ***	.65 ***	α= .82						
10. Autonomy- Thwarting Interpersonal Behaviour	-.31 ***	-.29 ***	-.21 ***	.55 ***	.41 ***	.43 ***	-.60 ***	-.34 ***	-.40 ***	α= .90					
11. Relatedness- Thwarting Interpersonal Behaviour	-.33 ***	-.50 ***	-.17 ***	.50 ***	.60 ***	.45 ***	-.51 ***	-.53 ***	-.44 ***	.60 ***	α= .90				
12. Competence-Thwarting Interpersonal Behaviour	-.29 ***	-.37 ***	-.16 ***	.43 ***	.43 ***	.44 ***	-.52 ***	-.42 ***	-.51 ***	.63 ***	.63 ***	α= .93			
13. Maladaptive Instagram Use	-.24 ***	-.13 **	-.13 **	.27 ***	.27 ***	.31 ***	-.19 ***	-.13 **	-.12 **	.21 ***	.26 ***	.17 ***	α= .81		
14. Body Dissatisfaction	-.33 ***	-.31 ***	-.26 ***	.37 ***	.44 ***	.51 ***	-.35 ***	-.32 ***	-.24 ***	.38 ***	.43 ***	.36 ***	.31 ***	α= .95	
15. Hour spent on Instagram daily	-.04	-.06	.04	-.03	-.02	-.01	-.02	.00	.01	-.11 *	-.06	-.08	.37 ***	.10 *	
16. Number of post/stories published daily	.14 **	.02	.06	-.07	-.05	-.10 *	-.00	.10 *	.04	-.03	-.07	.00	.14 ***	-.02	.21 ***

Note: N= 525, * p<.05 **p <.01, ***p <.001.

3.2 Mediation

Structural Equation Modeling (SEM) was employed with latent variables to investigate, in accordance with a dual-process model (Vansteenkiste & Ryan, 2013), the mediating role of basic psychological needs frustration/satisfaction and needs-supportive/needs-thwarting interpersonal behaviors on the relationship between Instagram Maladaptive Use and, Body Dissatisfaction. The hypothesized mediation path model with direct and indirect paths is shown in Figure 1. Latent mediation variables are constructed in accordance with a dual-process model, BPN frustration/satisfaction as well as needs-supportive/needs-thwarting interpersonal behaviors refers to all three domains of competence, autonomy and relationship. Estimation of this model did yield a good fit $\chi^2_{(120)}$ =361.79, p=.000, CFI = .976, SRMR = .046, RMSEA (90%CI) = .062 (.055, .069).

Results showed that Need Satisfaction was negatively predicted by Instagram Maladaptive Use (β = -.24, p <.001). Instead, Need Frustration was negatively predicted by Instagram Maladaptive Use (β = .37, p <.001). The Need-Supportive Interpersonal Behavior was negatively predicted by Instagram Maladaptive Use (β = -.16, p <.01). Instead, Need Thwarting Interpersonal Behavior was positively predicted by Instagram Maladaptive Use (β = .23, p <.001). Regarding the Body Dissatisfaction, it was positively predicted by Need Frustration (β = .50, p <.001).

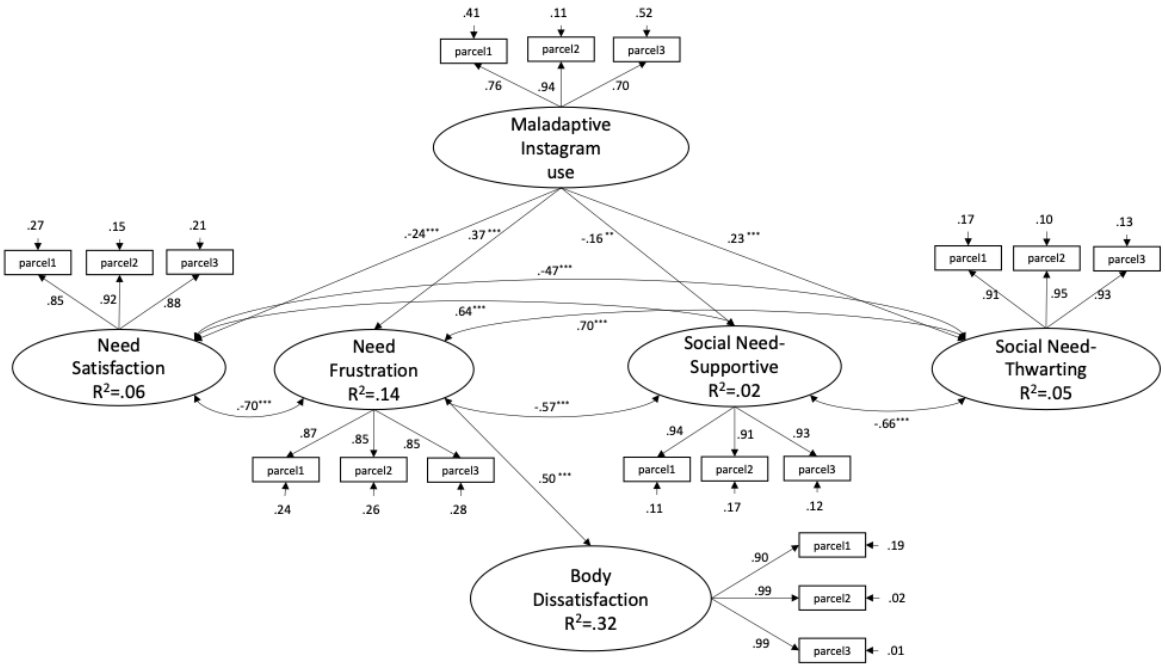

Figure 1. Full mediation models. Note: ***p ≤.001, **p ≤ .01, *p ≤ 05. Coefficients shown are standardized direct path coefficients. The insignificant paths have not been inserted.

Examination of the indirect effects from Instagram Maladaptive Use to Body Dissatisfaction, were examined (Table 5). The results showed the following significant indirect effects: from Maladaptive Instagram Use to Body Dissatisfaction via Need Frustration (β = .19, p <.001).

The SEM analysis showed that the indicators were significant for each latent variable, with scores ranging from .70 to .99.

Table 5. Path estimates, SEs and 95% Cis

	β	B-SE	Lower bounds (BC) 95% CI	Upper bounds (BC) 95% CI
Direct Effect				
Maladaptive Instagram Use →Basic Psychological Need Satisfaction	-.24	.04	-.28	-.12
Maladaptive Instagram Use →Basic Psychological Need Frustration	.40	.05	.27	.47
Maladaptive Instagram Use → Social Need-Supportive Interpersonal Behaviors	-.16	.07	-.39	-.08
Maladaptive Instagram Use → Social Need-Thwarting Interpersonal Behaviors	.23	.09	.18	.57
Basic Psychological Need Satisfaction → Body Dissatisfaction	-.06	.16	-.45	-21
Basic Psychological Need Frustration → Body Dissatisfaction	.50	.16	.51	1.17
Social Need-Supportive Interpersonal Behaviors → Body Dissatisfaction	.06	.09	-.12	.25
Social Need-Thwarting Interpersonal Behaviors → Body Dissatisfaction	.04	.10	-.15	.24
Maladaptive Instagram Use → Body Dissatisfaction	.07	.07	-.03	.27
Indirect effect via Basic Psychological Need Satisfaction				
Maladaptive Instagram Use → Body Dissatisfaction	.01	.03	-.04	.10
Indirect effect via Basic Psychological Need Frustration				
Maladaptive Instagram Use → Body Dissatisfaction	.19	.07	.18	.47
Indirect effect via Social Need-Supportive Interpersonal Behaviors				
Maladaptive Instagram Use → Body Dissatisfaction	-.01	.02	-.07	.02
Indirect effect via Social Need-Supportive Interpersonal Behaviors				
Maladaptive Instagram Use → Body Dissatisfaction	.01	.04	-.06	.09

4. Discussion and Conclusion

Several studies have linked both time investment on SNS and frequency of SNS use to a lower psychological well-being and poorer body image (Holland & Tiggemann, 2016; Faelens et al., 2021; Vandenbosch, Fardouly, & Tiggemann, 2022). Due to the fact that Instagram is a rather novel SNS and entirely focused on image-based content, there is little research that investigates the process linking maladaptive Instagram use to BI outcome. Several key psychological variables may be involved in the relationship between SNSs and body dissatisfaction (Pelletier et al., 2004; Tylka, & Kroon Van Diest, 2015; Hosseini & Padhy, 2019). The individuals' basic psychological needs and needs-supportive/needs-thwarting interpersonal behaviors have been conceptualized as mediating variables. In particular, the satisfaction of individuals' BPN (autonomy, competence, and relatedness) may have a protective function against image of perfect BI published on SNSs (Pelletier et al., 2004; Tylka, & Kroon Van Diest, 2015; Gattario & Frisén, 2019) and are predictive of less body dissatisfaction (Thøgersen-Ntoumani et al., 2010). Conversely, people who perceive that their BPN were unsatisfied experience greater body dissatisfaction (Edwards et al., 2016). Therefore, the aim of this study was to expand the knowledge of the factors that can influence the relationship among the variables considered and provide preliminary support for the indirect relationship between maladaptive Instagram use and body dissatisfaction through BPN satisfaction/frustration and needs-supportive/needs-thwarting interpersonal behaviors among young adults from with a self-determination theory framework.

The results partly confirmed our hypotheses. Indeed, although in the simple correlation matrix the variables considered are related to each other, some associations lose significance in the full model. In particular, from the data obtained in the correlation analysis, it can be observed that individuals who perceived their BPN as satisfied and interpersonal context as supportive of their needs tend to report a minor maladaptive Instagram use and lower body dissatisfaction. In contrast, individuals who perceived their BPN as frustrated and interpersonal context as thwarting of their needs tend to report major maladaptive Instagram use and high body dissatisfaction.

Based on the data obtained through SEM with latent variables, this study found a negative direct relationship between maladaptive Instagram use and BPN satisfaction and needs-supportive interpersonal behaviors. In contrast, there is a positive direct relationship between maladaptive Instagram use and, BPN frustration and needs-thwarting interpersonal behaviors. Moreover, there is only a positive, direct relationship between BPN frustration and body dissatisfaction.

This finding was unexpected, as previous studies have shown that a higher BPN satisfaction predicts less body dissatisfaction (Thøgersen-Ntoumani & Ntoumanis, 2007) and social needs support is a buffer against body dissatisfaction (Stice et al., 2001). As such, feeling self-determined and supported by an interpersonal context leads to the satisfaction the needs for autonomy, competence and relatedness, and thus BPN contentment may be an underlying factor that protects against the harmful effects of being continuously exposed to ideal BI (Brichacek, Neill, & Murray, 2018). These data can be explained considering that, in accordance with a dual process model, this finding takes into account the "dark" side and the "bright" side of BPN as two different pathways. Therefore, a perceived interpersonal context that is autonomy supportive promotes the "brighter" side because it increased BPN satisfaction. Conversely, a perceived interpersonal context that is thwarting promotes the "darker" side, activated by the experience of needs frustration (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011; Gunnell, Crocker, Wilson, Mark, & Zumbo, 2013; Haerens et al., 2015; Ng, Ntoumanis, Thogersen-Ntoumani, Stott, & Hindle, 2013; Unanue, Dittmar, Vignoles, & Vansteenkiste, 2014). Therefore, a feeling of needs neglect or a lack of opportunities for need satisfaction are related to a sense of needs dissatisfaction. Whereas, needs frustration is related to an active needs thwarting (Costa, Ntoumanis, & Bartholomew, 2015; Buzzai, Filippello, Costa et al., 2021; Buzzai, Sorrenti et al., 2021; Buzzai, Filippello, Caparello & Sorrenti, 2022).

Thøgersen-Ntoumani and Ntoumanis (2007) explored how autonomy and competence positively predict body satisfaction, while relatedness did not emerge as a significant predictor. Therefore, is possible to hypothesize that autonomy, relatedness and competence needs can have a different role in the relationship between maladaptive Instagram use and body dissatisfaction. After all, it is almost impossible to analyze all the components of the dimensions investigated individually, as it would imply attention to both personal and environmental variables. Such an analysis would require an excessively complex model, which would make the data too complex and difficult to interpret. The indirect relationship partially supported the hypotheses; our findings showed the role of only BPN frustration in the indirect relationship between maladaptive Instagram use and body dissatisfaction. This phenomenon can be explained considering that individuals who demonstrate maladaptive Instagram use (a long time spent daily on the app, an excessive concern for social media, an inability to control behavior, and a high frequency in checking the app) are more likely to perceived their BPN as frustrated (Hendrickse et al., 2017; Sherlock & Wagstaff, 2019). When the interpersonal context is perceived as particularly unsupportive, it thwarts the feeling of autonomy, relatedness, and competence. As such, it leads individuals to perceive their self-worth in terms of unstable

external factors imposed by social ideal images by SNSs (Pelletier et al., 2004), leading them to not feel accepted by other people. This makes young adults more susceptible to the negative effect of viewing thin-ideal BI, which suggests that maladaptive Instagram use may have relatively unique associations with body dissatisfaction that could be explained by the mediation role of needs frustration.

Therefore, feeling self-determined and supported are conditions that arise out of satisfying the needs for autonomy, competence, and relatedness (Vansteenkiste & Ryan, 2013), and thus BPN fulfillment may be an underlying factor that protects against the harmful effects of viewing BI ideals and body dissatisfaction. However, within the indirect relationship between maladaptive Instagram use and body dissatisfaction, BPN satisfaction mediation was not found.

Taken together, these results are consistent with previous studies. High social media use is associated with lower body satisfaction (Holland & Tiggemann, 2016; Saiphoo & Vahedi, 2019); this is particularly true for newer SNSs such as Instagram, which reinforces the importance of appearance ideals and BI comparisons. Specifically, individuals with lower body satisfaction may seek out gratification from social media, thus increasing their frequency of use. Although evidence regarding the direction of the SNSs and body satisfaction relationship is limited, empirical research supports bidirectionality through direct and indirect effects (Wang, Xie, Fardouly, Vartanian, & Lei, 2019; Rousseau, Eggermont, & Erisno, 2017). Additionally, there has been little theoretically grounded research into psychological factors that explain mechanisms underlying social media effects on body satisfaction. A psychological factor considered important in explaining differences in perceived sociocultural pressure around BI is self-determination theory (Matusitz & Martin, 2013; Pelletier at al., 2004). Indeed, the satisfaction of BPN can act as a protective factor against sociocultural stereotypes of the perfect body, which helps to create an ideal BI on SNSs (Pelletier et al., 2004; Tylka & Kroon Van Diest, 2015), and offer a protective function by reducing the impact of external threats to BI, such as viewing perfect BI on SNSs (Brichacek, Neill, & Murray, 2018).

6. Limitation and future directions

This study has some limitations that should be addressed in future studies. The transversal nature of the design does not allow for causal associations. Therefore, future experimental and longitudinal studies may attempt to explore the causal direction of these associations. Furthermore, the convenience sample recruited from university students and the non-homogeneity in the number of men and women participants, preventing the generalization of the results. Therefore, is recommended that future research conduct different sampling

techniques to study a more diverse range of participants. Another limitation to take into account is the use of students' self-reports. Future studies could include other methods of data collection in addition to the self-reports, such as direct observation. Moreover, future research should consider how autonomy, relatedness, and competence can have a different weight in the relationship between maladaptive Instagram use and body dissatisfaction. For this reason, future research should consider separately both BPN for personal satisfaction/frustration and the environments that thwart or support BPN.

Despite these limitations, the present study makes an important contribution to the literature by expanding the knowledge of the factors that can influence the relationship among the variables considered and providing preliminary support for the indirect relationship between maladaptive Instagram use and body dissatisfaction through BPN satisfaction/frustration and needs-supportive/needs-thwarting interpersonal behaviors among young adults. Moreover, this study is one of the first to investigate the relationship between maladaptive Instagram use, BPN satisfaction and frustration and body dissatisfaction, considering also needs-supportive and needs-thwarting interpersonal behaviours. Therefore, further studies are needed to further investigate these associations.

Our results extend the knowledge of the factors that can influence body dissatisfaction, with important application implications, especially from a preventive point of view of problems that can have negative repercussions on individuals' functioning and health.

It would be useful to educate young adult about the risk of idealized BI that come from engaging in a maladaptive Instagram use through a media literacy program and, ideally, before young adult become problematic users of Instagram and other SNSs. Media literacy programs are effective in protecting and preventing idealized BI among young adults (Espinoza, Penelo, & Raich, 2013; McLean, Paxton, & Wertheim, 2013; Guest, Costa, Williamson, Meyrick, Halliwell, & Harcourt, 2019) and are an evidence-based prevention strategy against body dissatisfaction. However, our results do suggest that it may be useful to incorporate information about the specific ways in which psychological needs act in the relationship between maladaptive Instagram use and BI into media literacy programs that target young adult who are at risk of body dissatisfaction and who demonstrate maladaptive and problematic Instagram use (McComb, Gobin, & Mills, 2021). Consequently, it is necessary to inform the general public via informational campaigns and to implement psychoeducation interventions about possible beneficial and detrimental effects of Instagram use, with positive effects on the individuals psychological functioning and health.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the the recommendations of the Ethical Code of the Italian Association of Psychology (AIP) and all subjects were given written informed consent in accordance with the Declaration of Helsinki (2013). The protocol was approved by the Ethics Committee of the Centre for Research and Psychological Intervention (CERIP) of the University of Messina (protocol number: 30465). This article does not contain any studies with animals performed by any of the authors.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The dataset analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest statement

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contribution

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by C.C., V.V., L.C., P.F. and L.S. The first draft of the manuscript was written by C.C. and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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