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The Quality of Late Adolescents' Online Dating Relationships: A Peri-Pandemic Perspective[*]

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Abstract

The study delves into late adolescents' relationships peri-pandemic, examining online communication's impact. It explores relationships' structure, tying the quality of dating

relationships to sociodemographic traits and relationship ambivalence. These facets, previously discussed individually in the literature, are consolidated into a unique model for the first time consisted of 16 independent and 10 dependent variables. The study expected a complex interplay involving gender, education, religious commitment, and cultural influences across the chosen Central and Southern European countries as Italy, the Netherlands, Poland, and Spain. A sample of 691 European late adolescents, both female (55%) and male, with an average age of 22 and who were currently or previously engaged in close relationships, was analysed. Canonical analysis was used as a main method of data process. Findings highlight the role of partnership, relationship satisfaction, ambivalence, gender, and nationality in determining the quality of online dating, love dynamics, and partner identification.

Keywords: adolescence, dating relationships, online dating, pandemic.

Introduction

The COVID-19 pandemic has brought about substantial changes in the lives of individuals, affecting various age groups, including late adolescents, who are commonly known as young adults (Sawyer et al., 2018). People around the world had to cope with significant changes in a short time which resulted in physical problems and psychological distress (Fernández et al., 2020; Violant-Holz et al., 2020; Rogers et al., 2021), thus having a strong impact on their emotional and general well-being (Brooks et al., 2020; Harper et al., 2020; Zacher & Rudolph, 2021). Change and uncertainty have been and still are the most relevant drivers in this new context that has brought about a huge alteration in people's daily lives, as well as many social challenges. Clear evidence of this has been observed, among other aspects, in the significant variation in the way people tend to engage in social interactions in general (Calbi et al., 2021) and with regard to their couple relationships (Pietromonaco & Overall, 2021). The present study arose from the need to explore the quality of relationships between young adults in the peri-pandemic period, with a particular focus on four European countries: Italy, Poland, Spain, and the Netherlands. These countries were selected to represent relatively diverse cultural and socioeconomic contexts of romantic partnerships (Markus & Kitayama, 2010; Guerrini Degl'Innocenti, 2023; López-Rodríguez & Gutiérrez, 2023).

Determinants of relationship quality in late adolescence

The young adult population undergone an important process of adaptation to the new reality caused by COVID-19 pandemic marked by restrictions in physical interaction (Alzueta et al., 2021) and an increase in dependence on social networks (Yamuna et al., 2021; Longest & Kang, 2022; Silveira et al., 2022), as well as online dating, which has changed the conditions shaping the quality of interpersonal relationships (Joshi et al., 2020; Sepúlveda et al., 2021).

Relationship quality is sometimes treated as a synonym for relationship satisfaction (Fincham & Rogge, 2010). However, from our point of view, it is useful to treat them separately. The term "relationship quality" describes a broader characteristic (Kansky & Allen, 2018), including factors such as emotional security, companionship, conflict, and overall satisfaction – measured by objective criteria in addition to self-reports. "Relationship satisfaction" refers to the individual and self-reported degree of subjective contentment with the relationship and partner (Fincham & Rogge, 2010).

In turn, by late adolescents or young adults we are referring to people who are in a transitional stage of life from adolescence to adulthood. According to Arnett (2000; 2011; 2012), who developed the concept of "emerging adulthood" this stage typically spans from around 18 to 25 years of age, and sometimes up to 30, in industrialized countries. It reflects an extended period during which young people delay adopting fully independent adult roles and is expressed through exploring educational and career paths, as well as romantic relationships, by engaging in multiple options simultaneously or frequently changing them (Sawyer et al., 2018; Arnett, 2000). This is a particularly important period in shaping one's abilities and gaining experience in building romantic relationships, in which these experiences modify cognitive processes and reactions to various situations, enabling adjustments in managing emotions and prompting reflection on personal identity and the human body (Coleman et al., 2013; Kiecolt-Glaser & Wilson, 2017; Dugal et al., 2018).

During late adolescence longer-term romantic relationships are usually established, and various forms of commitment and involvement are explored

(Schulenberg et al., 2004; Kansky & Allen, 2018). However, while developmental theories of the romantic stage suggest that young people in the period of emerging adulthood are fully capable of committing to an intimate partner relationship (Ellis, 2004; Connolly & Goldberg, 2009), some research indicates that current young people delay forms of deep commitment, while maintaining short-term casual encounters or noncommittal relationships (Arnett, 2004; Shulman & Connolly, 2013).

Establishing and maintaining romantic relationships can generate not only unequivocally positive or negative feelings and thoughts but also simultaneous experiences of ambivalence (Zayas & Shoda, 2015). These ambivalent states are particularly significant for relationship quality and individual well-being (Holt-Lunstad & Uchino, 2019; Zoppolat et al., 2022). They are typically perceived as unpleasant experiences (Hsieh & Hawkley, 2018), although their consequences are not always negative for the relationship itself (Moss & Wilson, 2015). Experiencing ambivalence generates negative emotions, but it also motivates reflective information processing and the search for ways to reduce the discomfort experienced (van Harreveld et al., 2015). However, for this reason, it may be a factor limiting the durability of a romantic relationship, as it fosters the redefinition and revaluation of the partner and the relationship formed with them (Miller et al., 2006). Furthermore, it also manifests in changes in self-identification with the partner; in other words, changes in the intimacy of one's sense of self in relation to the partner, as well as changes in evaluations of the partner, trust, and empathy toward them (Weinstein et al., 2016; Quintard et al., 2021). The quality of a relationship can be determined by many factors, particularly those related to the characteristics of the relationship and the sociodemographic characteristics of the individuals. One of the primary factors to consider is the age of individuals and the duration of the relationship (Shulman & Scharf, 2000; Shulman & Kipnis, 2001), with the age at which first stable relationships begin varying significantly even during adolescence and youth (Rauer et al., 2013). Young adults typically rate the quality of their relationship higher than representatives of older cohorts (Bühler et al., 2021), although ethnic origin and country may also play a role, introducing cultural diversity (Dion & Dion, 1996). Among the factors mod-

erating the impact of age on relationship quality, gender is also mentioned, but research results in this area are not always consistent (Ta, 2017), partly due to different associations of gender with emotional and communicative aspects of romantic relationships (Giordano et al., 2006), and due to the role of behavioral patterns identified with psychological gender (Ta, 2017). Significant role of religiosity for relationship quality is also indicated, but again, research results are not always conclusive (Langlais & Schwanz, 2017; Lakatos & Martos, 2019). Religiosity may increase rigor in partner selection, and therefore, as noted by Langlais and Schwanz (2017), the quality of relationships formed in this way may be perceived as higher. On the other hand, data on educational background and educational homogamy (Mihalceaa et al., 2013; Naszodi & Mendonca, 2022) suggest that education is at least potentially a determining factor in the quality and durability of romantic relationships formed by adolescents and young adults. Recent studies further reveal that shared educational levels enhance mutual understanding and reduce potential conflicts, contributing to long-term relationship success (Hohmann et al., 2022). Overall, comprehending the diverse factors influencing relationship quality is crucial for creating effective support systems to assist young adults in managing their romantic relationships.

The present study

Since the pandemic, the use of social networks has increased more considerably due to social isolation and the need to stay connected online (Lee et al., 2022). Some adolescents, due to the long period of pandemic restrictions, may have been able to establish their first lasting relationships online. Others, on the other hand, may have experienced the need to develop new strategies for initiating and maintaining relationships. Young adults, in particular, turned to social networks to initiate, maintain or terminate social and romantic relationships. Thus, technology has become a key vehicle for communication and bonding, being the channel through which adult and young adult couples strengthen their emotional connection, feel attached, express sexual desire, establishing new ways of intimacy and showing their commitment to each

other through new relational mechanics (Papp et al., 2012; Neustaedter & Greenberg, 2012; Hertlein & Blumer, 2014). Simultaneously, social networks and the constant use of the internet have become a potential source of conflict and misunderstanding in young adult relationships, due to misinterpretations of online postings or interactions by partners, leading to the emergence of jealousy and online intrusive dynamics among these young couples (Kewalramani & Hazra, 2018).

As we have seen above, we are witnessing a significant impact of social networks and technology on late adolescents and the way they relate to each other. Therefore, in this exploratory study, we aim to understand what role social networks and online communication play in relationships.

In synthesis, the main research question regards to the adolescent close relationships in the peri-pandemic period is: What is the structure of the relationship between the quality of dating relationships and the sociodemographic characteristics of late adolescents, including their prior romantic relationship experiences and relationship ambivalence?

Gaining insight into these dynamics can provide a basis for designing effective support systems to help young adults navigate their relationships in an ever-evolving social environment. With this research question, one might expect specific relationships based on previous research results related to selected aspects of the variable system we designed. However, because our project included many variables and no existing research had explored such a set, we decided that an exploratory approach would be optimal.

Method

This study was carried out using correlational design including canonical correlations for data analysis.

Participants

The sample of 691 participants was recruited from a population of late adolescents who live in Italy, the Netherlands, Poland, and Spain and who currently have a partner or had one in the past. Although the significance

of cultural factors is widely acknowledged, there remains a notable gap in comprehensive comparative studies on how adolescents from different European countries engage with and manage online romantic relationships. Our aims to fill this gap by observing online romantic relationship practices and their context among adolescents in these four European countries. These countries are geographically spread across Europe, representing different regions and diverse cultural backgrounds within the continent. They also vary in terms of educational systems. On the other hand, these countries are predominantly influenced by Christian religions (Caprara et al., 2018), and the prevalence of media and international social networking sites is quite similar (Dutton et al., 2017). This similarity allowed us to relatively control for cultural factors, particularly when considering diversity in religion and the current trends shaping Europe, which are significantly influenced by social media. Moreover, using platforms such as Facebook and Twitter to recruit respondents from these countries enhances the representativeness of the sample collected.

The sample consisted of 379 women, 304 men and 8 non-binary people aged approximately 21 years and declaring a similar age of their partners. The overall declared average duration of being in a partnership(s) was two years. Nearly 80% of the participants have passed the level of upper secondary education. The detailed characteristics of the sample are presented in Table 1. The minimum sample size was calculated using the G*Power application for linear multiple regression with $\alpha = 0.05$, assumed medium effect size $f^2 = 0.15$ and the number of predictors equal to 16 (actually 11, but four of them have transformed on dummy variables). This approach to the number of predictors yielded n = 204. However, we included all participants who completed all questionnaires on the study website.

Instruments

The study included measurements of the following demographic characteristics: gender, nationality, religion, religious commitment, attained education, overall relationship duration (total duration of being in a partnership), sex, age and partner's sex and age. To measure the core characteristics, such as

general dating relationship satisfaction, separate scales were used to assess the positive and negative aspects. Subsequently, ambivalence intensity was determined in the derivative measurement. In turn, the quality of the dating relationship was assessed using three tests: Cyberdating Q_A questionnaire (CQA), Sternberg's Triangular Love Scale (STLS), Inclusion of Other in Self Scale (IOS). The survey included a measure of general dating relationship satisfaction. This measure utilizes two unipolar visual analogue rating scales, each spanning a length of 100 points. One scale assesses the positive aspect of the variable (content), while the other scale assesses the negative aspect (discontent). By employing these unipolar scales in combination, the survey aims to capture both positive and negative states, thereby expanding the scope of observation to include another third variable. This variable is ambivalence toward relationships, a recurring theme in the literature on close relationships, relationship dynamics, and emotions towards loved ones. The determination of relationship ambivalence was based on the tension formula (T) developed by Pasikowski (2019):

$$T = \left(\frac{min(a, b)}{max(a, b)}\right)\left(\frac{m_{a,b}}{max_s}\right)$$

T – tension, a – intensity value of the first feature, b – intensity value of the second feature, $min(a, b)$ – the smaller of the values a and b, $max(a, b)$ – the larger of the values a and b, $m_{a,b}$ – arithmetic mean of the values a and b, max_s – maximum value on the rating scale. The T coefficient takes values in the range [0, 1], but for convenience of interpretation its value has been multiplied by 100.

The Cyberdating Q_A (CQA) (Sanchez et. al., 2014; Sanchez et al., 2015) is an original and unique instrument to assess the quality of adolescent dating relationships in social networks. The base of its theoretical construct is the assumption that Internet and social network use in dating relationships have positive as well as negative aspects. These aspects were reflected in the six factors identified during the validation studies. The six-factor structure was confirmed as stable in the original (Ibidem). This questionnaire comprises 28 items grouped into the following six scales:

1. Emotional Communication Strategies (ECS) includes seven items about the different ways people indirectly express emotions and coping with online limitations in emotional communication.
2. Online Intimacy (OI) includes three items and refers to how people generate closeness and intimacy by using social networks and mobile devices.
3. Cyberdating practices (CP) includes four elements related to readiness to establish and maintain online relationships.
4. Online Jealousy (OJ), which includes four items relating to the concern and insecurity caused by the partner's behaviour on social networks.
5. Online Control (OC) combines six items related to controlling and spying on partners.
6. Online Intrusive Behaviour (OIB) encompasses four items describing the use of invasive and intrusive behaviours occurring as a result.

These six dimensions characterize the online quality of dating relationships as a set of social networks and mobile devices practices. The first three concern positive dynamics in the relationship, the next three refer to conflict-related behaviours. This questionnaire uses a 5-point rating scale with response intervals ranging from 1 (never) to 5 (always). The results of the validation studies reported by the aforesaid publication indicate that the psychometric properties of the original version of the Cyberdating Q_A questionnaire (CQA) are satisfactory. The extracted factors are following emotional communication strategies (ECS), online intimacy (OI), Cyberdating practices (CP), online jealousy (OJ), online control (OC), and online intrusive behaviour (OIB).

The Sternberg's Triangular Love Scale (STLS) (Sternberg, 1986; 1997; Sorokowski et al., 2021) is a widely recognized and influential tool for measuring the Triangular Theory of Love. This theory, as supported by a large-scale cross-cultural study involving 25 countries (Sorokowski et al., 2021), demonstrates the cultural universality of the concept of love and its dynamics. The theory conceptualizes love as consisting of three components that can be vis-

ualized as vertices of a triangle: Intimacy (feelings of closeness and emotional connection), Passion (physical and sexual attraction, excitement, and desire), and Commitment (the intention to maintain the relationship in the long term). According to Sternberg's assumptions and subsequent empirical research, the Triangular Theory of Love provides a relevant framework for analyzing sexual interactions in various relationship contexts. Furthermore, the intensity of the three components of love varies depending on the duration of the relationship. The validation studies of the STLS included participants who were 18 years of age and older. The scale consists of 45 items, with 15 items dedicated to each of the three components, using a 9-point rating scale. The referenced study established satisfactory psychometric properties of the STLS.

The Inclusion of Other in Self Scale (IOS) (Aron et al., 1991; 1992; 1999; Shubert & Otten, 2002) is a pictorial non-verbal measure used to assess the perceived closeness of interpersonal relationships. Based on various theories, the self is understood to have collective aspects, and in social relationships, these aspects are expressed through categorization mechanisms. The IOS scale captures the extent to which individuals incorporate others into their self-concept and therefore describes the mechanism of identification. The IOS consists of seven diagrams, each showing two equal-sized circles centered on a horizontal line. The circles gradually get closer to each other until they are almost completely overlapped. The first diagram shows the "I" circle and the second shows the "Other" circle. In subsequent diagrams, the degree of overlap between the circles increases, symbolizing the perceived closeness of the relationship. In the current study, all seven diagrams were placed on one horizontal axis. At the left pole of the axis there was a diagram with zero circles overlap, and at the right pole of the axis there was a diagram with maximum circles overlap. The measurement was made on a continuous scale and consisted of placing the slider at a point on the axis corresponding to the respondent's feeling. The IOS meter takes values in the range [0, 70]. The psychometric properties of the IOS have been established through several independent research studies, confirming its reliability and validity (Aron et al., 1991; 1992; 1999; Shubert & Otten, 2002).

Procedure

Promotion of the study was carried out by social media and within university environments. Campaigns were run on Facebook and Twitter, and invitations to participate in the research were posted on social media platforms. In turn, requests to promote the invitation were sent to universities and school principals in Italy, the Netherlands, Poland, and Spain. Once the invitation was accepted, the national research team offered to meet the respondents to illustrate the aim of the research and to give more information about it. The participants could opt out after the initial meeting. To improve data collection and security, a specialized online platform was prepared to handle submissions. The platform software was installed on a hosting server. Access to the server was secured through login credentials with a unique username and password. Communication with the server was secured using the SSL protocol, ensuring the security of data migration. After logging in to the platform, the study participants completed an online form consisting of a section regarding demographic data and then three tests: CQA, STLS, and IOS.

All variables measured on the nominal or ordinal scale were transformed according to the dummy variables scheme. It means that, if the observation takes a given value of the original variable, it is assigned the number 1. When this value of the variable is not realized in the case of this particular observation, it is assigned the value 0. In this way, 3-valued variable result in three dummy variables, but two of them are included in the analysis to avoid high autocorrelation values. This does not limit the interpretation of the results, because the omitted dummy variable is visible as 0 in the implementation of the remaining dummy variables. With this procedure, the variables measured on weak measurement scales can be included in the analytical model and observe how the explained variable changes when the dummy variable changes from 0 to 1 or vice versa.

As a result, the set of independent variables (sociodemographic characteristics, including prior romantic relationship experiences and relationship ambivalence) consisted of 16 elements, i.e., 7 quantitative variables and 9 dichotomous (1, 0) variables: nationality (Italian, Polish, Spanish), sex (male),

partner sex (male), having a partner in the past (yes), having a partner at present (yes), attained education (graduate (L2), postgraduate (L3)). Because of relative homogeneity, religion was excluded from the analysis model. The set of dependent variables (quality of dating relationships) consisted of variables measured on a continuous scale using the following instruments: IOS, CQA, STLS.

The collected and transformed data were subjected to canonical analysis (CA), which is a generalization of multiple regression analysis for more than one explained variable. The use of regression analysis to assess the model for each of the dependent variables not only distorts the image of the studied phenomenon, but also increases the value of type I error (α). Then it is referred to as alpha inflation (α^*) which is that the value of alfa increases correspondingly to the number of repeated analyses (c). To avoid this, it is necessary to use analytical solutions to build a model of the phenomenon covering all the assumed dependent variables included in the model. Canonical analysis involves examining the relationships of latent variables, which are created by summing weights of standardized original independent variables (IV) and summing weights of standardized original dependent variables (DV). These weighted sums of independent (U) and weighted sums of dependent (V) variables are called canonical variables. Paired together, they form the canonical roots (CR). The weighted sums in each of the two sets of input variables are selected so as to maximize the correlation between the first pair of canonical variables and then the correlation between the successive pairs of canonical variables.

The quality of the data was checked against the assumptions of canonical analysis. The ratio of the number of observations to the number of variables was definitely more than fourfold (Laessig & Duckett, 1979), there were no outliers, and there was a lack of collinearity between independent variables. The value of Mahalanobis distance D^2 measure for the multivariate observation farthest from the center of the multivariate distribution was $D^2 = 34.69$ and proved statistically insignificant ($p > 0.001$). As regards collinearity, the tolerance values were definitely higher than 0.10 (m = 0.43, me = 0.37, sd = 0.23, min = 0.19, max = 0.96) and the variance inflation factor (VIF) values

were clearly lower than the limit of 10 (m = 2.97, me = 2.67, sd = 1.38, min = 1.05, max = 5.17) as established by the rule of thumb (Kutner et al., 2004). In the canonical analysis procedure, a scheme of stepwise backward removal of variables from the model was used to adjust the optimal. Starting from the initial model, each subsequent model was tested after first removing one variable with the weakest canonical loadings. It was done until a solution was obtained with high values of canonical loadings and a possibly wide range of variance in canonical variables explained by the original variables included in the model. Statistical inference was conducted at the assumed level of statistical significance α = 0.05.

Results

The overview of descriptive statistics (Table 1) indicates ambiguous results of measuring overall relationship satisfaction. However, a closer review reveals significantly higher variability in the values of responses for the items related to discontent than to those measuring content. The average result of ambivalence toward the relationship is low, but, similar to discontent, there is significant variability in measurement results. Comparing the arithmetic mean and median indicates that results lower than the mean prevail in the dataset for observations of discontent and ambivalence. Respondents exhibit a moderately high level of identification with their partners (IOS). Conversely, when examining the distribution of results obtained on the CQA scales, there are relatively high scores on the OI scale (the highest arithmetic mean and the lowest variance).

Simultaneously, there are relatively low scores in the other scales, with high variance both within and between scales.

Regarding the characterization of love measured using STLS, respondents display the highest levels of Intimacy, followed by Commitment and Passion. This is evident from the differences in arithmetic mean values with relatively similar standard deviations.

The structure of relationships between variables was determined based on canonical correlation analysis. The initial model including all independent

Table 1. Descriptive statistics of the variables included in the model

Variable		n	%	Variable	M	Me	SD	Min	Max
Nationality (language)	Dutch	44	6.37	Religious commitment	27.04	14.20	30.48	0.00	100.00
	Italian	227	32.85						
	Polish	131	18.96	Age	20.81	20.00	1.66	19.00	27.00
	Spanish	285	41.24	Partner's age	21.77	21.00	2.66	16.00	32.00
	Other (English)	4	.58	Overall relationship duration*	1.98	1.49	1.69	0.01	9.00
Sex	Partner's sex	Male	304	315	43.99	45.59	Relationship content	77.92	84.40	23.47	0.90	100.00
	Female	379	373	54.85	53.98	Relationship discontent	21.12	13.60	22.89	0.10	100.00
	Non-binary	8	3	1.16	0.43	Relationship ambivalence	11.70	7.19	13.11	0.05	61.84
Partner past	present	Yes	590	455	85.38	65.85	IOS	50.59	50.00	16.22	10.00	70.00
	No	101	236	14.62	34.15	CQA_ECS	12.61	12.00	4.90	0.00	28.00
Education attained	L1	74	10.71	CQA_OI	8.17	8.00	2.36	0.00	12.00
	L2	529	76.56	CQA_CP	4.48	4.00	2.60	0.00	16.00
	L3	88	12.74	CQA_OJ	5.00	5.00	3.85	0.00	16.00
Religion	Christianity	350	50.65	CQA_OC	3.48	2.00	3.45	0.00	24.00
	Islam	2	0.29	CQA_OIB	2.55	2.00	2.94	0.00	16.00
	Judaism	1	0.14	STLS_I	102.50	109.00	20.64	0.00	120.00
	Other	39	5.64	STLS_P	89.13	96.00	25.42	0.00	120.00
	Non-denominationalism	299	43.27	STLS_C	95.52	106.00	27.55	0.00	120.00

L1 – primary, lower secondary; L2 – upper secondary (graduate); L3 – bachelor, master, doctorate (postgraduate); IOS – Inclusion of Other in Self; _OI – Online Jealousy; _OC – Online Control; _ECS – Emotional Communication Strategies; _OIB – Online Intrusive Behaviour; _OI – Online Intimacy; _CP – Cyberdating Practices; _I – Intimacy; _P – Passion; _C – Commitment; M – arithmetic mean; Me – median; SD – standard deviation; Min – minimum; Max – maximum* Overall relationship duration was measured to the nearest day, but in the analysis and presentation the unit of measurement was converted to a year.

Source: Authors' research.

variables and all dependent variables was tested as a first, and then subsequent models were created as an effect of reducing the number of independent variables.

For the presentation of the main results, the initial model and the final one (the 9th) were selected (Table 2). In the first model, a statistically significant correlation occurred between the U and V canonical variables in four pairs. Regarding the final model, such correlation concerns three pairs of canonical variables. The initial model covering all canonical roots is characterized by a correlation of two weighted sums (the weighted sum of independent variables and the weighted sum of dependent variables) equal to .78 and explains 60% of the variance of original variables by canonical variables. Calculating the difference in values before and after removing the canonical variable from the model showed the canonical correlation between the canonical variables U and V (R) and the canonical R^2 with respect to each subsequent and statistically significant canonical root (CR). For the initial model, these values were as follows. CR1: R = 0.20, R^2 = 0.27, CR2: R = 0.23, R^2 = 0.21, CR3: R = 0.01, R^2 = 0.01, CR4: R = 0.10, R^2 = 0.05. For the final model these values were similar. CR1: R = 0.22, R^2 = 0.30, CR2: R = 0.25, R^2 = 0.21, CR3: R = 0.03, R^2 = 0.02. These values indicate that the first two CRs are crucial in interpretation. It should be noted that the value of R^2 depends on the number of variables in the model, so they were reduced and the value of the canonical correlation decreased with successive models. In the present study, this decrease was definitely modest, indicating a marginal role of the removed variables for the model.

For the final model, which contains eight independent variables rather than sixteen, the value of the canonical correlation coefficient and the range of explained variance basically did not change. This indicates that the successively removed variables were less significant for the relationship between the sets of IV and DV variables. In other words, the retained variables in the final model effectively explain the initially established relationship. The Wilk's λ value, reflecting the unexplained variance in V by U, decreases as the number of variables in each successive model is reduced.

Table 2. Relationships between sets of independent and dependent variables: testing the significance of canonical roots

Model	Removed	Canonical R	Canonical R^2	χ^2	df	p	Wilk's λ
Initial	0	0.78	0.60	1150.20	160	< 0.0001	0.183
	1	0.57	0.33	529.04	135	< 0.0001	0.457
	2	0.34	0.11	261.94	112	< 0.0001	0.679
	3	0.33	0.11	180.70	91	< 0.0001	0.766
	4	0.23	0.05	104.96	72	0.0069	0.856
	5	0.22	0.05	69.52	55	0.0902	0.902
Final	0	0.77	0.60	1007.99	80	< 0.0001	0.227
	1	0.55	0.30	387.93	63	< 0.0001	0.565
	2	0.30	0.09	144.47	48	< 0.0001	0.809
	3	0.27	0.07	79.98	35	< 0.0001	0.889
	4	0.15	0.02	28.95	24	0.2222	0.958

Note: Canonical R – correlation coefficient between the two linear combinations (canonical variates) derived from the two sets of variables, taking values from the range [-1, 1]; Canonical R^2 – squared value of the canonical correlation coefficient and offering a measure of shared variance between the canonical variates (the proportion of variance in one set of variables explained by the linear combination of the variables in the other set); χ^2 – statistic used to test the null hypothesis that the canonical correlations between the two sets of variables are zero (no relationship) and helps to determine the number of meaningful canonical variates in the analysis. A statistically significant χ^2 value means that the corresponding canonical variates explain a significant amount of shared variance between the two sets of variables; Wilk's λ – multivariate test statistic that evaluates how well the canonical variates account for the relationship between two sets of variables. It measures the proportion of variance [0, 1] in the dependent set of variables that is not explained by the independent set of variables through the canonical functions; df – degrees of freedom; p – p value.

Source: Authors' research.

Table 3 presents information about the variance of varieties explained by canonical roots (canonical variates). Considering the initial model, the general amount of extracted variance by the significant canonical roots (i.e., the original variables replaced by CR) are: 44% of IV set and close to 61% of DV set. The general amount of the extracted variance is the arithmetic mean of the squared factor loadings that are indicators of the variance of the original variables explained by the canonical root. The redundancy, defined as

the percent of variance in the one set of original variables explained based on the second set and its input to the canonical roots, is respectively 15% of IV and 24% of DV. These results were slightly improved in subsequent models. About the final model, the original independent variables were replaced in 71% and the original dependent variables in 56%. Admittedly, the redundancy increased as for independent variables and basically it has not changed significantly as for dependent variables. This means that DV variability is primarily determined by those original independent variables that remain in the final model.

Table 3. Variance of varieties explained by canonical roots: extracted variance and redundancy

Model	Canonical Root	Set *U*		Set *V*	
		s^2	R_d	s^2	R_d
Initial	1	0.1620	0.0973	0.2913	0.1750
	2	0.1199	0.0391	0.1267	0.0413
	3	0.1046	0.0118	0.1174	0.0133
	4	0.0524	0.0055	0.0746	0.0079
	Sum	0.4390	0.1538	0.6100	0.2375
	Total	0.7367	0.1609	1.0000	0.2485
Final	1	0.3081	0.1842	0.2910	0.1740
	2	0.2389	0.0719	0.1183	0.0356
	3	0.0816	0.0074	0.0976	0.0088
	Sum	0.7060	0.2690	0.5622	0.2224
	Total	1.0000	0.2736	0.8985	0.2270

Note: U – the set of independent variables; V – the set of dependent variables; s^2 – extracted variance; R_d – redundancy index.

Source: Authors' research.

A review of the canonical weights and canonical loadings (Table 4) indicates that among the independent variables, general relationship satisfaction and ambivalence in this regard, having a partner at the present, as well as nationality and sex contribute the most to the final model. In turn, among the

dependent variables, the order is as follows: STLS (the all three scales: feelings of closeness and emotional connection (I), physical and sexual attraction, excitement and desire (P), and the intention to maintain the relationship in the long term (C)), IOS, Online Intimacy (OI), Online Jealousy (OJ), Online Control (OC) and Emotional Communication Strategies (ECS). These dependent and independent variables commented on above maintained the highest stability from model to model.

While canonical loading reports the contribution of the original variable to a function such as CR (according to the rule of thumb the value of canonical loading should be ≥ 0.35), canonical weight can be interpreted similarly to the standardized beta coefficient in multiple regression.

A review of the canonical weights and loadings in CR1 indicates that having a partner and the relationship content increases, as well as STLS, IOS and OI. However, according to the values of canonical weights, the strongest relationship in the configuration of these variables occurs between relationship content, intention to maintain the relationship in the long term (STLS_C) and IOS. The opposite effect is caused by an increase in relationship discontent and relationship ambivalence.

CR2 adds additional information. According to the results obtained, when the nationality changed on Italian and respondents' and their partners' sex on male then OJ, OC and ECS increase as well as the OI decreases. Interestingly, the opposite effect occurs for Spanish participants; when the nationality changed on Spanish and respondents' and their partners' sex on male then OJ, OC and ECS decrease, OI increases. Nevertheless, according to the values of canonical weights, the strongest relationship in the configuration of these variables occurs between having an Italian nationality, OJ and OI. In such a way that the Italian nationality of the respondents is associated with higher OJ and lower OI values.

Regarding CR3, although this canonical root explains a significantly small part of the variance in the original variables, it is statistically significant. This justifies the result that with the change of nationality to Spanish, the level of online control (OC) and invasive and intrusive behaviour (OIB), two negative aspects of the quality of online dating relationships, decreases. In other words,

Table 4. Factor structure of relationships of variables in the canonical model: canonical weights and loadings

Original variable	Initial Model								Final Model					
	CR1		CR2		CR3		CR4		CR1		CR2		CR3	
	W	L	W	L	W	L	W	L	W	L	W	L	W	L
Variable U														
Italian n.	0.04	-0.15	0.66	**0.90**	-0.42	-0.29	0.78	0.05	0.03	-0.15	-0.79	**-0.95**	-0.80	-0.22
Spanish n.	0.16	0.08	-0.25	**-0.69**	-0.64	**-0.41**	0.71	0.04	0.14	0.08	0.21	**0.70**	-10.08	**-0.60**
Polish n.	0.03	0.05	0.03	-0.15	0.28	**0.75**	0.68	0.12						
Male	0.02	0.00	0.03	**0.47**	-0.20	-0.33	0.11	-0.25	0.00	0.00	-0.05	**-0.51**	-0.27	-0.26
Age	-0.05	0.11	-0.18	-0.14	-0.20	**0.36**	-0.35	**-0.35**						
Religious commitment	-0.04	-0.08	0.12	0.16	0.07	0.07	0.07	0.09						
Graduate education attained	0.00	0.06	-0.28	-0.28	0.03	0.01	0.40	0.28						
Postgraduate education attained	0.02	0.04	-0.09	-0.17	0.20	0.12	0.15	-0.25						
Overall relationship duration	0.00	0.20	0.17	0.05	0.53	**0.57**	0.04	-0.05						
Partner's past	-0.04	-0.25	0.00	0.07	-0.07	-0.02	-0.19	-0.29						
Partner's present	0.26	**0.69**	0.03	0.15	-0.09	0.14	0.68	**0.42**	0.27	**0.69**	-0.10	-0.16	0.17	0.26
Partner's age	0.02	0.08	0.07	0.02	0.00	0.30	-0.08	-0.20						
Male partner	0.05	0.03	0.09	**0.42**	0.00	-0.31	-0.34	-0.29	0.05	0.04	-0.06	**-0.45**	0.12	-0.24
Relationship content	0.72	**0.96**	0.33	0.05	0.22	0.10	-0.05	-0.15	0.72	**0.96**	-0.30	-0.04	0.18	0.08
Relationship discontent	-0.08	**-0.85**	0.20	0.03	0.12	0.03	0.73	0.25	-0.08	**-0.85**	-0.22	-0.04	0.18	0.04
Relationship ambivalence	-0.08	**-0.55**	0.08	0.14	0.33	0.21	-0.38	-0.07	-0.09	**-0.55**	-0.07	-0.15	0.32	0.21

Table 4 (continued)

Original variable	Initial Model								Final Model					
	CR1		CR2		CR3		CR4		CR1		CR2		CR3	
	W	L	W	L	W	L	W	L	W	L	W	L	W	L
Variable V														
IOS	0.36	**0.74**	0.21	0.21	0.21	0.10	-0.38	-0.16	0.36	**0.74**	-0.16	-0.17	-0.09	0.04
COA_ECS	-0.12	-0.27	0.24	**0.42**	-0.31	0.15	0.54	**0.48**	-0.13	-0.27	-0.29	**-0.42**	-0.34	0.05
COA_OI	0.12	**0.37**	-0.58	**-0.37**	0.03	0.11	0.35	**0.41**	0.12	**0.37**	0.60	**0.40**	-0.23	-0.12
COA_CP	-0.10	-0.29	-0.30	-0.21	0.13	0.32	-0.41	-0.31	-0.09	-0.28	0.33	0.25	0.13	0.26
COA_OJ	-0.07	-0.24	0.63	**0.71**	-0.34	0.09	-0.30	-0.01	-0.06	-0.23	-0.59	**-0.67**	-0.41	-0.01
COA_OC	-0.11	-0.30	0.12	**0.44**	0.62	**0.60**	-0.16	0.04	-0.11	-0.30	-0.12	**-0.41**	0.53	**0.48**
COA_OIB	-0.03	-0.12	-0.04	0.23	0.76	**0.79**	0.20	**0.30**	-0.03	-0.12	0.12	-0.16	0.82	**0.78**
STLS_I	0.17	**0.79**	0.09	0.13	0.01	0.06	-0.68	-0.16	0.16	**0.79**	-0.08	-0.13	-0.08	0.05
STLS_P	0.09	**0.73**	0.30	0.28	-0.34	0.05	0.71	**0.33**	0.09	**0.73**	-0.36	-0.29	-0.05	0.13
STLS_C	0.43	**0.87**	-0.08	0.13	0.42	0.18	0.11	0.10	0.44	**0.87**	0.09	-0.13	0.41	0.19

Note: CR – canonical root; W – canonical weight; L – canonical loading.

Source: Authors' research.

Spanish respondents are less likely to control their partners and less likely to engage in invasive and intrusive online behaviour towards their partners. This result is in line with the information provided by CR2.

In summary, the canonical correlation value indicates a definite relationship between the set of independent and the set of dependent variables. However, three of the original independent variables measured appeared to be specifically significant for the determination of love and its dynamic (STLS), identification with partner (IOS) and the online quality of dating relationship (CQA). These variables are: nationality, partner present, and general relationship satisfaction.

Discussion

Many studies focusing on adolescent online relationships display a bias highlighting their potential risk of abuse or harassment (Caridade et al., 2019; Bonilla-Zorita et al., 2021). However, our findings present a broader viewpoint. Moreover, they highlight the necessity of including significant variables, such as the cultural or national context, in research.

As it was shown in the results not all explanatory variables included in the model turned out to be important in determining the variability of dependent variables. For instance, we assumed that religiosity might play a role in differentiating relationship quality, but our findings suggest its influence is negligible, possibly due to its low or moderate intensity (Table 1). Similarly, the effect of education may be diminished by the influence of social network context. In contrast, having a partner, relationship satisfaction, and ambivalence regarding the relationship emerged as key determinants.

Part of the results are not surprising, and may even intuitively understandable, if we assume that staying in a current relationship and experiencing relationship contentment, translates into identification with the partner, a sense of closeness, the degree of intimacy, commitment, passion in the relationship, likewise online intimacy. Similarly, ambivalence was identified as a significant factor in reducing relationship quality, particularly when this quality is measured in terms of online intimacy, romantic love, and partner

identification. This finding is consistent with the results of studies cited in this paper. The situation differs concerning nationality and gender. Polish and Dutch nationalities show a similar pattern of relationships with the studied variables, unlike Italian and Spanish nationalities. In the case of Italian, a low degree of online intimacy is linked to an increase in the three dimensions outlined above. This reduced online intimacy may be a result of the social network itself (Scott et al., 2006). Perhaps Italian adolescents perceive online dating as less intimate, likely due to reduced physical proximity, leading to instability and insecurity, resulting in jealousy, controlling behaviour, and the use of emotional communication strategies. Although this line of interpretation requires further research. The perception of online dating intimacy may even vary depending on the time spent online. It appears that the absence of online intimacy creates a need for greater control over the partner (Emon et al., 2023). The Spanish nationality case is interesting because is less related to controlling behaviour, compared to the Italian. Probably on the contrary of Italians, Spanish adolescents develop a higher level of online intimacy which is connected to a decrease of online jealousy, online control, and emotional communication strategy. Spanish people perceive a higher level of online intimacy with their partners, probably this allows them to feel more secure about their relationships; therefore, they do not seem to need to display the above-mentioned controlling behaviours. Indeed, further results we found show that Spanish adolescents report a lower degree of online control and online intrusive behaviours.

A recent study carried out by Emond et al. (2023) has shown how online jealousy and intimacy are strictly connected when aggressive behaviour occurs within romantic relationships. When concerning non-aggressive behaviour, the relationship between jealousy and intimacy could have the opposite sign.

Control or jealousy behaviours could also be an indicator of the time spent online. A study carried out by Muise et al. (2009) on jealousy and social media, for example, found a positive correlation between time spent on Facebook and the level of jealousy experienced. Other research, including that of Elphinston and Noller (2011), has shown that high levels of social network

intrusiveness led to romantic dissatisfaction. These high levels of intrusiveness imply a reduced trust in partners, which in turn leads to harmful dynamics such as surveillance and jealousy.

The role of gender should be interpreted in the context of the aforementioned nationality-related factors. The opposite direction in how dependent variables are determined by male respondents and male partners (for Italian respondents: as OJ, OC, and ECS increase, OI decreases; for Spanish respondents: as OJ, OC, and ECS decrease, OI increases) can be interpreted in the context of differences within macho culture. Both of these countries, namely Spain and Italy, are characterized by its presence; however, it is Spain that has made greater progress in recent years in promoting gender equality and reducing conservative machismo (Renga, 2021; Morondo Taramundi, 2022). However, there are also reports that during adolescence, girls generally demonstrate a higher level of intimacy and emotional transparency than boys (Buhrmester & Furman, 1987; Lempers & Clark-Lempers, 1993).

The obtained results can also be explained by the role of earlier experiences related to security in caregiving and attachment, which determine the quality of functioning in romantic and friendly dyads. Individuals who experienced secure attachment and effective care earlier in life, including from friends, report a higher level of social acceptance, higher levels of given and received security, and lower negativity levels in romantic relationships in later adolescence (Allen et al., 1998; Allen et al., 2023). However, the findings mentioned here do not include strict control for the cultural factor, which would be crucial in accepting these findings. Perhaps differences in upbringing and exposure to gender differences could explain the results obtained in our study. However, at this point, these cited findings are more of hypotheses requiring further exploration.

Although this study primarily focuses on the quality of romantic relationships, its analysis of factors such as gender, nationality or close relationships experiences offers valuable insights into young people's social and emotional development, which closely intersects with their educational outcomes. By exploring the effect of sociodemographic variables and relationship quality, the research addresses key themes in adolescent psychology and social develop-

ment, highlighting potential implications for student well-being and educational practices in the scope of close and romantic relationships. The findings may prove particularly relevant to educators and researchers seeking to understand how online communication and relationship dynamics shape young people's overall development, including their educational experiences.

Conclusions

Understanding of how late adolescents feel when dating online is important to sustain their wellness and prevent negative feelings. The study presented here had the overall aim to unpack the quality of online dating to test the dimensions already described in the literature but probably never tested in one unique model.

From a practical perspective, this study supports the importance of integrating educational strategies that promote digital literacy and emotional intelligence. These tools can help adolescents better balance online and offline experiences, fostering healthier and more fulfilling interactions, as suggested by previous studies (Scott et al., 2006; Genc et al., 2022). Moreover, the presented results could concern adults' behaviour when they are called to monitor or accompany young adults in their online relationships. Knowing the dimensions producing content or discontent in dating online, adults could more efficiently help online younger users. A more sophisticated perception of what intimacy means, could help in living a positive online experience. A suggestion we can offer, reported also by the literature (Scott et al., 2006; Genc et al., 2022), is to integrate pre-existing offline relationships with the online experience. Adolescents should be encouraged to balance online and offline interactions by seeking offline verification of online messages and being mindful of the risks of misunderstandings that may arise from communication limited to a single modality.

While the results capture a focused analysis of a specific point in time during the peri-pandemic period, they provide a solid foundation for future research. Longitudinal studies with a more detailed cultural focus could examine how the structure of the tested variables evolves over time and adapts

to new digital environments, offering a more comprehensive understanding of romantic relationships in late adolescence.

Limitations of the study

This study acknowledges a few limitations that should be considered when interpreting the findings. Firstly, the imbalance in the number of participants recruited from different countries could be perceived as a limitation in interpreting the results. However, it is important to note that the study employed a correlational model rather than an intergroup comparison model. Therefore, the observed variability in characteristics is associated with the variability in nationality, rather than differences attributable to national groups. In the latter case, the number of subgroups is more crucial in terms of the analysis method being employed. Also, the method of collecting respondents, which involves obtaining them mainly through social media platforms, is characterized by all the limitations and advantages that are attributed to research conducted in this way (Beam, 2023; Zindel, 2023).

Secondly, we are fully aware that the dynamics underlying a phenomenon such as dating online is for its nature very unstable. New types of social networks, with different features may affect the online behaviour. Furthermore, at the age we consider for our participants changes of any types – biological, psychological, social – are very frequent and sometimes quite dramatic. Of course, such changes also affect online behaviour. This study provides a snapshot of the phenomenon but does not account for the fluidity of online dating behaviours over time.

An interesting follow up of this study, could be to administer our set of questionnaires at different times to the same participants, considering short intervals. In this way, we could grasp, at least partially, the dynamicity of how young adults manage to keep a relationship online. This would also allow us to improve the theoretical model proposed here. Surely, more research in this area will contribute to a deeper understanding of young adults' new styles of relating in a post-pandemic and highly connected online world.

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