



# Examining Peer Jealousy among University Students: A Mixed Method Study

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## Abstract

The purpose of this mixed methods research, conducted as three separate studies, is to explore university students' experiences with peer jealousy, develop the Peer Jealousy Scale (PJS) considering these experiences, and test the developed measurement tool in a hypothetical model. In Study I ( $N=14$ ), qualitative research yielded three overarching themes: "the behavioural aspect of peer jealousy", "the emotional aspect of peer jealousy", and "the cognitive aspect of peer jealousy". Based on these three themes, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), item analysis, Item Response Theory (IRT), test–retest analysis, criterion correlation validity, and reliability analyses were conducted for the PJS in Study II ( $N=971$ ). CFA validated the 14-item PJS developed by EFA. In the IRT, all items demonstrated excellent discrimination. As a result of the PJS's significant correlation with the Benign-Malicious Envy Scale (BeMaS), the validity of the criterion correlation was established, and the reliability of the scale was demonstrated using a variety of reliability coefficients. In Study III ( $N=515$ ), it was determined that peer jealousy and loneliness play serial multiple mediating roles in the relationship between self-esteem and harmony in life. All findings in this mixed methods study have expanded our understanding of peer jealousy.

**Keywords** Peer jealousy · Mixed method · Exploratory sequential design · Serial mediation analysis

## Introduction

Jealousy is one of the most common and universally experienced emotions. One of these definitions was contributed by Buunk [12] who defined it as the situation that arises when an individual perceives a real or imagined rival as a threat to an essential relationship in life. Jealousy, which is essentially the dread or anxiety of losing an object or relationship

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(Van [53]), is an exhausting emotion frequently observed in bilateral relationships [4]. According to these definitions, jealousy is a notion that significantly influences interpersonal interactions and can adversely impact individuals' mental health owing to the fear, anxiety, or perceived threat experienced [35, 55].

There are numerous varieties of jealousy, which have been studied from a variety of theoretical perspectives. These include jealousy in romantic relationships (Guerrero et al., 2011), jealousy between siblings [41], emotional jealousy [48], academic jealousy [8], workplace jealousy (Veiga et al., 2014), peer jealousy [26], and friendship jealousy (Parker et al., 2005). In this study, the concept of peer jealousy was examined and explained in depth, and its impact on individuals' psychological health and interpersonal relationships was explored.

## Peer Jealousy

Friendship jealousy [32, 33] and peer jealousy (Runions et al., 2021; Visconti et al., 2013) are used interchangeably in the literature. Individuals experience jealousy, a complex emotion toward those they view as close [10], Lavalley & Parker, 2009); this is a characteristic shared by these concepts. It was concluded that the term peer jealousy was more suitable for this study, as individuals may feel jealous not only of their friends but also of other people in their age group and social environment.

Peer jealousy can be described as a normal and complex emotion that develops between individuals of the same age group. Individuals in their age group may desire a success, object, or relationship that they do not possess [44]. In addition, the possibility of losing a success, object, or relationship that an individual values can also contribute to peer jealousy [33]. According to Akan [3] and Baumeister and Twenge [7], individuals who experience peer jealousy have difficulty controlling their emotions. According to Abraham [1], individuals with low self-esteem experience peer jealousy. Similarly, Kim et al. (2017) listed poor self-esteem as one of the characteristics of individuals who experience peer jealousy. The present study explores several indicators of peer jealousy.

Jealousy among peers, commonly manifested within comparable social groups, has been linked to numerous underlying factors (e.g., Özkoç & Çalışkan, 2015; Waldrop & Halverson, 1975). According to Özkoç and Çalışkan (2015), individuals may experience jealousy when their peers earn more money, achieve greater social or economic status, achieve success in work or education, or gain popularity in their environment, which can lead to feelings of inadequacy and competitive tension. Similarly, Waldrop and Halverson (1975) reported that jealousy can result from differences in interests and competence levels, often resulting in tense interactions and decreased self-esteem. Individuals are frequently jealous of their peers' social status, economic status, success in life, interests, level of competence, popularity, and social relationships, according to these studies. Such feelings of jealousy may adversely influence an individual's mental well-being and hinder the quality of their interpersonal relationships [32, 35, 55].

## The Present Study

Although jealousy has been widely explored in academic research, peer jealousy has received relatively little attention (e.g., [26, 35]; Mylecraine, 2012; [54]). Thus, it has been determined that peer jealousy has not been defined clearly in the literature and that there is no measurement tool to determine its level. Understanding peer jealousy may be important, especially in educational and personal settings, as it can influence individuals' social interactions and mental

health. Unlike jealousy in workplace or academic settings, peer jealousy is the subject of this study because it can specifically affect interpersonal relationships in a holistic way. This lacuna in the literature required these mixed methods sequential exploratory research design. Thus, a more precise definition and explanation of the phenomenon of peer jealousy were provided, as well as a method for measuring the level of peer jealousy using a measurement instrument. In order to accurately measure levels of peer jealousy and thus facilitate further research and effective intervention strategies, it was necessary to develop a reliable and valid PJS. This study is anticipated to address a significant lacuna in the literature.

According to research conducted by Crick and Ladd (1993), jealousy in relationships leads to isolation, social anxiety, and social avoidance. Likewise, according to Lavalley and Parker's (2009) research, individuals with peer jealousy became lonely. In this isolating environment, competition with colleagues can be useful. For instance, individuals who compete with their peers in academic subjects and receive poor grades may experience increased peer jealousy and isolation. This isolation can intensify negative emotions—such as sadness, hopelessness, helplessness, and anger—while simultaneously diminishing overall psychological well-being. This concept is also supported by research from Deutz et al. [24] in which it was highlighted that jealousy diminishes life satisfaction. Peer jealousy also hinders an individual's ability to adapt and negatively impacts social adaptation (Parker et al., 2005; Walker, 2003). Individuals who experience peer jealousy are likely to have a lower level of harmony in life, according to these findings. This process can also be explained by the tendency of individuals to evaluate themselves in relation to others, particularly when they perceive others as more successful or competent. Such comparisons may undermine self-worth and increase feelings of inadequacy, leading to withdrawal from social environments. Insecure emotional bonds and the fear of losing status or closeness in relationships may further amplify these reactions, contributing to difficulties in social adjustment and personal well-being.

Since peer jealousy negatively impacts all interpersonal relationships, notably close relationships, and lowers the well-being of individuals [10], Runions et al., 2021), university students in their young adult years were recruited. Research suggests that individuals bear specific responsibilities at each developmental stage, and fulfilling these obligations is essential for achieving healthy psychological growth [14]. In the young adulthood, one of these developmental stages, individuals have responsibilities. According to Havighurst, one of the fundamental responsibilities of individuals in this era is to maintain and enhance their interpersonal relationships [38]. To accomplish this endeavour in a healthy manner, it is believed that individuals should not experience excessively negative emotions, such as peer jealousy. The original value of examining peer jealousy among university students becomes apparent now.

The purpose of this three-stage mixed methods sequential exploratory research design is to disclose university students' experiences with peer jealousy (Study I), to develop the PJS considering these experiences (Study II), and to test the developed measurement tool in a hypothetical model (Study III). This research is believed to pave the way for future scientific studies on peer jealousy.

## Method

### Research Model

Using qualitative and quantitative approaches or methods in a single study, a mixed method research accumulates and analyses data, incorporates findings, and draws inferences [52].

The exploratory sequential design combines qualitative and quantitative research. In this design, the quantitative stage is implemented based on the qualitative stage's findings, and the primary findings are validated or generalized [17]. This research design is typically employed in studies of scale development (Creswell, 2019).

## Study I

In the Study I, university students' experiences with peer jealousy were explored to develop a better understanding of the phenomenon of peer jealousy. Peer jealousy was conceptualized as a broader construct encompassing both academic and friendship-related dimensions, rather than limiting it to a single context. Accordingly, an interpretive phenomenological analysis was conducted which is used in qualitative research to describe the phenomenon experienced by the participants (Smith & Osborn, 2003). This approach allows for the examination of peer jealousy in a broader context than just academic and friendship dynamics. In this investigation, a response was sought to the following research question:

*RQ1.* What experiences do university students have with peer jealousy?

Criterion sampling, which is described as a form of sampling based on situations or individuals meeting certain predetermined criteria [39], was utilized in Study I. The following criteria were established in Study I: i) participants are university students, ii) participants have diverse demographic characteristics in terms of gender, age, grade level, and department, iii) having a low score for agreeableness and a high score for neuroticism based on the Big Five personality traits. This was determined by analysing Digman's [25] research. According to the aforementioned study, individuals with low agreeableness and high neuroticism tend to be more jealousy, and iv) having a high jealousy score in BeMaS. Because individuals with high malicious envy scores may be more jealousy. Considering the criteria established by the researchers, 14 university students (seven female and seven male,  $M_{\text{age}} = 23$ , age range = 18–26) made up the sampling in Study I.

Before conducting interviews with 14 participants, a pilot interview was conducted with two university students who had varying age, gender, department, and grade level demographic characteristics. Using the feedback garnered from the pilot interview, the final semi-structured interview form was developed, and qualitative data was gathered from the participants. Initially, the draft interview form included 14 open-ended questions aimed at exploring the key themes of the study. Following the pilot interview, three questions were revised for clarity, and two questions were removed due to redundancy. This process resulted in a final form containing 12 refined questions that better aligned with the research objectives. In the final form, participants were asked questions aimed at understanding how they defined the concept of peer jealousy, what kinds of experiences they had on this subject, and how these experiences were reflected in their environment. In addition, opinions were obtained on in which situations and why peer jealousy emerged more clearly, the specific situations in which participants experienced jealousy, and what behaviors of individuals described as "jealous" in their environment created this perception. All of these were created by reviewing the literature on jealousy. During the process of data analysis, the stages outlined by Smith and Osborn (2003) were followed, and interpretations were made by repeatedly reviewing the documents. Based on these comments, codes, categories,

and themes pertaining to peer jealousy were established. In this process, their validity was ensured by obtaining expert opinion and their reliability was ensured by examining the participant opinions by another researcher. The MAXQDA 12 software was utilized throughout this procedure.

## Results Pertaining to Study I

The participants' experiences with peer jealousy in Study I revealed three overarching themes: the behavioural aspect of jealousy, the emotional component of jealousy, and the cognitive aspect of jealousy. Table 1 provides examples, codes, categories, and themes from participant perspectives that revealed these themes.

## Study II

This second stage of the mixed methods exploratory research design included the procedures associated with the creation of the PJS. To determine the validity and reliability of the PJS in Study II, EFA and CFA were conducted, and the following research question was addressed:

*RQ2.* Is the Peer Jealousy Scale (PJS) psychometrically valid and reliable?

In Study II, the convenience sampling procedure, which has advantages for the researcher in terms of time, cost, and labour force, but is difficult to represent the entire universe (Büyüköztürk, 2016), was favoured. Accordingly, quantitative data was collected from four distinct groups.

The first cohort consisted of 424 individuals, 185 female (43.6%) and 239 male (56.4%). The average age of participants between the ages of 18 and 30 was 22.59 ( $SD=2.47$ ). Using the data gathered from this cohort, EFA and reliability analysis were conducted. The second cohort included 290 female (77.3%) and 85 male (22.7%), for a total of 375 participants (age range=18–32,  $M_{age}=20.50$ ,  $SD=2.20$ ). Students from diverse grade levels and departments at four institutions in Türkiye made up the participants. Data collected from this group was utilized for CFA, item analysis, Item Response Theory (IRT), and reliability analyses (Cronbach's  $\alpha$ , McDonald's  $\omega$ , Guttman's  $\lambda_6$ ). The third group consisted of 75 individuals (age range=19–32,  $M_{age}=20.68$ ,  $SD=2.05$ ) from various grade levels and departments at a single university in Türkiye, 48 female (64%) and 27 male (36%). This group's data were used to determine the validity of the criterion correlation. In the fourth and final group, there were 62 female (63.9%) and 35 male (36.1%), for a total of 97 individuals (age range=18–31,  $M_{age}=20.76$ ,  $SD=1.89$ ). Students from various grade levels and departments at two institutions in Türkiye made up the participants. A test–retest analysis was conducted on the data gathered from this cohort.

In the beginning, some preliminary analyses were conducted for Study II. Before analysing the data, the problem of missing values, the assumption of normality, and multicollinearity were examined. For a normal distribution, the skewness and kurtosis values of the variables were examined. IBM SPSS Statistics version 26, Mplus version 6.12, and Stata Statistics version 14.2 were utilized for analysis at this stage.

The Kaiser–Meyer–Olkin (KMO) coefficient and the Bartlett Test for Sphericity were used to determine if the sample size was sufficient for EFA. The KMO value must be greater than 0.60, and the chi-square value obtained from the Bartlett Test of Sphericity

**Table 1** Interpretative phenomenological analysis of qualitative data

| Theme                                   | Category                           | Code                                              | Response                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Behavioural Aspect of Peer Jealousy | Behaviours To Look Different       | Behaviours Towards Acceptance                     | "...I try not to show my peer jealousy as much as I can, so that I will not be excluded. In order to be with them, I usually try not to show this feeling." (P3)                                                                                                                         |
|                                         |                                    | Behaviours Oriented To Be In Someone Else's Place | "I want to realize my dream and work abroad for a few years, but I cannot go because I do not have enough knowledge and support. And it makes me jealous that people who don't even worry about payment issues, who are fully supported by their families, go abroad as they wish." (P9) |
|                                         |                                    |                                                   | "I used to be jealous of the people around me who had good relationships when my relationship was not going well. There were many times when I thought that I would be happy if I had such a relationship. I always compare other people's relationships with my own." (P13)             |
|                                         |                                    | Behaviours Orienting to Prominence                | "I think it mostly happens in sports and academic matters. The reason for this is always wanting to be better, to be at the forefront. It actually happens in most cases. Everyone wants to be the best, and so am I. This may be the cause of jealousy." (P7)                           |
|                                         |                                    |                                                   | "...For example, when someone shows interest in someone else, I sometimes do different actions to attract attention to myself. I like to be in the foreground and to have my say. Maybe that's why I'm doing this behavior." (P6)                                                        |
|                                         | Behaviours Oriented to Superiority | Ambitious Behaviours                              | "I can't wait for someone around me to be in a better position than me, to earn more money, in short, to be successful." (P12)                                                                                                                                                           |
|                                         |                                    |                                                   | "...I get jealous when someone does something great in a race. I say to myself that I have to do it too." (P6)                                                                                                                                                                           |
|                                         |                                    | Competitive Behaviours                            | "... If in a subject, this lesson, social activity, award etc. it could be. Even though I fell behind them, I feel bad." (P1)                                                                                                                                                            |
|                                         |                                    |                                                   | "In one of the most important courses of the department, I had a close friend of mine trained before the exam. As a result of the exam, I got a lower grade than him and I wished I hadn't trained him. So I thought I would get higher than him." (P5)                                  |
|                                         |                                    | High Achievement Behaviours                       | "I sometimes get jealous when my successful friends win something instead of finding out how they got it." (P7)                                                                                                                                                                          |

**Table 1** (continued)

| Theme                                 | Category                       | Code                  | Response                                                                                                                                                                                                                                                                                                    |
|---------------------------------------|--------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Emotional Aspect of Peer Jealousy | Category<br>Negative Affection |                       | "...I am trying to make a career-oriented observation. I can't say if it's direct jealousy, but I observe the careers of some people by age. For example, I can say what people are doing. I can envy people who read a lot and improve themselves." (P10)                                                  |
|                                       |                                | <b>Code</b>           | <b>Response</b>                                                                                                                                                                                                                                                                                             |
|                                       |                                | Envy                  | "There are people I envy because they are more successful than me. Of course, there are people I say I want to achieve a lot and I don't want him to succeed." (P14)                                                                                                                                        |
|                                       |                                | State of Jealousy     | "Dual relations, family relations and academic issues reveal this situation to me a lot. For example, what a beautiful relationship he has, what a beautiful family he has. If a person is having a great time with his family, I can't take it. I always wanted to be like that with my own family." (P13) |
| The Cognitive Aspect of Peer Jealousy | Self-Reflections               | Low self-respect      | "...This sometimes makes me feel inadequate when I experience peer jealousy." (P3)                                                                                                                                                                                                                          |
|                                       |                                | Lack of self-esteem   | "I think peer jealousy arises from lack of self-confidence and lack of self-confidence; I attribute it to this. Sometimes I see that in myself too." (P7)                                                                                                                                                   |
|                                       |                                | Not being cared about | "...There are always situations where I wish it was done to me when people around me are cared about." (P2)                                                                                                                                                                                                 |

must be statistically significant at the 0.05 level [50]. When determining the number of factors, the eigenvalue and scree plot result were considered [13], Costello & Osborne, 2005). The threshold value was determined to be 0.40 (Avcu, 2021) for the scale items to have a good common variance value and 0.55 [16] for the scale items to have a good factor load. Lastly, Cronbach's alpha reliability analysis was performed.

To validate the structure determined by EFA, CFA was performed on a separate sample. The estimator used for CFA is maximum likelihood estimation. This analysis was performed with the AMOS Graphics 24 program. With regard to CFA, the values for  $\chi^2/\text{df}$ , CFI, TLI, RMSEA, and SRMR were analysed. Hooper et al. (2008) state that a  $\chi^2/\text{df}$  value less than two indicates a decent fit, while a value between two and five indicates an acceptable fit. While CFI and TLI values of 0.95 and above indicate a perfect fit, these indices should be 0.90 and above for an acceptable fit [11]. RMSEA and SRMR values below 0.05 indicate superb fit, and values below 0.08 indicate acceptable fit. In addition, the item-total correlation was computed for each item, and the threshold value for each item was determined to be 0.30 (Büyüköztürk, 2016). In the final step of the reliability analysis, a test-retest analysis was conducted using data acquired on a separate sample three weeks apart. The same 97 people participated in both stages of the process. Robinson et al. (1991) underscore that the correlation between test-retests administered at three-week intervals must be at least 0.50. Additionally, Cronbach's alpha, McDonald's omega, and Guttman's lambda values were determined. According to Nunnally and Bernstein [43], these reliability values must be at least 0.60.

IRT was used to evaluate the discrimination, difficulty, and informativeness of the scale following CFA. In comparison to the Classical Test Theory, IRT provides more specific and reliable information at the individual and item level [15]. It is anticipated that values calculated for item discrimination in IRT will be greater than 1.0 [6]. In addition, the item characteristic curve was examined to determine its visual representation of the items' discrimination [29]. This curve illustrates the relationship between the competence level of the participants and the correct response.

At the conclusion of the data analysis for Study II, the relationships between the PJS and the BeMaS were assessed for criterion correlation validity by calculating the Pearson Correlation coefficient. The BeMaS was developed by Lange and Crusius [34], Turkish version: [19]). The 10 items (e.g., “*When I envy others, I focus on how I can be as successful as them in the future*”, “*I want people who are better than me to lose their superiority*”) are rated on a six-point scale from 1 (*strongly disagree*) to 6 (*strongly agree*). The BeMaS gives two separate scores for benign envy and malicious envy from each of the five items. The Cronbach's alpha coefficient of the scale was reported as 0.86 for the malicious envy dimension and 0.78 for the benign envy dimension [19].

## Results Pertaining to Study II

During the development of the PJS, it was determined that neither an absent value nor a multicollinearity issue existed in the data set. The 29 items whose skewness and kurtosis values did not satisfy the normality assumption were excluded from the data set, and analyses were conducted with the remaining 26 items. It was determined that these items had appropriate EFA values (KMO=0.795; Bartlett's  $\chi^2=1812.371$ ,  $p<0.000$ ). EFA resulting in a four-factor, 14-item measurement instrument that explained 63.015% of the total variance. The scree diagram supports this structure (see Fig. 1). In Table 2, the factor loads

of the items of the PJS, the sub-dimensions of the items, and the Cronbach's alpha values calculated for the overall scale and its sub-dimensions are presented:

The 14-item PJS, which was administered to a different sample to validate the obtained structure, demonstrated satisfactory agreement according to CFA ( $\chi^2=189.312$ ,  $p<0.001$ ,  $df=71$ ,  $\chi^2/df=2.666$ , CFI=0.951, TLI=0.938, RMSEA=0.067, SRMR=0.042). The factor loadings of the scale items varied between 0.612 and 0.818. Table 3 displays the factor loadings, descriptive statistics, and item-total correlation values of the scale items. The results indicated that the scale representation capacity of the items was adequate.

After confirming the structure of the scale, IRT was conducted. The analysis revealed that the discrimination coefficient ( $\alpha$ ) varied between 1.40 and 3.80. This result indicates that the items of the PJS have a high capacity for discrimination. Figure 2 and Table 4 depict the outcomes of the IRT.

Within the scope of the PJS's reliability analysis, the test-retest reliability in a distinct sample was determined to be 0.711. In addition, Table 5 contains the Cronbach's alpha, McDonald's omega, and Guttman's lambda reliability values for the overall scale and its sub-dimensions. All calculated reliability values were determined to be adequate.

The relationship between the PJS and the BeMaS was examined to ascertain its criterion correlation validity. It was determined that there was a significant positive correlation between peer jealousy and benign envy level ( $r=0.230$ ,  $p<0.05$ ) and malicious envy level ( $r=0.483$ ,  $p<0.01$ ) among the participants. These results demonstrate that the PJS meets the criteria for criterion correlation validity.

All these findings within the scope of Study II demonstrate that the 14-item structure of the PJS, which consists of four factors, is psychometrically valid and reliable in the sample of university students.

### Study III

In the third and final stage, a hypothetical model was used to discuss the concept of peer jealousy. In this hypothetical model, the role of peer jealousy and loneliness as serial

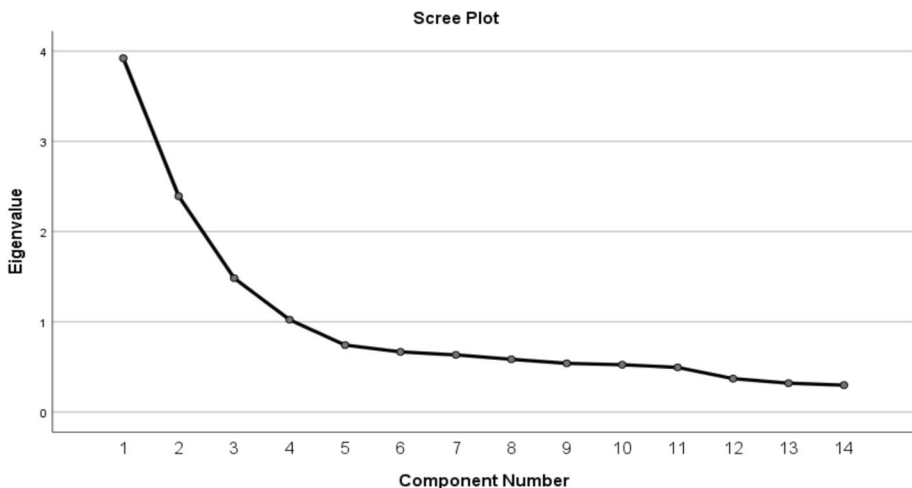


Fig. 1 The scree plot

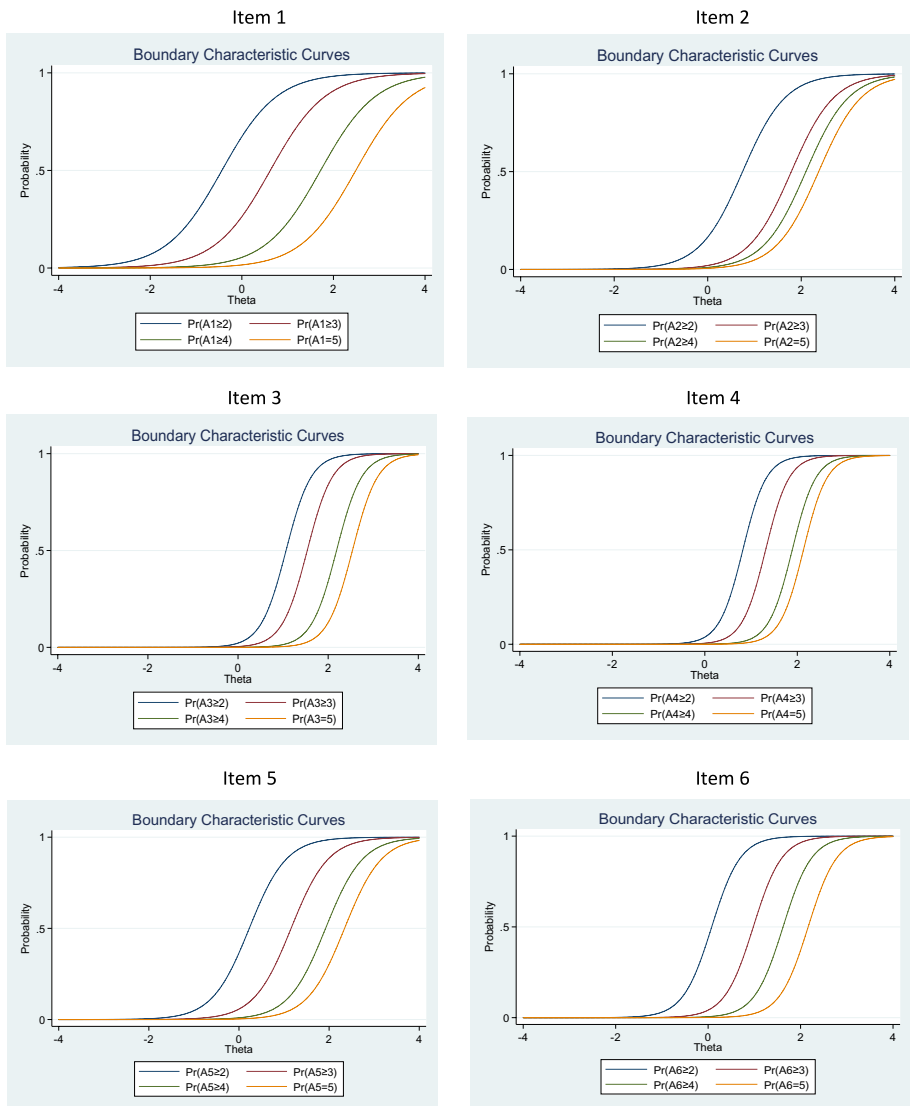
**Table 2** The results of the exploratory factor analysis of the peer jealousy scale and the cronbach alpha reliability values

| Item Number                       | Communalities | F1      | F2      | F3      | F4     |
|-----------------------------------|---------------|---------|---------|---------|--------|
| 8                                 | .607          | .582    |         |         |        |
| 13                                | .543          | .788    |         |         |        |
| 10                                | .582          | .675    |         |         |        |
| 12                                | .602          | .664    |         |         |        |
| 7                                 | .478          | .582    |         |         |        |
| 5                                 | .741          |         | .867    |         |        |
| 6                                 | .708          |         | .850    |         |        |
| 1                                 | .568          |         | .722    |         |        |
| 11                                | .729          |         |         | .920    |        |
| 9                                 | .676          |         |         | .739    |        |
| 14                                | .660          |         |         | .699    |        |
| 3                                 | .687          |         |         |         | .856   |
| 4                                 | .671          |         |         |         | .763   |
| 2                                 | .570          |         |         |         | .562   |
| Eigenvalue                        |               | 3.921   | 2.393   | 1.484   | 1.024  |
| Explained rate of variance        |               | 28.011% | 17.090% | 10.603% | 7.311% |
| Ratio of total explained variance |               | 63.015% |         |         |        |
| Cronbach alpha                    |               | .785    | .762    | .753    | .627   |
| Cronbach alpha (General)          |               | .786    |         |         |        |

**Table 3** Factor loadings, descriptive statistics, and item-total correlations of the peer jealousy scale

| Item    | Factor loadings | Mean  | SD    | Item-total correlations |
|---------|-----------------|-------|-------|-------------------------|
| Item 1  | .636            | 2.123 | 1.133 | .589                    |
| Item 2  | .714            | 1.437 | .902  | .566                    |
| Item 3  | .814            | 1.275 | .729  | .566                    |
| Item 4  | .793            | 1.387 | .876  | .538                    |
| Item 5  | .746            | 1.677 | .989  | .688                    |
| Item 6  | .818            | 1.765 | 1.023 | .749                    |
| Item 7  | .623            | 2.027 | 1.118 | .591                    |
| Item 8  | .687            | 1.605 | 1.010 | .633                    |
| Item 9  | .725            | 1.869 | 1.202 | .627                    |
| Item 10 | .757            | 1.605 | .994  | .698                    |
| Item 11 | .637            | 2.461 | 1.417 | .563                    |
| Item 12 | .743            | 1.789 | 1.090 | .704                    |
| Item 13 | .612            | 1.637 | .966  | .586                    |
| Item 14 | .744            | 1.840 | 1.154 | .646                    |

N = 375



**Fig. 2** Item characteristic curve for the peer jealousy scale

multiple mediators in the relationship between university students' self-esteem and their level of harmony in life was examined. In this context, the following research query was sought during the final phase of the investigation:

*RQ3.* Do peer jealousy and loneliness have a serial mediating role in the relationship between self-esteem and harmony in life?

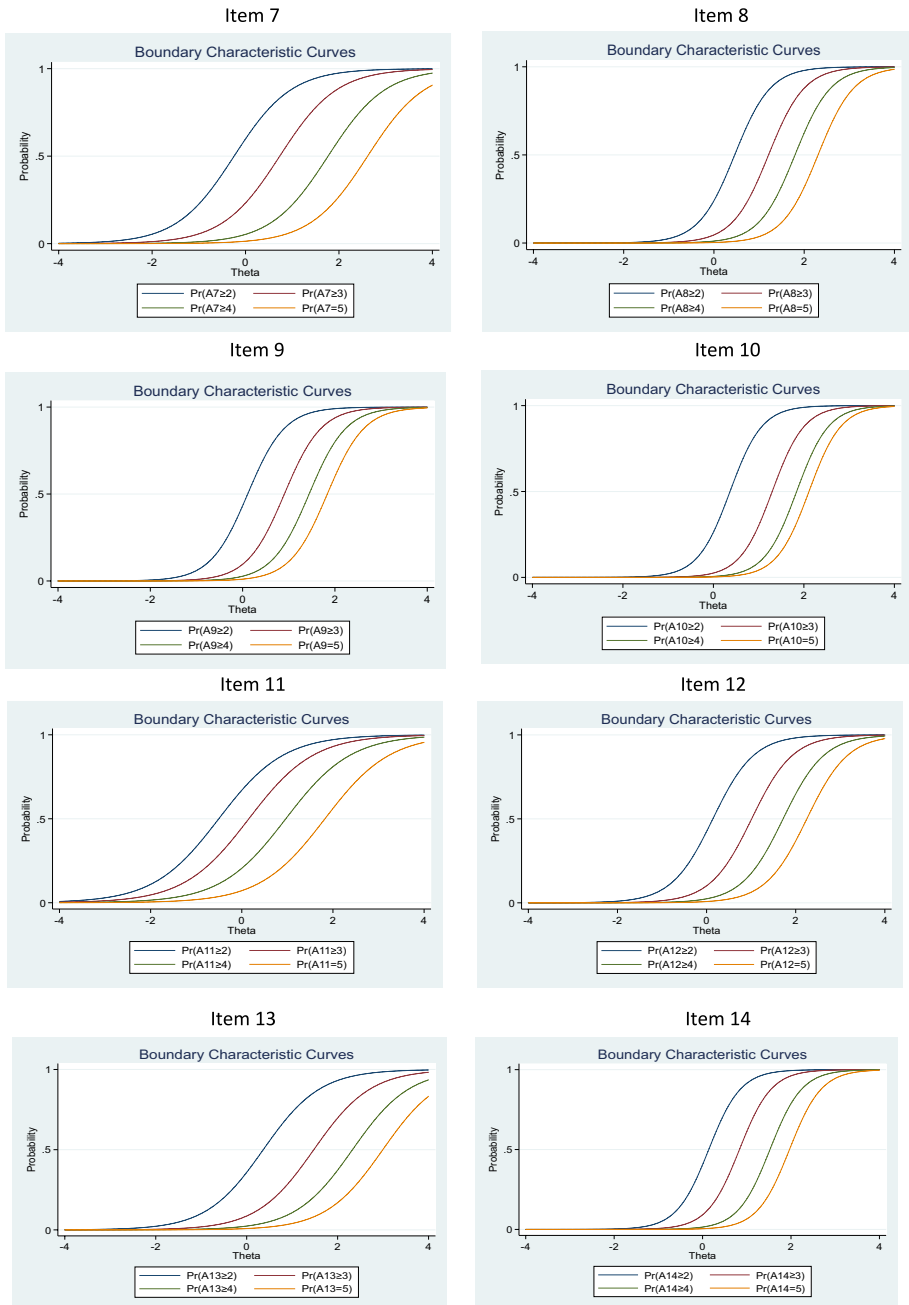


Fig. 2 (continued)

**Table 4** IRT Results for the peer jealousy scale

| Item    | $\alpha$ coefficient | SE   | Confidence interval | z    | $p >  z $ |
|---------|----------------------|------|---------------------|------|-----------|
| Item 1  | 1.66                 | .20  | 1.26–2.06           | 8.17 | .001      |
| Item 2  | 2.17                 | .34  | 1.51–2.84           | 6.41 | .001      |
| Item 3  | 3.56                 | .77  | 2.04–5.08           | 4.60 | .001      |
| Item 4  | 3.93                 | 1.06 | 1.86–6.00           | 3.72 | .001      |
| Item 5  | 2.42                 | .39  | 1.66–3.18           | 6.24 | .001      |
| Item 6  | 3.21                 | .68  | 1.89–4.54           | 4.75 | .001      |
| Item 7  | 1.63                 | .19  | 1.26–2.01           | 8.51 | .001      |
| Item 8  | 2.50                 | .32  | 1.87–3.13           | 7.78 | .001      |
| Item 9  | 2.48                 | .42  | 1.66–3.30           | 5.92 | .001      |
| Item 10 | 2.81                 | .38  | 2.07–3.55           | 7.42 | .001      |
| Item 11 | 1.40                 | .18  | 1.04–1.76           | 7.61 | .001      |
| Item 12 | 2.16                 | .26  | 1.64–2.68           | 8.16 | .001      |
| Item 13 | 1.60                 | .20  | 1.21–1.99           | 8.00 | .001      |
| Item 14 | 2.75                 | .51  | 1.75–3.75           | 5.39 | .001      |

**Table 5** Reliability results of the general and sub-dimensions of the peer jealousy scale

|                                                   | Cronbach's $\alpha$ | McDonald's $\omega$ | Guttman's $\lambda_6$ |
|---------------------------------------------------|---------------------|---------------------|-----------------------|
| Peer Jealousy (General)                           | .910                | .912                | .918                  |
| Self-comparison (F1)                              | .813                | .815                | .785                  |
| Jealousy regarding efficiency and attraction (F2) | .773                | .774                | .703                  |
| Jealousy regarding academic achievement (F3)      | .729                | .730                | .662                  |
| Jealousy regarding relationships (F4)             | .808                | .812                | .751                  |

$N = 375$

At this point in the investigation, the convenience sampling technique was utilized. There was a total of 515 participants (age range = 18–32,  $M_{\text{age}} = 20.99$ ,  $SD = 2.60$ ) in Study III, with 303 female (58.8%) and 212 male (41.2%). Participants were undergraduates from 65 different departments at 49 different Turkish universities. During the period of data collection, 87 participants (16.9%) were enrolled in the preparatory class, 82 were in the first grade (15.9%), 100 were in the second grade (19.4%), 120 were in the third grade (23.3%), 125 were in the fourth year (24.3%), and one was in the fifth year (0.2%).

The measures instrumented in Study III consisted of Life Adjustment Scale-3, Two-Dimensional Self-Esteem Scale, PJS, and The UCLA Loneliness Scale, all of which are described below.

### Life Adjustment Scale-3 (LAS-3)

Kjell and Diener developed the LAS-3 (2021; Turkish version: Yelpaze et al., 2022). The three items (e.g., “Many aspects of my life are in balance”) are scored on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with a range of 3 to 21. No reverse item exists on the scale. The fit index values of the scale demonstrate that adequate fit was achieved (CFI = 0.935, GFI = 0.948, IFI = 0.936). The harmony in life is greater

the higher the score. The scale's Cronbach's alpha coefficient was determined to be 0.87 (Yelpaze et al., 2022). In this study, Cronbach's alpha coefficient was found to be 0.832.

### Two-Dimensional Self-Esteem Scale (TWSES)

The TWSES was devised by Tafariodi and Swann [51], Turkish version: Doğan, 2011). The 16 items (e.g., “*I am sure of my own worth*”) are scored on a five-point scale spanning from 1 (*not at all suitable*) to 5 (*completely suitable*), with a range of 16 to 80. On the measure, there are items with reverse scoring. As a result of CFA, the fit index values of the scale were reported to be at a good level (CFI=0.97, GFI=0.94, NFI=0.95, IFI=0.97, RMSEA=0.049). The greater the score, the higher the level of self-esteem. According to Doğan (2011), the Cronbach's alpha coefficient of the scale was 0.83 and 0.74, respectively. The Cronbach alpha internal consistency value obtained in this study is 0.915.

### Peer Jealousy Scale (PJS)

The PJS was developed by researcher(s). The 14 items (e.g., “*I jealousy my peers who have better grades than me*”) are rated on a five-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*) with scores ranging from 14 to 70. There is no reverse item in the scale. The higher the score, the greater the peer jealousy. The scale has four sub-dimensions: i) Self-comparison, ii) jealousy regarding efficiency and attraction, iii) jealousy regarding academic achievement, and iv) jealousy regarding relationships. The Cronbach's alpha coefficient was calculated as 0.786 for the overall scale and 0.785, 0.762, 0.753, and 0.627 for the sub-dimensions, respectively.

### The UCLA Loneliness Scale (ULS)

The ULS was developed by Hays and DiMatteo [31]; Turkish version: Doğan et al., 2011). The eight items (e.g., “*There is no one I can turn to*”) are rated on a four-point scale from 1 (*not at all suitable*) to 4 (*completely suitable*), with scores ranging from 8 to 32. There are reverse scored items in the ULS. It was stated that the construct validity of the scale was provided at a good level (CFI=0.94, GFI=0.97, NFI=0.92, RMSEA=0.066). The higher the score, the greater the loneliness. The Cronbach's alpha coefficient of the scale was calculated as 0.72 (Doğan et al., 2011). In this study, Cronbach alpha reliability value was calculated as 0.829.

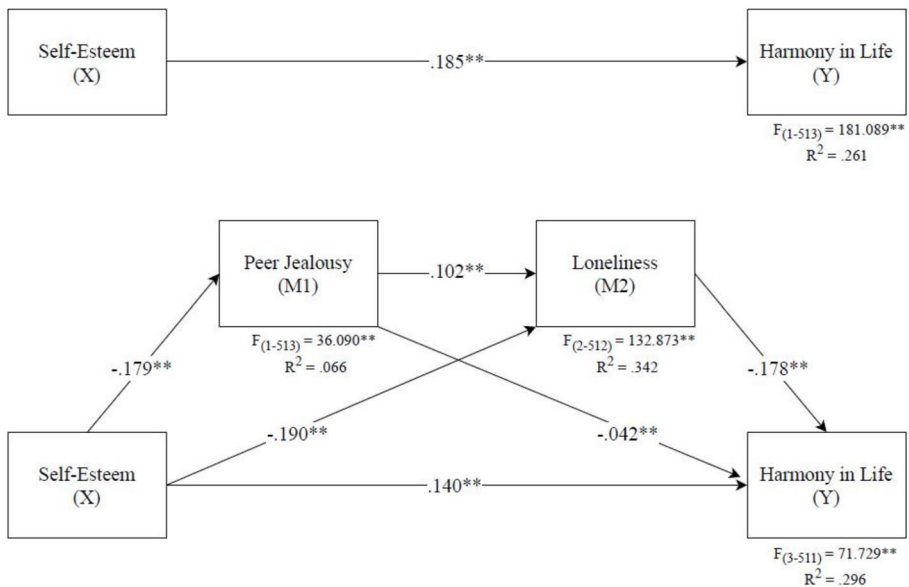
At this point in the study, preliminary analyses have been conducted. When the skewness and kurtosis coefficients were evaluated, it was determined that the variables fell between  $\pm 2$  and that the assumptions of normality were met [50]. At this point, analyses were conducted using version 26 of IBM SPSS Statistics.

Following these preliminary analyses, Pearson correlation analysis was used to examine the relationships between peer jealousy, harmony in life, loneliness, and self-esteem. The participant data for Study III were then analysed using PROCESS v4.0 (Model 6; [30]). In this analysis of sequential mediation, the independent variable influences the dependent variable in four ways: one directly and three indirectly. After testing the hypothetical model, the bootstrapping method, as defined by Hayes and Preacher (2014), was used to ascertain the significance of the mediating variables. Maximum likelihood estimation was utilized, 5,000 bootstraps were employed, and the analysis was conducted with a 95%

**Table 6** Descriptive statistics and correlations of the variables in the study

| Variable           | 1       | 2       | 3       | 4 | M     | SD    | Skewness | Kurtosis |
|--------------------|---------|---------|---------|---|-------|-------|----------|----------|
| 1. Self-Esteem     | –       |         |         |   | 51.63 | 11.34 | -.280    | .108     |
| 2. Peer Jealousy   | -.256** | –       |         |   | 25.90 | 7.95  | .630     | .263     |
| 3. Loneliness      | -.555** | .320**  | –       |   | 13.51 | 4.27  | .933     | .645     |
| 4. Harmony in Life | .511**  | -.240** | -.426** | – | 14.99 | 4.11  | -.849    | .168     |

$N=515$ , \*\*  $p < 0.01$

**Fig. 3** The result of serial multiple mediational model, \*\*  $p < .01$ 

confidence interval. MacKinnon et al. (2004) state that the absence of a zero value within the confidence interval values indicates significance.

### Results Pertaining to Study III

Table 6 displays the relationships between the variables of this study and their descriptive statistics, such as mean score, standard deviation, skewness, and kurtosis.

According to Table 6, there is a statistically significant relationship between all variables ( $r = -0.555$ ;  $r = 0.511$ ,  $p < 0.01$ ). Moreover, the skewness values of the variables range between  $-0.849$  and  $0.933$ , and the kurtosis values range between  $0.108$  and  $0.645$ . Therefore, the assumption of normality is made. These results demonstrate that the assumptions underlying serial multiple mediation analysis are met.

In Study III, the role of peer jealousy and loneliness as serial multiple mediating in the relationship between self-esteem and harmony in life was investigated. The direct and

indirect effects of self-esteem on harmony in life are discussed in the hypothetical model. Figure 3 illustrates the outcomes of the analysis.

Figure 3 shows that self-esteem positively predicted harmony in life ( $c=0.185$ , 95% CI=0.158, 0.212). When both peer jealousy and loneliness are simultaneously included in the model, the relationship between self-esteem and harmony in life is still significant, albeit to a lesser extent ( $c'=0.140$ , 95% CI=0.108, 0.172). This finding demonstrates that peer jealousy and loneliness partially mediate the relationship between self-esteem and harmony in life. The direct and indirect effects are detailed in Table 7.

As seen in Table 7, this hypothetical model explains three distinct indirect effects. Self-esteem predicted harmony in life through peer jealousy in a statistically significant manner (bootstrap coeff=0.008, 95% CI=0.001, 0.017). Self-esteem significantly predicted acclimation to life through loneliness (bootstrap coeff=0.034, 95% CI=0.015, 0.054). The serial multiple mediation of peer jealousy and loneliness was statistically significant in the relationship between self-esteem and harmony in life (bootstrap coeff=0.003, 95% CI=0.001, 0.006).

## Discussion

A small number of studies (e.g., [28]) have examined peer jealousy although it affects individuals emotionally [24] and socially (Lavallee & Parker, 2009). In this mixed method study, the concept of peer jealousy was examined in depth in three separate studies. The first study aimed to explore university students' experiences of peer jealousy, while the second study focused on developing the PJS grounded in the insights gathered from these experiences. The objective of the third study is to test the developed measurement instrument using a hypothetical model.

In Study I, three overarching themes were derived from the experiences of university students with peer jealousy. The first has to do with the behavioural facet of jealousy. Peer jealousy is prompted by the aspiration of university students to attain prominence. This finding is corroborated by Akan [2] who argued that jealous individuals desire to be at the vanguard of any subject more than others. Likewise, individuals experiencing peer jealousy may adopt altered behaviors in an effort to gain acceptance within their social environment or to assume the role or status of another person. University students frequently experience feelings of jealousy, notably due to their pursuit of popularity and social standing. This

**Table 7** The findings of bootstrapping coefficients and confidence intervals

| Effect                                                                | Bootstrap Coefficient <sup>a</sup> | SE   | <i>t</i> | <i>p</i> | Lower Limit <sup>b</sup> | Upper Limit <sup>b</sup> |
|-----------------------------------------------------------------------|------------------------------------|------|----------|----------|--------------------------|--------------------------|
| Total effect                                                          | .185                               | .014 | 13.457   | <.001    | .158                     | .212                     |
| Direct effect                                                         | .140                               | .016 | 8.627    | <.001    | .108                     | .172                     |
| Total indirect effect                                                 | .045                               | .011 |          |          | .023                     | .067                     |
| Indirect effect ( $X \rightarrow M_1 \rightarrow Y$ )                 | .008                               | .004 |          |          | .001                     | .017                     |
| Indirect effect ( $X \rightarrow M_2 \rightarrow Y$ )                 | .034                               | .010 |          |          | .015                     | .054                     |
| Indirect effect ( $X \rightarrow M_1 \rightarrow M_2 \rightarrow Y$ ) | .003                               | .001 |          |          | .001                     | .006                     |

X: Self-Esteem, Y: Harmony in Life,  $M_1$ : Peer Jealousy,  $M_2$ : Loneliness; <sup>a</sup> Based on 5000 bootstrap samples, <sup>b</sup> 95% confidence intervals

result is consistent with previous research (e.g., [40], Özkoç & Çalışkan, 2014) emphasizing that individuals can become jealous to obtain the same possessions or position as another individual. As the behavioural aspect of peer jealousy, ambition and competition for high achievement also provoke peer jealousy. Jealousy is more prevalent among university students when it comes to athletics, academics, and social status. The literature contains research results that corroborate this conclusion. In the study conducted by Malkoç and Erginsoy [37], it was found that a competitive attitude influences jealousy. The findings in the study of Deliveli [20] showed that competition and ambition in the workplace breed jealousy. According to a recent study by Humayon and Shoaib (2019), competition is a factor that increases jealousy. Power and Dalglish [47] found that the notion of high achievement—often examined in conjunction with competition and ambition—serves as an additional contributor to heightened feelings of jealousy. All these results corroborate the behavioral component of peer jealousy.

Another theme that emerged from Study I was the emotional component of jealousy. In this context, this study determined that individuals who experience peer jealousy are typically negative-emotional individuals. This result is consistent with numerous previous research findings (e.g., [5, 23, 45]). According to these studies, individuals with peer jealousy frequently experience feelings of unhappiness, hopelessness, helplessness, and wrath. It is evident that individuals experiencing peer jealousy cannot be attracted to the characteristics, relationships, or objects of others, and even resent them, desiring that they not exist in others. In the study conducted by Smith and Kim [49], it was found that jealous individuals desire for the other party to lose what they have by experiencing anger, hopelessness, and pain. All these findings corroborate the emotional aspect of peer jealousy.

The final theme discovered in Study I relates to the cognitive aspect of jealousy. Within the scope of this theme, it has been determined that individuals who experience peer jealousy have negative self-perceptions. Peer jealousy may be more prevalent among these individuals due to their low self-esteem, lack of self-confidence, and inability to receive attention from their environment. There are research results in the literature that support this finding. For instance, according to recent research by Akan [3], there is a significant negative correlation between friendship jealousy and self-esteem. According to Demirtaş and Dönmez [22], poor self-esteem is also associated with jealousy. According to the research of Blevins [9], a lack of self-confidence is a factor that initiates peer jealousy. Indifference is one of the irrational thoughts that create jealousy. When university students feel unappreciated or ignored by others, they may experience increased jealousy. Individuals can attempt to improve their well-being in this manner by drawing attention to themselves in society. This conclusion is corroborated by the research of Dryden [27]. According to the aforementioned study, a dearth of interest plays a role in individuals experiencing jealousy. All these findings demonstrate the cognitive aspect of peer jealousy. These results underline the importance of addressing maladaptive thought patterns in individuals with low self-esteem to reduce jealousy-related distress. Moreover, interventions that enhance self-worth and perceived social value may be effective in mitigating the cognitive triggers of jealousy.

In Study II, a 14-item PJS comprising four subdimensions was constructed using a sample of university students based on the themes derived from the qualitative research findings. As stated by Pett et al. [46], the fundamental assumptions of EFA such as missing data, multicollinearity, normality, sample size, and factorability were provided during the development of this scale. It was determined that there were no missing data and no multicollinearity issues in the dataset. As Tabachnick and Fidell [50] stated, items not between  $\pm 2$  were excluded from the data set and analyses were conducted under

the assumption of normality. Norušis [42] demonstrates that a sufficient sample size is delivered by EFA with 424 participants. The fact that the KMO value is greater than 0.60 and the chi-square value derived from the Bartlett Test of Sphericity is significant at the 0.05 level indicates that factorability has been achieved [50]. As a result of the analysis, the common variance value and factor loadings of all items of the PJS are at a good level (Avcu, 2021; [16]). In addition, the fact that the total variance explained is greater than 50 percent indicates that it is consistent with the accepted theory [46]. When determining the four sub-dimensions of the scale, care was taken to ensure that the eigenvalue was greater than 1 (Costello & Osborne, 2005), and a scree plot (Cattell, 1996) confirmed this result. In addition, the subdimensions of the PJS were found to be consistent with the qualitative research themes. The Cronbach's alpha reliability coefficient of the total scale and its subdimensions is satisfactory [43].

In Study II, the PJS was validated using CFA on a separate sample. Browne et al. [11] and Hooper et al. (2008) determined that the fit index values for the scale were acceptable. The result of the item-total correlation indicated that the items of the PJS adequately represented the scale (Büyüköztürk, 2016). According to Baker's [6] criteria, items on the IRT and PJS following CFA were categorized as high. This analysis of the properties and validity of the items improved the statistical reliability of the scale. It is also essential to scrutinize the item characteristic curve, which provides a visual representation of the items' discrimination. More distinctive the item, the steeper the slope of its characteristic curve (Avcu, 2021). This study's visuals indicate that the items are adequately distinguishable.

It was determined that the Cronbach's alpha, McDonald's omega, and Guttman's lambda reliability values computed within the scope of the scale's reliability analyses were acceptable [43]. Since the test-retest result on a distinct sample administered at three-week intervals is greater than the threshold value specified in the literature (Robinson et al., 1991), this demonstrates the reliability of the scale. In conclusion, the PJS is a psychometrically valid and dependable instrument for measuring jealousy among university students. These findings collectively indicate that the scale can yield stable and consistent results over time and across different psychometric approaches. Therefore, it offers a reliable foundation for future studies aiming to explore the dynamics of peer jealousy.

In Study III, the role of peer jealousy and loneliness as serial mediating in the relationship between university students' self-esteem and their level of harmony in life was investigated. There is no research in the literature that considers these variables concurrently. The direct and indirect results of this study are discussed in detail, accordingly, below.

The first finding of Study III is that peer jealousy mediates the relationship between self-esteem and harmony in life. In other words, university students' self-esteem predicts their harmony in life through peer jealousy. Based on this finding, it can be concluded that university students with low self-esteem experience greater peer jealousy and are unable to develop their adaptation skills throughout their lives. Therefore, continuing activities aimed at boosting university students' self-esteem and indirectly reducing peer jealousy can enhance their lifelong adaptability. Literature contains research findings that support this conclusion [1, 3]. According to these studies, there is a significant correlation between self-esteem and peer jealousy. According to the findings of Kim et al. (2017), self-esteem predicted friendship jealousy. In the study conducted by Çırpan and Özdoğru [19], it was discovered that jealousy is negatively associated with self-esteem. Nonetheless, according to Parker et al. (2005), jealousy is a concept that makes adaptation in life difficult and negatively impacts social adaptation. Similarly, Walker's (2003) study found a correlation between jealousy and adaptability abilities in everyday life. According to these studies,

the interpersonal relationships of jealous individuals may deteriorate, and they may have difficulty adapting to their environment. This highlights the importance of developing psychological interventions that not only address jealousy directly but also strengthen core self-beliefs in young adults to promote better life harmony.

The second finding from Study III is that loneliness serves as a mediator between self-esteem and harmony in life. Due to their low self-esteem, university students become lonelier, and as a result, their level of life integration decreases. Recent research indicates that there is a significant negative relationship between self-esteem and loneliness (e.g., Deniz et al., 2022; [36], Smith, 2022; van Tonder et al., 2023). All these studies indicate that self-esteem is a predictor of loneliness. However, previous research has shown that loneliness is also associated with harmony in life. In the study conducted by Lavalley and Parker (2009), for instance, a significant correlation was found between loneliness and adjustment. According to Lee's (2020) research, there is a correlation between loneliness and social cohesion in life. In a recent study by Akdeniz and Gültekin-Ahçı (2023), it was reported that loneliness predicted psychological adjustment. All these research outcomes are consistent with this study's findings. This suggests that enhancing students' self-esteem may be a strategic step not only to reduce feelings of loneliness but also to foster a greater sense of coherence and connection in life.

In accordance with the research question of Study III, the key finding is that peer jealousy and loneliness serve as serial multiple mediators in the relationship between self-esteem and harmony in life. In other words, self-esteem indirectly predicts life satisfaction via peer jealousy and isolation. Based on this finding, it can be concluded that university students with low self-esteem are more likely to experience peer jealousy, which may increase loneliness and indirectly reduce the level of harmony in life. In particular, diminished self-esteem can heighten sensitivity to social comparisons and evoke feelings of inadequacy during peer interactions, thereby provoking jealousy toward peers [49]. This heightened jealousy can disrupt social connectedness and trust, eventually escalating feelings of loneliness (Parker et al., 2005). Consequently, the together effect of peer jealousy and loneliness diminishes one's perception of harmony in life, as the individual struggles with emotional distress and a lack of fulfilling social relationships. It has been reported that these concepts are related to one another in two ways, even though there is no research in the literature that discusses these four variables together. In the study conducted by Demirci et al. [21], for instance, self-esteem significantly predicts harmony in life. This finding supports the study's direct effect conclusion. In the study conducted by Parker et al. (2005), it was discovered that jealousy among peers predicted loneliness. This finding also validates the relationship between our study's mediator variables. Taken together, these results highlight the need for holistic interventions that target both emotional and social dimensions of university students' psychological well-being.

## Implications

This mixed methods study provided a more in-depth examination of the concept of peer jealousy, which has been the subject of a limited number of previous studies, as well as a definition and explanation of the phenomenon of peer jealousy. In addition, with the development of an instrument for measuring the level of peer jealousy, a significant gap in this field has been filled. Testing peer jealousy in a complex model with concepts such as self-esteem, loneliness, and harmony in life, which are essential for the interpersonal relationships of the individual, also had significant implications for the literature. Moreover, the

integration of these constructs offers a holistic perspective, allowing for a more comprehensive analysis of the psychological dimensions associated with peer jealousy.

All the findings from this study are expected to contribute to the mental health literature. In addition, both researchers and practitioners will benefit from this study's findings. Researchers are capable of developing intervention programs relating to peer jealousy. This study examines the causes of peer jealousy among university students in young adulthood, as well as the consequences of such jealousy. Therefore, practitioners can intervene more effectively in psychological counseling activities if they are aware of the characteristics of individuals with peer jealousy. For instance, mental health professionals can design psychoeducational workshops that help individuals identify and manage feelings of jealousy, and incorporate techniques for enhancing self-esteem and emotional regulation. Furthermore, counselors working in university settings can integrate peer jealousy awareness modules into student support programs to promote healthier peer interactions. Lastly, considering the research, the use of a mixed-methods approach—integrating both qualitative and quantitative phases—enabled a more nuanced and comprehensive understanding of peer jealousy.

### Limitations and Future Research

Although this study has numerous implications, it also has some limitations. The first of these is that the themes that arose in Study I were derived from the selection of volunteer participants according to predetermined criteria. In future studies, various criteria can be utilized to conduct research. The second limitation is the self-report nature of the instruments used in Studies II and III. This reliance on self-report may have introduced recall bias or subjective misinterpretations of items. In future research, various data collection methods can be implemented. In addition, although the data were collected from volunteers, social desirability error may have led to the collection of biased responses. Future research can be improved by incorporating the Marlowe-Crowne Social Desirability Scale [18] into the collection of measurement instruments. In Studies II and III, the use of an accessible sampling method is another limitation. This may limit the generalizability of the findings beyond the current sample. In future investigations, different sampling methods may be preferred. In addition, the PJS developed for university students can be adapted for use with other sample groups (e.g., children or adolescents). In Study III, the selection of a cross-sectional research design is the final limitation. This design restricts the ability to draw conclusions about temporal changes or long-term effects among variables. By taking more frequent and longer-term measurements in future studies, the cause-and-effect relationship between the variables can be clarified.

### Conclusion

This research was carried out with an exploratory sequential design, one of the mixed method research designs. In this study, which was carried out in three stages, first, three overarching themes were revealed based on the experiences of university students regarding peer jealousy. Then, in the light of these themes, a psychometrically valid and reliable Peer Jealousy Scale was developed for university students. Finally, in this complex model conducted with university students, the series played a multiple mediator role in the

relationship between peer jealousy and loneliness, self-esteem, and harmony in life. These research findings have expanded the understanding of peer jealousy.

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**Data Availability** Data will be available upon request.

## Declarations

**Ethical Approval** The study protocol has been approved by the Human Research Ethics Committee of Marmara University (Reference Number = 341143, 22.06.2022/05–40). The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its following updates.

**Consent to Participate** Informed consent was obtained from all the individual participants that were included in the study.

**Pre-registration Statement** This study was not pre-registered.

**Conflict of interest** No conflict of interest exists for this manuscript between the authors.

## References

1. Abraham MM. *Early adolescent friendship and self-esteem* [Unpublished Doctoral Thesis]. Kent State University, Kent, OH. (2008).
2. Akan Y. Development of friendly jealousy measurement: validity reliability study. *J Soc Sci Muş Alparslan Univ.* 2019;7(5):133–40. <https://doi.org/10.18506/anemon.506363>.
3. Akan Y. Friendship jealousy and self-efficacy as predictors of self-esteem in adolescents: a research on secondary and high school students. *Int J Eurasian Educ Cult.* 2020;5(10):1213–41.
4. Aune KS, Comstock J. Experience and expression of jealousy: Comparison between friends and romantics. *Psychol Rep.* 1991;69(1):315–9. <https://doi.org/10.2466/PR0.69.5.315-319>.
5. Attridge MD. Jealousy and relationship closeness: exploring the good (reactive) and bad (suspicious) sides of romantic jealousy. *Sage Open.* 2013;3(1):1–16. <https://doi.org/10.1177/2158244013476054>.
6. Baker FB. *The basics of Item Response Theory* (Second Ed.). Retrieved from (2001). <http://eric.ed.gov/?id=ED458219>
7. Baumeister RF, Twenge JM. The social self. In T. Millon & M. J. Lerner (Eds.), *Handbook of psychology: personality and social psychology*. 2003;5 pp.327–352. John Wiley & Sons, Inc. <https://doi.org/10.1002/0471264385.wei0514>
8. Bayar A, Koca M. The perspectives of academicians on academic jealousy. *Shanlax Int J Educ.* 2021;9(4):78–90. <https://doi.org/10.34293/education.v9i4.4064>.
9. Blevis M. *Jealousy: love is the most trapped* (I. Aydın & Ç. Bakırcioğlu Arslan, Trans.). Sel Publishing, İstanbul. (2010).
10. Blomquist KP. Jealousy in close relationships among emerging adults [Unpublished Doctoral Thesis]. Duke University, Durham, North Carolina. (2014).
11. Browne MW, MacCallum RC, Kim CT, Andersen BL, Glaser R. When fit indices and residuals are incompatible. *Psychol Methods.* 2002;7:403–21. <https://doi.org/10.1037/1082-989X.7.4.403>.
12. Buunk BP. Personality, birth order and attachment styles as related to various types of jealousy. *Pers Individ Differ.* 1997;23(6):997–1006. [https://doi.org/10.1016/S0191-8869\(97\)00136-0](https://doi.org/10.1016/S0191-8869(97)00136-0).
13. Cattell RB. The scree test for the number of factors. *Multivar Behav Res.* 1966;1(2):245–76. [https://doi.org/10.1207/s15327906mbr0102\\_10](https://doi.org/10.1207/s15327906mbr0102_10).

14. Cavanaugh JC, Blanchard-Fields F. *Adult development and aging*. (Fourth Ed.). Thomson Learning Inc (2002).
15. Chalmers RP. Mirt: a multidimensional item response theory package for the R environment. *J Stat Softw.* 2012;48:1–29. <https://doi.org/10.18637/jss.v048.i06>.
16. Comrey AL, Lee H. *A first course in factor analysis*. Lawrence Erlbaum Associates, Mahwah, New Jersey. (1992).
17. Creswell JW, Plano-Clark VL. *Designing and conducting mixed methods research*. Sage Publications, Thousand Oaks, CA. (2007).
18. Crowne DP, Marlowe D. The approval motive: Studies in evaluative dependence. Wiley, New York, NY. (1964).
19. Çırpan Y, Özdoğru AA. Turkish adaptation of BeMaS benign and malicious envy scale: transliteral equivalence, reliability and validity study. *Anatolian J Psychiatry.* 2017;18(6):577–85. <https://doi.org/10.5455/apd.256664>.
20. Deliveli K. Female managers victims of mobbing in universities. *J Soc Sci Humanit.* 2013;5(1):341–52.
21. Demirci İ, Ekşi H, Ekşi F. Narcissism, life satisfaction, and harmony: The mediating role of self-esteem and self-compassion. *Eurasian J Educ Res.* 2019;84:159–76. <https://doi.org/10.14689/ejer.2019.84.8>.
22. Demirtaş HA, Dönmez A. Jealousy in close relationships: personal, relational and situational variables. *Türk J Psychiatry.* 2006;17(3):181–91.
23. DeSteno DA, Salovey P. Evolutionary origins of sex differences in jealousy? questioning the “fitness” of the model. *Psychol Sci.* 1996;7(6):367–72. <https://doi.org/10.1111/j.1467-9280.1996.tb00391.x>.
24. Deutz MHF, Lansu TAM, Cillessen AHN. Children’s observed interactions with best friends: associations with friendship jealousy and satisfaction. *Soc Dev.* 2014;24:39–56.
25. Digman JM. Personality structure: emergence of the five-factor model. *Annu Rev Psychol.* 1990;41:417–40. <https://doi.org/10.1146/annurev.ps.41.020190.002221>.
26. Dillon L. Functional aspects of jealousy across the lifespan. *Hum Ethol Bull.* 2013;28(2):13–26.
27. Dryden W. *Kıskançlığın üstesinden gelin [Overcome jealousy]* (Z. Babayiğit, Trans.). HYB Basım Yayın (2009).
28. Goyal T. Globalization and gender-based violence: case of acid attacks on Indian women. *J Polit Gov.* 2014;3(1):121–30.
29. Hambleton RK, Swaminathan H, Rogers HJ. *Fundamentals of Item Response Theory*. Sage Publications (1991).
30. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. The Guilford Press, New York, NY. (2018).
31. Hays RD, DiMatteo MR. A short-form measure of loneliness. *J Pers Assess.* 1987;51(1):69–81. [https://doi.org/10.1207/s15327752jpa5101\\_6](https://doi.org/10.1207/s15327752jpa5101_6).
32. Kraft C, Mayeux L. Associations among friendship jealousy, peer status, and relational aggression in early adolescence. *J Early Adolesc.* 2018;38(3):385–407. <https://doi.org/10.1177/0272431616670992>.
33. Krems JA, Williams KEG, Merrie LA, Kenrick DT, Aktipis A. Sex (similarities and) differences in friendship jealousy. *Evolution and Human Behavior*, 1–10. Advance online publication (2021). <https://doi.org/10.31234/osf.io/gfpd8>
34. Lange J, Crusius J. Dispositional envy revisited: unraveling the motivational dynamics of benign and malicious envy. *Pers Soc Psychol Bull.* 2015;41(2):284–94. <https://doi.org/10.1177/0146167214564959>.
35. Lennarz HK, Lichtwarck-Aschoff A, Finkenauer C, Granic I. Jealousy in adolescents’ daily lives: how does it relate to interpersonal context and well-being? *J Adolesc.* 2017;54:18–31. <https://doi.org/10.1016/j.adolescence.2016.09.008>.
36. Lin S, Liu D, Niu G, Longobardi C. Active social network sites use and loneliness: the mediating role of social support and self-esteem. *Curr Psychol.* 2022;41:1279–86. <https://doi.org/10.1007/s12144-020-00658-8>.
37. Malkoç A, Erginsoy D. Competitive attitude, cognitive distortions and multi dimensional jealousy. *Stud Psychol.* 2008;28:1–14.
38. Manning ML. Havighurst’s developmental tasks, young adolescents, and diversity. *Clear House.* 2002;76(2):75–7.
39. Mertens DM. Transformative mixed methods research. *Qual Inquiry.* 2010;16(6):469–74. <https://doi.org/10.1177/1077800410364612>.
40. Miceli M, Castelfranchi C. The envious mind. *Cogn Emot.* 2007;21(3):449–79. <https://doi.org/10.1080/02699930600814735>.
41. Miller AL, Volling BL, McElwain NL. Sibling jealousy in a triadic context with mothers and fathers. *Soc Dev.* 2000;9(4):433–57. <https://doi.org/10.1111/1467-9507.00137>.

42. Norušis MJ. *SPSS guide to data analysis*. Prentice Hall (2005).
43. Nunnally JC, Bernstein IH. The assessment of reliability. *Psychometric Theory*. 1994;3:248–92.
44. Özdemir S. The phenomenon of jealousy and its reflection on academic organizations. *Süleyman Demirel Üniver Visionary J*. 2021;12(30):652–76. <https://doi.org/10.21076/vizyoner.806859>.
45. Parrott WG. The emotional experience of envy and jealousy. In: Salovey P, editor. *The psychology of jealousy and envy*. Guilford Press; 1991. p. 3–30.
46. Pett M, Lackey N, Sullivan J. *Making sense of factor analysis*. Sage Publications (2003).
47. Power M, Dalglish T. *Cognition and emotion: From order to disorder* (Second Ed.). Psychology Press, Hove, East Sussex. (2008).
48. Shackelford TK, Buss DM. Cues to infidelity. *Pers Soc Psychol Bull*. 1997;23(10):1034–45. <https://doi.org/10.1177/01461672972310004>.
49. Smith RH, Kim SH. Comprehending envy. *Psychol Bull*. 2007;133(1):46–64. <https://doi.org/10.1037/0033-2909.133.1.46>.
50. Tabachnick BG, Fidell LS. *Using multivariate statistics* (Sixth Ed.). Pearson (2013).
51. Tafarodi RW, Swann WB. Two-dimensional self-esteem: theory and measurement. *Pers Individ Differ*. 2001;31(5):653–73. [https://doi.org/10.1016/S0191-8869\(00\)00169-0](https://doi.org/10.1016/S0191-8869(00)00169-0).
52. Tashakkori A, Creswell JW. Editorial: exploring the nature of research questions in mixed methods research. *J Mixed Methods Res*. 2007;1(3):207–11. <https://doi.org/10.1177/1558689807302814>.
53. van de Ven N, Zeelenberg M, Pieters R. Leveling up and down: The experiences of benign and malicious envy. *Emotion*. 2009;9(3):419–29. <https://doi.org/10.1037/a0015669>.
54. van Peer W. Jealousy: self-inflicted agony and ruin. *Int Rev Psychiatry*. 2023;35(1):25–32. <https://doi.org/10.1080/09540261.2023.2168521>.
55. Zolfaghari S, Najarian S, Najarian B. Study of the jealousy effects on mental health from the perspective of Islam and psychology. *J Res Relig Health*. 2016;2(3):65–74.

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