

DEVELOPMENT AND VALIDATION OF THE ROMANTIC EXPERIENCE UNCERTAINTY SCALE (REUS)

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Abstract: Contemporary romantic experiences are increasingly heterogeneous, highlighting the need for instruments capable of capturing their nuanced dimensions, such as uncertainty and ambiguity. This study aimed to develop and validate a scale to measure these dimensions within adolescents' and young adults' romantic relationships. The scale development employed a sequential and multiphase design consisting of: identification of the conceptual domain and item generation through focus groups; preliminary pilot study to evaluate item clarity and relevance; item analysis and Exploratory Factor Analysis to examine underlying factor structure; Confirmatory Factor Analysis to assess psychometric properties and the test of concurrent and discriminant validity. Three main factors emerged: partners' uncertainty, relationship uncertainty and behavioral ambiguity. The resulting scale (REUS) demonstrated good internal consistency, strong model fit indices, good reliability as well as concurrent and discriminant validity, thus constituting a valid and reliable instrument to investigate uncertainty and ambiguity in adolescents' and young adults' romantic experiences.

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INTRODUCTION

Exploration in the romantic domain represents a normative major developmental task in both adolescence and young adulthood (Arnett, 2000; Connolly & McIsaacs, 2009). Nowadays, contemporary romantic relationships in these stages of life have undergone significant transformations, resulting in the emergence of multiple types of intimate relationships that testify the increasing heterogeneity and complexity in their nature (for a review, see Colombo et al., 2023). This may be ascribable to cultural changes (e.g., a strong process of individualization) and to the advent of Social Networking Sites (SNS) and dating apps that have drastically altered the romantic landscape, modifying relationships' construction and maintenance dynamics (e.g., Gibbs et al., 2011; Goldberg et al., 2022; Moreira et al., 2021; Rus & Tiemensma, 2017). Indeed, online platforms play a significant role in shaping romantic relationships, influencing them both positively and negatively. For instance, on one hand, they can facilitate self-disclosure more easily than in face-to-face interactions and support the maintenance of long-distance relationships. However, on the other hand, they may increase ambivalence and the risk of misinterpretation, potentially fostering negative emotions and contributing to conflict (e.g., Lenhart & Duggan, 2014; Vaterlaus et al., 2018).

Within this scenario, several studies (e.g., James-Kangal, 2020; Knobloch & Solomon, 1999) have begun to investigate relational uncertainty and ambiguity, which frequently seem to constitute a core element in adolescents' and young adults' romantic experiences, potentially affecting individuals' psychological and relational well-being and psychosocial adjustment (e.g., Draucker et al., 2012; James-Kangal, 2020; Knobloch & Solomon, 2003; Stanley et al., 2017).

Relational uncertainty has been primarily conceptualized by Knobloch and Solomon (1999) as the individual's degree of confidence in one's perceptions about the romantic relationship and it involves three dimensions: *self-uncertainty*, concerning doubts about one's own level of involvement in the relationship; *partner uncertainty*, namely perplexities about partner's engagement and intentions; and *relationship uncertainty*, which captures broader questions concerning the overall status and the trajectory of the relationship.

More recently, James-Kangal (2020) introduced the construct of relational ambiguity as an overarching term describing a lack of clarity regarding the current status and the future direction of the romantic relationship, and about the appropriate behaviors to adopt with the partner. Four are the dimensions from which ambiguity could stem: *own ambivalence* (i.e., unclarity about one's involvement in the relationship and about its nature); *partner ambiguity* (i.e., ambivalence regarding partner's intentions and level of involvement); *behavioral norm uncertainty* (i.e., confusion about how to act in the absence of clear norms or defined relational boundaries); and *exclusivity uncertainty* (i.e., unclear expectations concerning the degree of exclusivity and the adequate behaviors to carry out in the relationship).

Although relational uncertainty and relational ambiguity appeared to be overlapping and have been often used interchangeably in the literature, they seem to represent two distinct constructs that warrant separate

examination. As a matter of fact, a recent systematic review (Colombo et al., 2023) highlighted that relational uncertainty seems to relate more to the thoughts and the emotions regarding one's own commitment and affective involvement, which might emerge in response to ambiguous circumstances or behaviors enacted by the partner. Conversely, relational ambiguity seems to regard more the situations and the behaviors through which uncertainty is manifested (e.g., inconsistent or contradictory actions that hinder a clear understanding of partner's intentions and feelings).

These two constructs have been investigated adopting heterogeneous methodological approaches. Indeed, some studies privileged qualitative methods, using the Interpretative Phenomenological Analysis (e.g., Draucker et al., 2012) or the Grounded Theory (e.g., Vallade et al., 2016), while others employed a quantitative approach, using different measurement scales (e.g., *Relational Ambiguity Scale*, James-Kangal, 2020; *Relational Uncertainty Measure*, Knobloch & Solomon, 1999; *Commitment Uncertainty Short Scale*, Stanley & Rhoades, 2011). Specifically focusing on the scales used in the literature, although some of them have been largely employed over the years, they seem to exhibit limitations that need to be addressed (Colombo et al., 2023).

The *Relational Uncertainty Measure* (RUM; Knobloch & Solomon, 1999) is based on the Uncertainty Reduction Theory (URT; Berger & Calabrese, 1975; Berger & Bradac, 1982), a communication theorization that attempts to explain how to reach an understanding during an interpersonal exchange with strangers and the role played by uncertainty while communicating during initial encounters. Although the authors (Knobloch & Solomon, 1999), following the URT, tried to capture the nuances of uncertainty within intimate relationships, they did not consider the broader and more specific literature on romantic relationships, which are characterized by distinctive features, different from the general interpersonal relationships. Moreover, even though authors included participants with various levels of emotional commitment, the majority of the sample reported to have a relationship characterized by emotional attachment, love and desire for marriage, thus mainly comprising individuals in a stable and solid relationship.

Similarly, the *Commitment Uncertainty Short Scale* (CUSS; Stanley & Rhoades, 2011; Owen et al., 2014) was lately developed to specifically investigate uncertainty in well-established and exclusive relationships, in order to assess the degree to which partners intend to commit to the relationship. This limits its applicability to a more heterogeneous sample in younger populations, that may be involved in different romantic experiences (e.g., hooking up, dating not exclusively...), not necessarily stable and committed.

The *Relational Ambiguity Scale* (RAS; James-Kangal, 2020) was developed to specifically measure ambiguity in undefined or uncommitted romantic and sexual experiences only among emerging adults. As such, it primarily focuses on the early stages of a relational involvement (e.g., "talking", "seeing each other", "hanging out", "dating") or on uncommitted relationships (e.g., "hooking up", "friends with benefits"), thus excluding other relationship stages, in which ambiguity may also occur.

Since the above-mentioned measures have been developed and used on young adult and/or adult samples, they may not fully capture the complexity and nuances of contemporary romantic relationships in adolescence and young adulthood. This represents a gap in the literature, considering that some qualitative studies (e.g., Draucker et al., 2012; Len-Ríos et al., 2016; Rowley & Hertzog, 2016) highlighted that these dimensions frequently seem to constitute a predominant feature in adolescents' romantic and sexual relationships. Furthermore, currently, there are no scales assessing uncertainty and ambiguity in romantic relationships in Italy.

Moreover, these dimensions were found to be positively related to dating violence (e.g., Draucker et al., 2012; Fernet et al., 2021). Since in the Italian context recent prevalence data revealed high rates of both victimization and perpetration of violence (e.g., Cucci et al., 2020; Tomaszewska & Schuster, 2021; Cucci et al., 2024), it appears to be crucial to have a measure investigating uncertainty and ambiguity as potential predictors of conflict and violence.

In light of these considerations, by filling an important gap in the current research, the present study aimed to develop and validate a new scale to measure uncertainty and ambiguity within romantic relationships among Italian adolescents and young adults.

A comprehensive set of psychometric analyses was conducted to establish the Romantic Experience Uncertainty Scale (REUS) as a reliable and valid measure. This process encompassed steps such as focus groups, pilot test, factor analysis, and validation. The use of the Romantic Experience Uncertainty Scale will contribute to a more comprehensive understanding of the role played by uncertainty and ambiguity in contemporary youths' romantic and sexual experiences and of the associated potential individual and relational outcomes.

METHOD

The present study included two phases. The first phase (Step 1) focused on construct conceptualization and items development, whereas in the second one (Step 2, 3, 4) the factor structure and psychometric properties were determined, and the scale was validated.

Step 1. Initially, using a qualitative methodology, adolescents' and young adults' perceptions of uncertainty and ambiguity within romantic relationships were explored in order to identify the pool of items for the

Romantic Experience Uncertainty Scale. The conduction of focus groups (Wilkinson, 2004) was carried out to collect the opinions, perceptions, and representations of the participants on the topic by promoting a group discussion, which was facilitated by the guidance of a moderator. The focus group outline was created based on a comprehensive review of the literature on uncertainty and ambiguity. Through a convenient sampling technique, a sample of 25 adolescents (12 males and 13 females, age range of 15-18 years) and 47 young adults (19 males and 28 females, age range of 19-30 years), who voluntarily decided to participate in the study, were recruited. 11 focus groups were conducted online (4 with adolescents and 7 with young adults) by an expert researcher, separately for sex. Each focus group session lasted, on average, about two hours. The study began with a brief introduction, highlighting the aim and ensuring confidentiality and anonymity to each participant. Then, participants were invited to answer questions concerning the following aspects: the meaning attributed to the dimensions of uncertainty and ambiguity within romantic relationships asking also to provide concrete examples (e.g., situations and/or behaviors...), the associated emotions and feelings, the perceived motivations, the potential consequences and/or related positive aspects. Throughout the discussion, participants were encouraged to provide specific examples and elaborate their ideas, promoting dialogue and confrontation among the group members. Participants were recruited until data saturation was reached, namely the stage in data collection and analysis where additional information leads to little or no changes in the codebook (Guest et al., 2006). Participants' responses were audio-recorded and successively transcribed verbatim in an anonymous form. Informed consent was obtained from all individual participants included in the study for audio-recording. Subsequently, the transcripts were analyzed to uncover recurring themes and patterns. Following a thorough analysis, a list of 78 items was generated. The items were meant to globally capture all the facets of uncertainty and ambiguity. Careful attention was paid to preserve participants' original sentences and meanings during this procedure.

Therefore, for the item generation, the deductive and inductive methods have been used: through a literature review, assessment of existing scales and responses of individuals to focus groups, the domains and the questions to assess uncertainty and ambiguity have been identified

Step 2. After generating the initial pool of items of the Romantic Experience Uncertainty Scale, the researchers tested face validity with 31 participants, both adolescents and young adults (14 males and 17 females, age range of 15-30 years). Thus, they were given the list of 78 items together with the instructions and a 6-point Likert scale hypothesized to rate the statements (1 = *not at all*, 2 = *slightly*, 3 = *rather no than yes*, 4 = *rather yes than no*, 5 = *very much*, 6 = *extremely*). Through a series of open-ended questions, participants were asked if the instructions and items were adequate to measure the construct, clear and easy to understand. Additionally, experts in the field of romantic relationships were consulted to assess the pertinence and goodness of the items. Through this double process 28 items were eliminated and 50 were retained. Then, the scale was named Romantic Experience Uncertainty Scale.

Step 3. The 50-items scale was administered to a sample of 495 Italian adolescents and young adults and data were analyzed. More specifically, item analysis and Exploratory Factor Analysis (EFA) were performed to evaluate item quality and identify the Romantic Experience Uncertainty Scale underlying factor structure, eliminating poorly performing items. Additionally, reliability analyses, including Cronbach's alpha coefficients, were conducted to assess the internal consistency of the extracted factors. After this process, the scale consisted of 26 items, divided into three factors.

Step 4. A survey was administered to a sample of 415 Italian adolescents and young adults, including the Romantic Experience Uncertainty Scale (REUS) and other scales and/or items ad hoc. During this step, Confirmatory Factor Analysis (CFA) was conducted to confirm the factor structure and remove items that did not show adequate fit. Moreover, validity was tested.

Participants

The samples used in Steps 3 and 4, on which EFA and CFA were respectively conducted, are described below.

Literature recommendations were followed to determine a priori the sample size required to obtain an acceptable level of statistical power. More specifically, for the EFA N:p ratios traditionally used are 5:1 and 10:1 (Boateng et al., 2018; Kyriazos, 2018), while for the CFA the commonly suggested ratio is 20:1 (the minimum required is 10:1) (Kyriazos, 2018; Schumacker & Lomax, 2015).

Step 3. 1014 participants accessed the survey online. Of these, 420 did not meet the inclusion criteria (currently dating or having a romantic relationship) and 108 had not completed the Romantic Experience Uncertainty Scale. Thus, the final sample consisted of 495 participants (59% females), aged between 16 and 30 years ($M_{age} = 22.88$; $SD = 4.22$). As concerns sexual orientation, 89.1% of participants identified themselves as heterosexual, 5.6% as bisexual, and 5.3% as homosexual. Regarding the typology of their romantic involvement, 79.8% of participants had a romantic relationship and 20.2% selected to be dating someone. The length of their romantic relationships was 22.84 months ($SD = 26.41$) and most of the sample considered their relationship as very important (61.6%).

Step 4. 976 participants accessed the survey online, 312 did not meet the inclusion criteria (currently dating or having a romantic relationship) and 249 had not completed the Romantic Experience Uncertainty Scale. The final sample consisted of 415 participants (71.1% females), aged between 16 and 30 years ($M_{age} = 20.94$;

SD= 3.82). Concerning sexual orientation, 93.7% of the sample described to be heterosexual, 2.4% to be bisexual, and 3.9% to be homosexual. Regarding the type of the romantic relationship, 75.4% were in a romantic relationship while 24.6% were dating someone. The mean duration of the romantic relationship was 20.35 months (SD= 22.40) and the majority of them described their relationship as very important (66.3%).

Procedure

After obtaining approval from the Ethical Commission of the Università Cattolica del Sacro Cuore di Milano, the process of data collection began.

The present study employed a sequential design consisting of four steps and utilized a mixed-method approach.

In Step 1 and 2, participants were recruited using a convenience sampling technique. Adolescents and young adults interested in the research were asked for an email address at which they could be contacted to receive study-related information and the consent form. In the case of minor adolescents, they were asked to provide the email contact of a parent, with whom the researchers could communicate. Parents were asked to return, in response to the email received, a copy of the informed consent completed and signed. Only adolescents whose consent form was signed by both parents were eligible to take part in the study. Adolescents aged 18 or above, on the other hand, were allowed to provide the consent themselves. As concerns young adults, they were sent an email containing a brief description of the study along with the informed consent form. To participate, they were required to sign the consent form and return a scanned copy via email to the researchers.

In Step 3 and 4, adolescents were recruited by contacting some high school principals, who were provided with a letter introducing the study. Upon obtaining the principals' consent, specific classes were selected. In order to participate, minor adolescents had to return the informed consent duly signed by both parents, while adolescents aged 18 years or older were allowed to autonomously provide the consent. The administration of the survey took place in the school computer lab under the supervision of a researcher. Young adult participants were recruited through snowball sampling and by posting a message on social networks. After filling an online consent form, they voluntarily completed an online survey.

Instruments

Socio-demographic information. Each participant completed items on socio demographic variables concerning gender, age, nationality, region of residence and educational qualification (one's own or that of the parents in case of adolescent participants).

Characteristics of the romantic relationship. Through a series of ad hoc items, participants were asked to indicate their relationship status, the relationship duration, the possible presence of a long-distance relationship, and the perceived importance of the relationship (e.g., *"What is your current relationship status?"*).

Items ad hoc on breadcrumbing, orbiting and ghosting. Participants were invited to indicate the frequency of engagement in the following behaviors: breadcrumbing, namely the action of digitally sending flirtatious yet non-committal messages, either to maintain minimal connection or to sustain the other's interest post-breakup (e.g., Rodríguez-García et al., 2020); orbiting, a disengagement practice involving sudden disappearance, yet marked by contradictory behaviors, such as continuing to follow the ex-partner on social media and occasionally reacting to their posts (e.g., Pancani et al., 2022); and ghosting, the sudden and complete avoidance of online and offline interaction with the partner (Kay & Courtice, 2022). The items were the following: *"Have you ever ghosted your partner/someone you were dating?"*, *"Have you ever engaged in breadcrumbing toward your partner/someone you were dating?"*, *"Have you ever engaged in orbiting toward your partner/someone you were dating?"*. These items were used to establish the concurrent validity of the newly developed Romantic Experience Uncertainty Scale.

Network Relationships Inventory (NRI; Furman & Buhrmester, 1985; Italian validation of Guarnieri & Tani, 2011), to evaluate the perceived relationship quality. The NRI, indeed, measures the perception of relationship quality with others (i.e., mother, father, peers and romantic partner). Nevertheless, in the present study participants were asked to complete the scale with reference to their current romantic partner. It consists of 36 items divided into 11 subscales: Satisfaction (e.g., *"How satisfied are you with your relationship?"*, $\alpha = .90$), Union (e.g., *"How certain are you that your relationship will last despite conflicts?"*, $\alpha = .93$), Companionship (e.g., *"How often do you spend free time with this person?"*, $\alpha = .70$), Intimacy (e.g., *"How often do you share secrets and private feelings with this person?"*, $\alpha = .85$), Instrumental aid (e.g., *"How much does this person help you figure out or fix things?"*, $\alpha = .78$), Affection (e.g., *"How much does this person really care about you?"*, $\alpha = .88$), Nurturance (e.g., *"How much do you protect and look out for this person?"*, $\alpha = .80$), Enhancement of worth (e.g., *"How much does this person treat you like you are good at many things?"*, $\alpha = .79$), Punishment (e.g., *"How much does this person punish you?"*, $\alpha = .81$), Conflict (e.g., *"How often do you and this person get mad at or get in fights with each other?"*, $\alpha = .87$), and Antagonism (e.g., *"How much do you and this person get on each other's nerves?"*, $\alpha = .84$). Participants answer on a 5-point Likert scale ranging from 1 (never) to 5 (always). The NRI was used to establish the discriminant validity of the newly developed Romantic Experience Uncertainty Scale.

Experiences in Close Relationships Scale-Revised (ECR-R; Fraley et al., 2000; Italian validation of Busonera et al., 2014), to measure the attachment towards the romantic partner. The scale comprises 36 items divided into two subscales: Anxiety (e.g., *"I often worry that my romantic partner doesn't really love me"*, $\alpha = .86$) and Avoidance (e.g., *"I prefer not to show a partner how I feel deep down"*, $\alpha = .87$). Participants rate their agreement on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The ECR-R was used to establish the discriminant validity of the newly developed Romantic Experience Uncertainty Scale.

Data Analysis

In Step 3, data were analyzed utilizing SPSS Version 29. Firstly, to assess the psychometric properties of the scale, an item analysis was conducted to eliminate the items that could have generated a distortion. More specifically, attention was focused on means, standard deviations, kurtosis and skewness. Also, frequency distributions were analyzed to identify the possible presence of a ceiling effect and/or a floor effect, meaning that the instrument didn't capture the full range of variability in the data. Successively, an Exploratory Factor Analysis (EFA) was performed following literature recommendations for scale development (e.g., Boateng et al., 2018; Kyriazos, 2018). We adopted the Principal Axis Factoring (PAF) as method of extraction (Costello & Osborne, 2005) and Promax as factor rotation method. Indeed, the PAF is preferable when there is not a multivariate normal distribution and in case response options are on a Likert scale. Instead, Promax is an oblique factor rotation method that is commonly used when factors are expected to be related. The Bartlett's test of sphericity (BTS) and the Kaiser-Meyer-Olkin test (KMO) were considered in order to verify the adequacy (i.e., the factorability) of the correlation matrix (Chiari, 2011; Tabachnick & Fidell, 2013). Moreover, two criteria were established for item inclusion: a cutoff value of .20 for communalities (values exceeding .30 were considered preferable) and a minimum value of .40 for factor loadings on a single factor, ensuring the absence of cross-loadings on other factors (Tabachnick & Fidell, 2013). Finally, Cronbach's α was calculated to evaluate internal consistency of each factor items, considering .70 as the minimum required (Hinkin, 1998).

In Step 4, data were analyzed utilizing Jamovi 2.5.4.0 Version. Firstly, a Confirmatory Factor Analysis (CFA) was performed. Maximum Likelihood Estimation (MLE), the default estimation method in Jamovi, was employed. To evaluate the goodness of the model, fit indices were compared with commonly accepted thresholds (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003; Kyriazos, 2018). Particularly, the model fit was examined using Chi-square test, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR). Models with an acceptable good fit present a Chi-square test >0.05 . For the CFI >0.95 values indicate a good model fit, whereas values between 0.90 and 0.95 reflect an acceptable fit. Regarding the RMSEA, <0.05 values suggest a very good fit, while values up to 0.08 are considered acceptable. For the SRMR, <0.08 values indicate a good model fit. Three criteria were established for item inclusion in order to refine the model: a minimum value of .40 for standardized factor loadings, a maximum value of .30 for residual covariances, and a maximum value of .40 for modification indices. After finalizing the scale, internal consistency of each factor was evaluated calculating Cronbach's α (Hinkin, 1998). Finally, concurrent validity and discriminant validity were assessed. More specifically, concurrent validity was examined to verify whether the Romantic Experience Uncertainty Scale (i.e., the construct) correlated with the enactment of breadcrumbing, orbiting and ghosting (i.e., the criterion, namely other variables that quantify an outcome and/or behaviors that could be an observable manifestation of the construct). On the other hand, discriminant validity was examined to test the degree to which the Romantic Experience Uncertainty Scale correlated with different attachment styles and the perceived quality of the romantic relationship, that the Romantic Experience Uncertainty Scale was not designed to measure. Specifically, the constructs used for testing discriminant validity were selected due to their previous employment in other validation studies related to uncertainty and ambiguity (e.g., Brisini & Solomon, 2019; James-Kangal, 2020). In order to test concurrent and discriminant validity, bivariate correlations were conducted.

RESULTS

Item analysis and Exploratory Factor Analysis (EFA)

First, an item analysis was conducted in order to enhance data quality, increase the validity of the scale, and ensure that the EFA is conducted on a well-structured set of items suitable for identifying latent dimensions. Particularly, we focused on means, standard deviations, frequency distributions, kurtosis and skewness. During this phase, 6 items were removed: 2 items did not meet the acceptable thresholds for skewness and kurtosis (± 1.5 to a maximum of ± 2 ; e.g., Gravetter & Wallnau, 2014; Tabachnick & Fidell, 2013), 3 items presented a highly unbalanced response distribution (a single response option on the Likert scale was selected by 60% or more of the sample, indicating a lack of variability and a potential ceiling or floor effect) and 1 item exhibited both issues simultaneously. Specifically, as concerns frequency distributions, given the nature of the construct and that of the items, a shift in responses was expected. For this reason, a more permissive range ($\leq 60\%$) was adopted, considering the characteristics of the variables.

Successively, an EFA was performed on the 44 items of the Romantic Experience Uncertainty Scale, utilizing Principal Axis Factoring as method of extraction and Promax rotation. The scree plot revealed the presence of seven factors. Nevertheless, some items had a factor loading below .40 or exhibited cross-loadings. Thus, we refined the model by gradually excluding problematic items (i.e., items with low loadings, cross-loadings, low communalities) and re-running the EFA to improve the factor structure and to ensure both a statistical and a conceptual goodness. By proceeding in this manner, the initial set of 44 items was reduced to 26, structured into 3 factors. As concerns sampling adequacy, the Bartlett's test of sphericity (BTS) and the Kaiser-Meyer-Olkin test (KMO) were considered, revealing a marvelous sampling sufficiency (Kaiser & Rice, 1974), with a $p < .001$ in Bartlett's test and a value of .95 in the KMO test. Finally, the internal consistency was assessed using Cronbach's α , demonstrating good reliability: Factor I ($\alpha = .91$); Factor II ($\alpha = .81$); Factor III ($\alpha = .73$). Beyond the three factors, the total factor was tested. The REUS total Cronbach's α is of .85. The explained variance was 56.41%.

Table 1 displays factor structure of the Romantic Experience Uncertainty Scale after performing the Exploratory Factor Analysis (EFA).

TABLE 1 Factor structure of the Romantic Experience Uncertainty Scale (REUS) with Promax rotation ($N = 495$)

Items	F1	F2	F3	Items	F1	F2	F3
REUS33	.720			REUS10		.668	
REUS6	.696			REUS44		.695	
REUS31	.722			REUS47		.561	
REUS43	.633			REUS42		.593	
REUS32	.632			REUS36		.511	
REUS39	.598			REUS48		.506	
REUS27	.566			REUS18			.680
REUS50	.554			REUS23			.671
REUS37	.429			REUS34			.668
REUS28	.434			REUS38			.576
REUS3		.920		REUS16			.468
REUS1		.857		REUS24			.435

Factor 1: partners' uncertainty. It consisted of 11 items (35, 33, 6, 31, 43, 32, 39, 27, 50, 37, 28), reflecting doubts and insecurities regarding one's own and partner's interest, feelings, level of openness and reciprocal intentions and attitudes.

Factor 2: relationship uncertainty. It comprised 9 items (3, 1, 15, 10, 44, 47, 42, 36, 48), describing doubts and concerns about the willingness to pursue the relationship, the value attributed to the romantic experience and its potential future development.

Factor 3: behavioral ambiguity. It contained 6 items (18, 23, 34, 38, 16, 24), reflecting doubts about the engagement from both partners in specific ambiguous behaviors that could vehiculate uncertainty.

Confirmatory Factor Analysis (CFA)

The CFA showed that the model with three related factors and 26 items did not have a good fit with the empirical data. Thus, to improve the model fit both Standardized Expected Parameter Change (SEPC) and Modification Indices (MI) were analyzed as suggested in the literature (e.g., Brown, 2015; Kline, 2023). Based on this iterative model refinement process, 9 items were removed from the initial measurement model: 2 items were excluded due to low standardized factor loadings (<.40), 5 items were eliminated because they exhibited substantial residual covariances with other items, 2 items were removed because demonstrated high modification indices for cross-loadings. The final model, composed by 17 items, achieved good fit, although chi-square still test resulted to be significant. However, this value is strongly influenced by sample size, tending to be significant when the sample size is large (e.g., Byrne, 2012; Jöreskog & Sörbom, 1993). The model presented the following fit indices: $\chi^2 (116) = 31.4$, $p < .001$; CFI = .945; RMSEA = .064, 90% CI [.056, .073]; SRMR = .048.

Regarding internal consistency, it was assessed using Cronbach's α , demonstrating good reliability: Factor I ($\alpha = .88$); Factor II ($\alpha = .90$); Factor III ($\alpha = .75$). The REUS total Cronbach's α is of .90.

Table 2 shows standardized loading factors of all items of the Romantic Experience Uncertainty Scale (REUS) and intercorrelations among the subscales of the REUS.

TABLE 2 Standardized loading factors of the Romantic Experience Uncertainty Scale (REUS) and factor correlations ($N = 415$)

Items	F1	F2	F3	Items	F1	F2	F3
REUS35	.657			REUS15		.867	

REUS33	.774			REUS47		.775	
REUS31	.664			REUS42		.744	
REUS43	.563			REUS48		.841	
REUS32	.649			REUS18			.548
REUS39	.781			REUS23			.754
REUS27	.741			REUS34			.835
REUS37	.721			REUS38			.482
REUS1		.848					
Factors correlations							
Partner's uncertainty		—					
Relationship uncertainty		.734**	—				
Behavioral ambiguity		.268**	.287**	—			
REUS total		.898**	.878**	.570**	—		

Note. ** p < .01.

Concurrent validity

The concurrent validity of the Romantic Experience Uncertainty Scale was tested using ad hoc items measuring the engagement in behaviors ascribable to breadcrumbing, orbiting and ghosting. Results (Table 3) showed the presence of significant positive correlations between the considered variables.

TABLE 3 Intercorrelation among Romantic Experience Uncertainty Scale (REUS), its subscales and ad hoc items measuring the frequency of behaviors related to breadcrumbing, orbiting and ghosting (N = 415)

Variables	Partners' uncertainty	Relationship uncertainty	Behavioral ambiguity	REUS total
Breadcrumbing	.173**	.136**	.226**	.220**
Ghosting	.155**	.139*	.084	.169*
Orbiting	.286**	.241**	.080	.280**

*p < .05; **p < .01; ***p < .001.

Discriminant validity

The discriminant validity of the Romantic Experience Uncertainty Scale was tested using the Network Relationships Inventory (NRI; Guarnieri & Tani, 2011) and the Experiences in Close Relationships Scale-Revised (ECR-R; Busonera et al., 2014). Findings showed that uncertainty was negatively associated with a positive romantic relationship quality and positively associated with a negative romantic relationship quality (Table 4). Furthermore, results highlighted that higher levels of uncertainty were associated with higher levels of anxious and avoidant attachment (Table 4).

TABLE 4 Intercorrelation among Romantic Experience Uncertainty Scale (REUS), its subscales, the Network Relationships Inventory (NRI) and the Experiences in Close Relationships Scale-Revised (ECR-R) (N = 415)

Network Relationships Inventory				
Variables	Partners' uncertainty	Relationship uncertainty	Behavioral ambiguity	REUS total
Satisfaction	-.712**	-.699**	-.271**	-.730**
Union	-.674**	-.762**	-.286**	-.736**
Companionship	-.578**	-.536**	.166**	-.563**
Intimacy	-.594**	-.575**	-.219**	-.603**
Instrumental aid	-.466**	-.477**	-.169**	-.483**
Affection	-.676**	-.653**	-.343**	-.715**
Nurturance	-.466**	-.470**	-.195**	-.488**
Enhancement of worth	-.604**	-.542**	-.228**	-.598**
Punishment	.211**	.159**	.208**	.236**
Conflict	.229**	.139**	.112*	.218**
Antagonism	.285**	.223**	.185**	.292**
Experiences in Close Relationships Scale-Revised				
Variables	Partners' uncertainty	Relationship uncertainty	Behavioral ambiguity	REUS total

Anxiety	.437**	.258**	.130*	.370**
Avoidance	.681**	.628**	.302**	.701**

* $p < .05$; ** $p < .01$; *** $p < .001$.

DISCUSSION

This study aimed to develop and validate the Romantic Experience Uncertainty Scale (REUS), a new scale designed to measure uncertainty and ambiguity within romantic relationships among adolescents and young adults.

The scale was constructed through a systematic and methodologically rigorous procedure, in accordance with recommendations from the literature and established best practices for scale development (e.g., Boateng et al., 2018; Kyriazos, 2018). Indeed, the development of the Romantic Experience Uncertainty Scale involved the employment of a sequential and multiphase design comprising four key steps: (1) identification of the conceptual domain and item generation through focus groups; (2) a preliminary pilot test study to assess item clarity and relevance; (3) an Exploratory Factor Analysis (EFA) to examine underlying factor structure; (4) a Confirmatory Factor Analysis (CFA) and subsequent validation to test the model's fit and psychometric properties. The resulting final scale comprised 17 items rated on a 6-point Likert scale. Factorial analyses (EFA and CFA) supported a multidimensional structure, suggesting that uncertainty is a complex construct encompassing distinct facets. More specifically, three factors emerged: partners' uncertainty, relationship uncertainty and behavioral ambiguity. *Partners' uncertainty* captures doubts and insecurities of both the individual and the partner regarding their interest and emotional investment, transparency and openness in communication, clarity of reciprocal intentions and attitudes. *Relationship uncertainty* encompasses doubts and concerns regarding the willingness and the commitment in continuing and maintaining the relationship, the importance and the value attributed to the romantic experience and its possible future trajectory. Lastly, *behavioral ambiguity* reflects doubts about the reciprocal engagement in behaviors that may convey or reinforce feelings of uncertainty within the couple (i.e., dating ex partners, interrupting communication after a fight...). These findings were in line with a recent systematic review (Colombo et al., 2023), which highlighted that uncertainty seems to constitute the core construct, while ambiguity represents a subdimension of uncertainty. Indeed, as emerged in the present study, uncertainty was mainly found to reflect the range of thoughts and feelings related to the relational involvement, whereas ambiguity resulted to pertain more specifically to a behavioral level (i.e., confusing and inconsistent behaviors that hinder a clear understanding of either partner's underlying intentions).

Concerning the psychometric properties, the scale proved to be a solid instrument. Indeed, it showed good internal consistency across its three subscales, strong model fit indices and a general good reliability, thus constituting an adequate instrument to investigate uncertainty and ambiguity in adolescents' and young adults' romantic experiences.

Concurrent and discriminant validity were examined. As for concurrent validity, findings revealed that when romantic experiences are characterized by doubts about feelings and intentions, as well as confusion about the relationship itself, individuals tend to be more likely to engage in online behaviors such as breadcrumbing, orbiting and ghosting. In other terms, those who are more uncertain about the partner and/or the relationship itself seem to be more prone to elude direct communication and/or interact online sporadically to maintain the other's interest. These results are in line with a qualitative study (LeFebvre et al., 2019), which highlighted that ghosting is frequently perceived as a convenient strategy to end a relationship, particularly when individuals experience uncertainty about their attraction towards the partner and/or doubts about the relationship, as it allows them to avoid direct discussions and the consequent potential emotional discomfort. Concerning discriminant validity, findings showed that individuals experiencing uncertainty within the couple may be more prone to perceive the romantic relationship quality as negative (e.g., characterized by punitive attitudes, interpersonal conflict and antagonistic dynamics). This is consistent with existing literature (e.g., Theiss & Solomon, 2006; Solomon & Theiss, 2008, Clifford et al., 2017; Brisini & Solomon, 2019), which emphasized that uncertainty may significantly undermine important aspects of the romantic relationship (i.e., intimacy, relationship satisfaction and relationship dedication). Further to this point, a previous study (Draucker et al., 2012) suggested that uncertainty may foster aggressiveness, conflict and violence, through lack of communication and reciprocal transparency between partners, thereby representing a potential risk factor for dating violence.

Moreover, always concerning discriminant validity, results highlighted the existence of a positive relationship between uncertainty and insecure attachment styles, suggesting that individuals who exhibit higher levels of anxious or avoidant attachment tend to experience greater uncertainty within their romantic relationship, consistently with a previous study (Jin & Peña, 2010). Regarding anxious attachment, it could be that individuals who have experienced inconsistent caregiving and fear of abandonment during childhood may be more likely to develop difficulties in emotion regulation (e.g., Ye et al., 2024). This may translate into a persistent preoccupation with partner's availability, leading to be more sensitive to romantic situations characterized by instability and uncertainty. Notably, the association between uncertainty and avoidant attachment appeared to be particularly strong. This could be because individuals with an avoidant attachment style

tend to hesitate within the relationship (e.g., Li & Chan, 2012). Their tendency to suppress emotional expression and limit emotional openness may hinder communication and emotional attunement, thus amplifying uncertainty and ambiguity. Therefore, the scale demonstrated good sensitivity as findings supported the scale's discriminant validity (i.e., it effectively differentiated between adaptive and maladaptive relational functioning).

The present study contributes to deepen the literature on uncertainty and ambiguity by addressing some existing gaps. Indeed, the newly developed Romantic Experience Uncertainty Scale (REUS) constitutes a valid and reliable tool capable of capturing specific contemporary features of romantic experiences and relationships that perhaps may not be fully addressed by traditional scales. Indeed, there is a growing need for instruments that could investigate nuanced constructs since, nowadays, romantic relationships no longer follow a normative and defined trajectory and are becoming more increasingly heterogenous, evolving in response to ongoing social and cultural changes (e.g., Rowley & Hertzog, 2016; Lanz et al., 2017; Knopp et al., 2020). Thus, despite being largely used, existing measures on romantic relationship features and quality may not be fully adequate to assess specific elements (i.e., uncertainty and ambiguity) of current romantic experiences and dynamics. The present scale is designed to fill this gap, offering a psychometrically sound and sensitive measure to examine dimensions that are likely to become even more salient in future romantic relationships. Moreover, given the potential implications of uncertainty and ambiguity for individual and relational well-being (e.g., Len-Ríos et al., 2016; Frampton & Fox, 2018; Brisini & Solomon, 2019; James-Kangal, 2020), its systematic assessment represents a crucial step in the research field. Moreover, it represents the first study conducted on the topic within the Italian context. Additionally, the sample included both adolescents and young adults with different romantic experiences, acknowledging the increasing complexity of contemporary romantic relationships. This enhanced the ecological validity.

Nevertheless, this study presents some limitations that should be acknowledged. The first one is related to the cross-sectional nature of the data, which limits the possibility of drawing conclusions about causal relationships between variables. Indeed, longitudinal or experimental studies could be useful to investigate the directionality and the causality. A second limitation concerns the reliance on self-report measures, which may expose to the risk of social desirability bias. Indeed, participants may have been more inclined to portray themselves and their relationship in a more favorable manner, possibly leading to underreport negative experiences. Thus, future research could benefit from incorporating multiple methods of data collection, such as dyadic data, to reduce the potential influence of self-presentation and obtain a more comprehensive and objective understanding. A third limitation concerns the use of only a few ad hoc items to evaluate concurrent validity and of just two scales to assess discriminant validity, which may have not fully captured the constructs of interest. Moreover, construct validity was not tested since the scales in the literature investigating uncertainty or ambiguity are not validated in Italian.

Future studies could investigate potential differences in the levels of uncertainty based on the type of the romantic experience (e.g., dating vs committed relationship) or its length, since these are factors that may influence the perception and expression of uncertainty. Furthermore, future research could explore uncertainty in association with potential outcome variables (e.g., general distress, jealousy) that were investigated in association with uncertainty only in samples of young adults and/or adults and others that are still not studied (e.g., self-esteem) along with uncertainty and ambiguity, thus contributing to clarify and better understand the complexity of contemporary romantic relationships.

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APPENDIX A Italian version of the Romantic Experience Uncertainty Scale

Partners' uncertainty
Sono certo/a di piacere al mio partner caratterialmente (r)
Sono certo/a di come io e il/la mio/a partner possiamo comportarci nei confronti l'uno dell'altro (r)
Sono certo/a che al/la mio/a partner vada bene l'atteggiamento che ho nei suoi confronti (r)
Sono certo/a di riuscire ad interpretare correttamente i comportamenti del/la mio/a partner nella relazione (r)
Sono certo/a che per me e il/la mio/a partner vada bene mettere in atto comportamenti affettuosi anche in pubblico (es: abbracciarsi, tenersi per mano, darsi un bacio...) (r)
Sono certo/a che il/la mio/a partner si senta a suo agio all'interno di questa relazione (r)
Sono certo/a che io e il/la mio/a partner possiamo dirci tutto all'interno di questa relazione (r)
Sono certo/a che io e il/la mio/a partner definiremmo allo stesso modo la relazione che abbiamo (r)
Relationship uncertainty
Sono certo/a di cosa voglio da questa relazione (r)
Sono certo/a di volere che questa relazione duri nel tempo (r)
Sono certo/a di volere questa relazione in questo momento della mia vita (r)
Sono certo/a di avere una progettualità condivisa con il/la mio/a partner (r)
Sono certo/a di quanto per me sia importante questa relazione (r)
Behavioral ambiguity
Sono certo/a che per me e il/la mio/a partner vada bene visualizzare un messaggio nella nostra chat e rispondere dopo giorni
Sono certo/a che per me e il/la mio/a partner vada bene lasciarci e poi rimetterci insieme più volte
Sono certo/a che per me e il/la mio/a partner sia normale non farsi sentire anche per più di un giorno dopo un litigio
Sono certo/a che per me e il/la mio/a partner vada bene frequentare ex partner

Note. (r) = reverse-scored items. Individuals answer per item considering the following response options: 1 = Not at all, 2 = A little, 3 = More no than yes, 4 = More yes than no, 5 = A lot, 6 = Very much.