How is the problematic smartphone use affected by social support? A research model supported by the mediation of Ikigai

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Abstract

Social support and ikigai (making life worthwhile) have positive effects on problematic smartphone use and are seen to be related to each other. However, what mediates these relationships has not been adequately analyzed. This study aims to examine how the effect between social support and problematic smartphone use occurs by suggesting the mediator role of ikigai. The study was designed as quantitative and cross-sectional, and 1189 university participants aged 18 and over were reached online. The multidimensional scale of perceived social support, ikigai-9 scale, smartphone application-based addiction scale and sociodemographic information form were used as data collection tools in the study. The data obtained were carried out using SPSS 24 and Amos 25 statistical programs. Established hypotheses were tested with correlation, multiple regression and mediation analyzes. The results confirmed that social support was positively associated with ikigai, and ikigai was negatively associated with problematic smartphone use. In addition, interaction analyzes found that ikigai had a mediating effect. These findings show the importance of implementing specific applications based on the meaning and purpose of life (ikigai), especially for vulnerable groups, to minimize the problems that may arise with the excessive use of smartphones.

Keywords Problematic smartphone use · Ikigai · Social support · Behavioral addiction · Public health

Introduction

Smartphones have an important place in the center of human life (Abbasi et al., 2021). Socialization, on the other hand, is considered as a productive process in terms of supporting the development of social and behavioral skills (Haggard,

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1957). Today, this socialization process is provided by technologies such as smartphones rather than face-to-face communication (Drago, 2015). This situation largely represents less face-to-face communication and, as a result, a more isolated life from the social environment (Rotondi et al., 2017; Subrahmanyam et al., 2008). According to the We Are Social (2022) report, there are 5.31 billion mobile phone users globally, and according to the Pew Research Center (2018) report, there are 2.5 billion smartphone users. In the same report, it is stated that the amount of time spent on mobile phones daily in Turkey is 4:24, and the world average is 4:48. Between 2016 and 2021, the number of smartphone subscribers increased from 3.7 billion to 6.3 billion (O'dea, 2022a). This number is expected to reach 6.6 billion in 2022 and 7.7 billion in 2027 (O'dea, 2022b). Thanks to its numerous features, smartphones have become a necessity for users. Despite its many benefits, excessive use of smartphones can result in adverse effects (Hou et al., 2021). This misuse of technology has traditionally been associated with the addiction phenomenon, commonly used for alcohol and drugs (Al-Kandari & Al-Sejari, 2020). In the literature, this misuse of smartphones is characterized as problematic

smartphone use. Problematic smartphone use shows similar characteristics to tolerance and withdrawal situations as drug use in the absence of a smartphone (Billieux et al., 2015). Problematic smartphone use, however, is not officially defined as an addiction and is not listed as a disorder in the DSM-5. Some researchers used concepts such as smartphone addiction, mobile phone addiction, problematic mobile phone use, impulsive mobile phone use and mobile phone overuse to describe this negative situation (Ahmed et al., 2011; Alhassan et al., 2018; Billieux et al., 2008; Casey, 2012; Hong et al., 2012; Krajewska-Kułak et al., 2012; Kwon et al., 2013; Noë et al., 2019; Park, 2005; Szpakow et al., 2011; Takao et al., 2009; Vezzoli et al., 2021; Yu & Sussman, 2020; Panova & Carbonell, 2018; Elhai et al., 2017) argue that despite the negative effects of smartphones, there is insufficient evidence to be considered as an addiction. In this context, the term problematic smartphone use was used instead of smartphone addiction in this study.

Problematic smartphone use represents negative processes for individuals' mental well-being (Demirci et al., 2015; Enez Darcin et al., 2016; Roberts et al., 2014; Samaha & Hawi, 2016). The quality of social relations and support mechanisms have an impact on behaviors (Hunter et al., 2019; Labrague, 2021). Many studies have focused on factors such as social support and ikigai, predicting their positive impact on negative behaviors (Callaghan & Morrissey, 1993; Ghaderi Rammazi et al., 2018; Ishida, 2012b; Kaplan et al., 1977; Schwarzer & Leppin, 2016; Seko & Hirano, 2021; Steger & Kashdan, 2009). The role of social support as preventive and protective is important in terms of social and behavioral problems (Schwarzer & Leppin, 1991). Because when social support decreases, individuals prefer non-face-to-face communication tools to meet this emotional need, and as a result, problematic smartphone use emerges (Aker et al., 2017; Kim, 2017). Ikigai represents a motivation towards finding value in life, and reflects the meaning and purpose of life(Kono & Walker, 2020; Mori et al., 2017). On the other hand, ikigai, which promotes positive beliefs and subjective well-being, increases belonging by improving problem-solving ability (Dezutter et al., 2015; Fredrickson, 1998; Fredrickson et al., 2003). High-level ikigai helps to overcome mental and behavioral problems (Crumbaugh, 1968; Frankl, 1985; Garfield, 1973; Ghaderi Rammazi et al., 2018; Harlow et al., 1986; Steger et al., 2006; Steger & Kashdan, 2009; Testoni et al., 2018). Moreover, individuals with low ikigai are more vulnerable and prone to negative behaviors such as addiction (Ishida, 2012a). Previous similar research has separately highlighted the associations between social support, ikigai, and problematic smartphone use. However, we did not find any specific research or literature that examines ikigai as a mediator between social support and problematic smartphone use.

Therefore, we asked whether we could explain the effect of social support on problematic smartphone use through ikigai. In this context, there is a research question in the present study. RQ1: "How does social support affect problematic smartphone use in Turkish society?"

Consistent with the research question, we supposed that ikigai has a mediating role between social support and problematic smartphone use. In this study, 1189 university students living in different cities of Turkey were analyzed to examine the mediating effect of ikigai and to make some recommendations to academics, practitioners, and policymakers.

Social support

Although there are various definitions of social support, in general, it is expressed as all kinds of help provided by the people around the individual under stress or in a difficult situation (Ryff & Singer, 2000; Yıldırım, 2006). Social support consists of mutual interaction among people, and at the same time, it appears as a dynamic event that is affected by the characteristics of people, the nature of the interaction, and socio-cultural situations (Baltaş, 2000). Social support is also closely related to physical and mental health (Holahan & Moos, 1982). Because the most important function of social support is that it acts as a buffer against stressful life events by balancing the psychological damages experienced by the individual (Cohen & Wills, 1985b). Individuals can overcome problems and stress more easily with the buffer effect of social support (Ünüvar, 2003). In other words, social support, which is suggested as a protective factor against negative effects on physical and mental health, constitutes an efficient mechanism for getting rid of psychological problems (Szkody & McKinney, 2019). This situation greatly contributes to the socialization process. Because the lack of social relationships and support can result in more introversion and feeling threatened (Cacioppo et al., 2006). Behavioral traits such as introversion are linked to self-worth (Bano, 2020). While social support refers to positive cognitive schemas such as self-worth, its lack also reflects problems such as depression and addiction (Batıgün & Kılıç, 2011; Ding et al., 2021).

Ikigai; making life worthwhile

Ikigai, in Japanese culture, reflects the views that make life meaningful, and life is worth living (Sone et al., 2008). Furthermore, the term ikigai refers to having a "reason for living" or "purpose in life" (Mori et al., 2017; Park, 2015). While ikigai has definitions related to achieving a purpose or gaining joy, researchers suggest that ikigai should be considered as a holistic structure that encompasses the meaning,

motivations, and values of life (Kono & Walker, 2020; Toshiro et al., 2003; Weiss et al., 2005). Kamiya (1966), who was the first to comprehensively study ikigai, emphasized that ikigai is oriented towards the future and appears more as a result of people's successes (Kono & Walker, 2020). Similarly, strong social bonds also strengthen ikigai (Seko & Hirano, 2021). A better and more satisfying life is at the core of ikigai and having something worth living for strengthens this perception (Kumano, 2018). It is also associated with concepts such as enjoying life, happiness, self-confidence, and ethics, and has been shown to have similar characteristics to subjective well-being in literature (Belice et al., 2022; Park, 2015; Seko & Hirano, 2021). In short, ikigai is a comprehensive perspective that includes the meaning and purpose of life, as well as fun and happiness (Sone et al., 2008; Tanno et al., 2009; Weiss et al., 2005). In other words, it is a synthesis of a positive future perception and current social satisfaction (Fukuzawa et al., 2019).

Problematic smartphone use

Smartphones have countless useful applications and features that make life easier, and therefore have gradually become widespread in human life over the past decade (Abbasi et al., 2021; Fino et al., 2020; Radovic et al., 2016). The discovery of various applications and new features through smartphones shortens the distance between users (Fu et al., 2020). Indeed, smartphones are successful in offering countless conveniences to human life. However, alongside these benefits, the various negative effects of smartphone use should not be ignored. Moreover, according to current perspectives, smartphone use is interpreted as smartphone addiction because it is an irresistible inner desire (Abbasi et al., 2021; Cha & Seo, 2018). In other words, smartphone addiction is characterized as a behavioral addiction because it has similar features to internet addiction (Kim, 2013). Previous studies suggest that chemical and behavioral addictions share some common characteristics, such as salience, tolerance, mood swings, conflict, withdrawal, problems, and relapse (Grant et al., 2010; Griffiths, 2009; Li & Lin, 2014). Due to the personal differences of users, there is no specific criterion that determines the limit of smartphone excessive use, and excessive use may reflect a negative effect on the mental well-being of individuals (Demirci et al., 2015; Enez Darcin et al., 2016; Roberts et al., 2014; Samaha & Hawi, 2016). For example, those who overuse smartphones suffer greatly from loneliness, sleep problems, anxious feelings, and even irregular eating habits (Choi et al., 2018; Liu et al., 2017; Panova et al., 2019). Moreover, physical damage such as decreased concentration, stiff neck, blurred vision, and wrist or back pain can occur chronically through excessive use of smartphones (Kwon et al., 2013; Mok et al., 2014).

In current literature, this behavioral problem is explained with various concepts such as smartphone addiction, mobile phone addiction, problematic mobile phone use, impulsive mobile phone use, and mobile phone overuse (Ahmed et al., 2011; Billieux et al., 2008; Casey, 2012; Hong et al., 2012; Krajewska-Kułak et al., 2012; Kwon et al., 2013; Park, 2005; Szpakow et al., 2011; Takao et al., 2009; Vezzoli et al., 2021; Yu & Sussman, 2020). All these definitions center around the negative feedback which is related to the usage and basically explain the same problem.

Social support and ikigai

According to the telic theory, which is one of the positive psychology theories, there are two dimensions of happiness that are emphasized (Diener & Ryan, 2009; Gencer, 2018). The first dimension is the ability of individuals to meet their basic needs. After physical and security needs are met, the need for belonging and love needs to be met (Das et al., 2020). This need is dependent on perceived social support. The other dimension that the telic theory emphasizes is the formation of a life purpose for an individual to add value to themselves and their environment. Activities that align with this life purpose help to fulfill the individual's needs by providing a sense of self-realization and completion of the needs pyramid. Therefore, the formation of a life purpose and the completion of the needs pyramid is dependent on the fulfillment of the need for belonging and love in the lower step.

For more than 30 years, the effects of social support on mental well-being have been focused on, and it has been emphasized that social support successfully reduces social stressors (Cohen & Wills, 1985; Mincu & Taşcu, 2015; Park, 2015). Although the existence of our social environment is important, it is not sufficient on its own. The thing emphasized here is social support from the social environment (family, spouse, friend, etc.) (Langford et al., 1997). Social support is defined as a psychosocial phenomenon that supports individuals' coping skills and expands their limited resources (Hobfoll et al., 1990). This psychosocial phenomenon is an important buffering factor that makes life more livable in stressful situations (Dunn & O'Brien, 2009). In other words, the existence of social support has positive reflections that expand the ikigai. Previous studies reveal a positive relationship between ikigai and social support (Fukuzawa & Sugawara, 2022; Park, 2015; Shintaro & Kazuo, 2015). Additionally, the correlation between well-being, which is used instead of the concept of ikigai in Western countries, and social support strengthens the validity of this view (Chu et al., 2010; Kono & Walker, 2020). In this context, the following hypotheses have been proposed according to the available literature.

H1. Perceived social support has a positive relationship with ikigai.

H1a. Family support has a positive relationship with ikigai.

H1b. Friend support has a positive relationship with ikigai.

H1c. Special friend support has a positive relationship with ikigai.

Ikigai and problematic smartphone use

Purpose and willingness are central to the concept of ikigai. According to literature ikigai consists of three components: cognitive, emotional, and motivational. Firstly, the cognitive aspect forms the beliefs and thoughts of individuals about their experiences and events in daily life. Secondly, the emotional aspect refers to feelings that are satisfying and complementary based on the view that life is worth living. Finally, the motivational aspect emphasizes the pursuit of personal purpose in relation to individuals' subjective values, desires, and needs (Kono & Walker, 2020; Nakanishi, 1999; Tanno et al., 2009; Toshiro et al., 2003; Weiss et al., 2005). All these definitions represent the psychosocial processes for a good life and offer a comprehensive framework (Wong, 2012, 2016). Previous studies supporting these three components state that ikigai is associated with various health outcomes and supports positive emotions (Arslan et al., 2022; Nakao et al., 2021; Park et al., 2008; Seki, 2001; Wilkes et al., 2022). Indeed, ikigai is a process that supports positive cognitive schemas. Therefore, it is a result expected to exercise control over tendencies and vulnerabilities. Some studies on this topic have found a negative association between high levels of ikigai and depression, addiction, and aggression (Ishida, 2012a, b, 2013; Wilkes et al., 2022). Individuals with low ikigai tend to overcome this deprivation by engaging in addictive behaviors, as they lack the understanding of the ikigai perspective (Ishida, 2012a). Especially with the Covid-19 epidemic, the meaninglessness of life, the aimlessness of life, and death anxiety have risen, and the use of the internet via smartphones has increased to escape from these feelings (Hu et al., 2022; Kayis et al., 2021; Toraman, 2022; van Deursen, 2020). Since smartphones are seen as a compensatory mechanism, it also revealed a direct negative correlation between smartphone addiction and well-being, which used as ikigai in Japan culture (Kumcağız & Gündüz, 2016). Some studies in the literature support that subjective well-being is a part of ikigai and emphasize its negative relationship with smartphone addiction (Doğan et al., 2012; Koç & Turan, 2020). Although smartphones have transformed daily life into a more livable form, they have negative feedback in terms of people's physical and mental health (Choi et al.,

2018; Demirci et al., 2015; Enez Darcin et al., 2016; Kwon et al., 2013; Liu et al., 2017; Mok et al., 2014; Panova et al., 2019; Roberts et al., 2014; Samaha & Hawi, 2016). In this respect, ikigai is successful in suppressing smartphone addiction. Hence, based on the above-mentioned ideas, the following hypothesis has been developed.

H2. Ikigai has a negative relationship with problematic smartphone use.

Social support and problematic smartphone use

Studies supported by cross-sectional and longitudinal evidence have examined the benefit of social support on both the general population and at-risk groups over the past fifty years (Herrero et al., 2019; Holt-Lunstad et al., 2010; Uchino, 2009; Uchino et al., 1996). The social support perspective, which supports sustainability in relationships against various problems, is at the center of human life (Al-Kandari & Al-Sejari, 2020). Indeed, social support is an essential part of the socialization process and promotes diversity. Previous studies highlight that antisocial behaviors are triggered by a variety of factors (Cacioppo & Cacioppo, 2014; Primack et al., 2017; Şimşek et al., 2021). It is known that individuals with low social support and high antisocial behavior prefer non-face-to-face communication tools to increase their support levels and to meet these needs (Kim, 2017). Moreover, it is seen that those who prefer smartphones to meet their social support needs have a more tendency to addiction (Jeong et al., 2016). Numerous previous studies indicate that individuals with low social support have high problematic smartphone use habits (Aker et al., 2017; Billieux et al., 2015; Jennifer, 2018; Kim, 2017, 2018; Kwon et al., 2016; Lu et al., 2011). This is largely related to the quality of social relationships and positive change (Dunkel-Schetter, 1984; Holland & Holahan, 2003). The positive impact of social support on psychological health has been discussed for over three decades (Callaghan & Morrissey, 1993; Kaplan et al., 1977; Schwarzer & Leppin, 1991). Especially when it is thought that excessive use of smartphones causes problems such as depression, antisocial behavior, social fragmentation and loneliness, the relationship between social support and problematic smartphone use becomes stronger (Cerniglia, Griffiths, et al., 2019; Cerniglia, Guicciardi, et al., 2019; Enez Darcin et al., 2016; Matar Boumosleh & Jaalouk, 2017). In this context, the following hypotheses have been developed based on the above literature.

H3. Perceived social support is negatively associated with problematic smartphone use.

H3a. Family support is negatively associated with problematic smartphone use.

H3b. Friend support is positively associated with problematic smartphone use.

H3c. Special friend support is positively associated with problematic smartphone use.

Social support, problematic smartphone use, and ikigai as mediator

Studies on social support and ikigai give some clues for a healthy life (Gökçearslan et al., 2018; Nakao et al., 2021; Sone et al., 2008; Uchino et al., 1996). Social support and ikigai stand out independently of each other in order to overcome mental problems and support subjective well-being (Turner & Brown, 2010; Wilkes et al., 2022). Social support is an effective sociological approach to seeing the impact of social networks and bonds. Characteristic indicators such as ikigai are also a good research topic for positive psychology research. Because ikigai and social support are supportive elements for the construction of a good life, happiness and subjective well-being (Kono & Walker, 2020; Moeini et al., 2018). The lack of social support and ikigai push individuals to use non-face-to-face communication as a way to maintain their level of support (Çevik et al., 2020; Kim, 2017). Smartphones, which have spread rapidly all over the world in recent history, are the most popular and easily accessible communication tools among these non-face-to-face communication tools. In this context, previous literature shows the negative relationship between social support and problematic smartphone use (Cha & Seo, 2018; Meng et al., 2022; Reese Bomhold, 2013; Vezzoli et al., 2021; Yu & Sussman, 2020). Moreover, lack of social support is associated with depression and increases predisposition to internet addiction (Batıgün & Kılıç, 2011). On the other hand, a negative relationship between problematic smartphone use and the purpose and meaning of life, which is part of ikigai, is also seen in the literature (Çevik et al., 2020). However, some studies support that subjective well-being is a part of ikigai and emphasize its negative relationship with smartphone addiction (Doğan et al., 2012; Koç & Turan, 2020). Moreover, the expected positive relationship between positive approaches such as ikigai and social support has also been reinforced by various studies in the literature (Blau et al., 2018; Shintaro & Kazuo, 2015; Fukuzawa & Sugawara, 2022; Park, 2015). Although the relationships between the existing variables have been emphasized separately in the previous literature, these relationships are not clear. Furthermore, the effect of ikigai on the relationship between social support and problematic smartphone use has not been discovered yet. In this context, it is considered that ikigai has a mediator role in the relationship between social support and problematic smartphone use. Therefore, based on this prediction and previous literature, the following hypotheses were formed.

H4. Ikigai has a mediating effect between perceived social support and problematic smartphone use.

H4a. Ikigai has a mediating effect between special friend support and problematic smartphone use.

H4b. Ikigai has a mediating effect between family support and problematic smartphone use.

H4c. Ikigai has a mediating effect between friend support and problematic smartphone use.

Many studies in literature have shown that women have a higher level of problematic smartphone use (van Deursen et al., 2015). This situation is related to women trying to meet their social support needs through smartphones (Gökçearslan et al., 2018). It is assumed that women with high ikigai can meet their social support needs in real life and use smartphones more for personal development. In this context, the following hypothesis has been formed.

H5. In female individuals, the mediating effect of ikigai in the relationship between perceived social support and problematic smartphone use is relatively greater than in males.

H5a. In female individuals, the mediating effect of ikigai in the relationship between special friend support and problematic smartphone use is relatively greater than in males.

H5b. In female individuals, the mediating effect of ikigai in the relationship between family support and problematic smartphone use is relatively greater than in males.

H5c. In female individuals, the mediating effect of ikigai in the relationship between friend support and problematic smartphone use is relatively greater than in males.

The context of this study

This study investigated the effect of university students' social support levels on ikigai and problematic smartphone use. Social support is a positive feedback tool that increases individuals' coping capacities and removes their vulnerabilities. It is possible that the negative behavioral tendencies of people with high social support decrease, and it creates positive reflections on ikigai as it supports subjective well-being. Thus, individuals can use these support mechanisms functionally in their private and professional lives. Social support contributes to being more resilient to stressful and fragile modern life, especially to keep up with today's innovations. In this way, individuals are strengthened against existing negative problems and support their subjective well-being for the purpose and meaning of life. In the current research, it was assumed that social support (special friend, family, and friend) increases ikigai and reduces problematic smartphone addiction. For this purpose, the conceptual model of the current research is shown in Fig. 1. Direct and indirect analyzes were used in the conceptual model. Hypotheses were defined and tested for each relationship
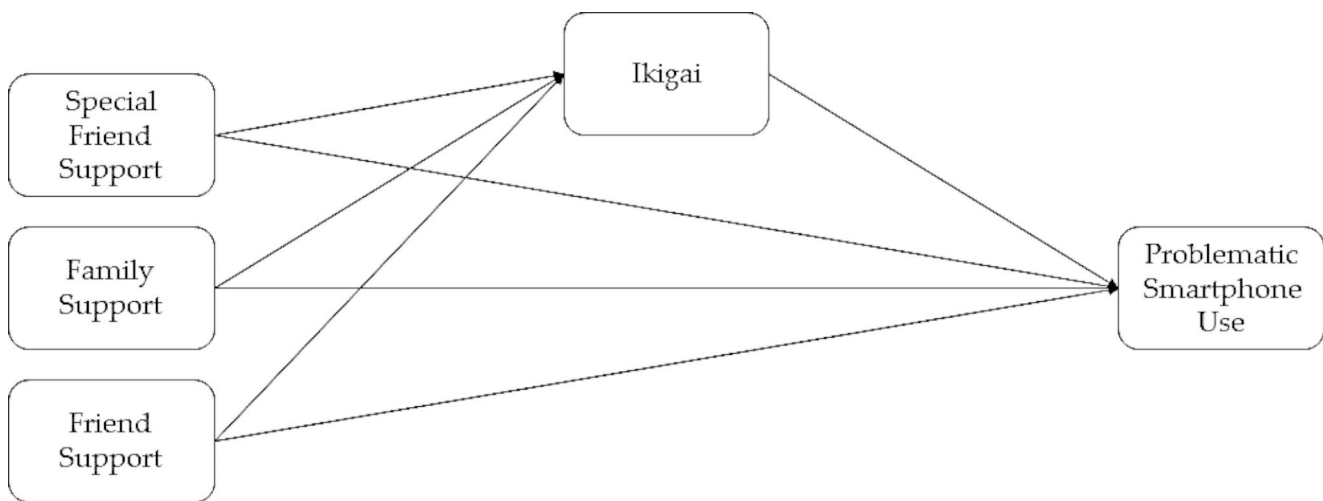
Fig. 1 Conceptual Diagram of the Model

in accordance with the research model. Accordingly, social support increases ikigai, and increasing ikigai reduces problematic smartphone use.

Materials and methods

Participants and procedure

According to Campus Technology (2018) smartphones are among the top favorite gadgets for college students. Another study states that 95% of university students use smartphones (Pew Research Center, 2018). The discovery of new features in smartphones day by day causes students to spend a significant amount of time on smartphones, which leads to problematic smartphone use (Fu et al., 2020). For this reason, the participants of the present study were selected from university students using the convenient sampling method. The study group consisted of 1189 (790 Female and 399 Male) university students. Participants are individuals aged 18 and over (M = 22.18; SD = 14.68) selected from different regions of Turkey.

Participants who voluntarily supported the research were reached through the online survey platform Survey Monkey (https://tr.surveymonkey.com, accessed June 3, 2022) between 19 March and 2 June 2022. Participants were informed about the purpose, confidentiality and reliability of the data obtained in the study and their consent were obtained. Private information of the participants was not asked, their IPs were not kept, and their privacy was protected. Participants were allowed to start and end the survey or withdraw from the survey at any time. It was determined that the questionnaire was completed in an average of 6 min. The survey was conducted according to the Helsinki Declaration criteria.

Measures

As measurement tools, the Sociodemographic Information Form, the Multidimensional Scale of Perceived Social Support, the Ikigai-9 Scale, and the Smartphone Application-Based Addiction Scale were used. Confirmatory factor analysis was applied to test the validity of the scales. According to the results of the confirmatory factor analysis, the 4th and 5th questions of the Ikigai-9 scale were excluded from the analysis because their factor loads were < 0.50. It was determined that the final test results were suitable for the research conceptual model (CMIN/DF = 2.263; RMSEA = 0.023; GFI = 0.946; CFI = 0.965; TLI = 0.960; IFI = 0.965; NFI = 0.939). The cut-off values determined by Kline (2011) were used as the criteria for the measurement values.

Sociodemographic Information Form. To determine the socio-demographic status of the participants through the personal information form, questions were asked about gender, age, class, university type, education level of the parents and income status of the family.

Multidimensional Scale of Perceived Social Support (MSPSS). It is a scale developed by Zimet et al. (1988) to measure the perceived social support of individuals. The validity and reliability of the scale on the Turkish sample was performed by Eker et al. (2001). The scale consists of a total of 12 items and a 7-point Likert type response graded between absolutely no (1) and definitely yes (7). The scale has three sub-dimensions consisting of four questions: family, friend, and special friend. In the scale, items were used such as "My family (for example, my mother, father, spouse, children, siblings) is willing to help me in making decisions." and "I can trust my friends when things go wrong.". A high score from the scale means high perceived social support. The internal consistency rate of the current

study was $\alpha = 0.86$ for family support, $\alpha = 0.88$ for friend support, and $\alpha = 0.94$ for special friend support.

Ikigai-9 Scale. Ikigai-9 was first developed by Imai et al. (2012) as a Chinese psychometric scale. Later, Fido et al. (2020) reviewed Ikigai-9 for validity and reliability as an English version in the UK. The validity and reliability study of the scale on the Turkish sample was performed by Belice et al. (2022). The scale consists of 9 questions and 5-point Likert answers rated between does not apply to me (1) and applies to me a lot (5). In the scale, items were used such as "I often feel that I am happy.", "I feel that I am contributing to someone or the society." and "My life is mentally rich and fulfilled.". The higher the score obtained from the scale, the higher the ikigai. The internal consistency ratio of the current study is $\alpha = 0.76$ for Ikigai-9.

Smartphone Application-Based Addiction Scale (SABAS). It is a scale developed by Csibi et al. (2018) to assess the app-based addiction risk of smartphones. The Turkish validity and reliability study of the scale was carried out by Gökler & Bulut (2019). The scale consists of 6 questions and 6-point Likert answers rated between strongly disagree (1) and strongly agree (6). In the scale, items were used such as "My smartphone is the most important thing in my life." and "I have conflicts with my family (or friends) due to my smartphone use.". The internal consistency rate of the current study is $\alpha = 0.74$ for the Smartphone Application-Based Addiction Scale.

Statistical analyses

In this study, a descriptive and quantitative method was used in a cross-sectional design, which is defined as the information collected over the appropriate sample in a certain time (Kesmodel, 2018). After the data were collected online via Survey Monkey, they were transferred to MS Excel (Microsoft, Albuquerque, NM, USA) and the data was cleaned and organized. Then, the cleaned data was transferred to IBM SPSS statistical software (IBM, Armonk, NY, USA) (IBM Corp, 2017). Afterward, confirmatory factor analysis (CFA) was applied to see the suitability of the proposed measurement model using Amos 25 (IBM, Armonk, NY, USA) and to ensure the construct validity of the factors (IBM SPSS Statistics for Windows, 2017). After reaching the necessary values for the goodness of fit of the factors, a SPSS data file was created in which the scales were reviewed with the data assignment in the Amos program. Finally, frequency, correlation, multiple direct regression, and mediation analyzes were performed on the SPSS dataset, respectively. The significance criteria level in the study was 0.05.

Findings and hypotheses tests

Descriptive analyses

The study group consisted of 1189 (790 Female and 399 Male) university students. Participants are individuals aged 18 and over (M = 22.18; SD = 14.68) selected from different regions of Turkey. The majority of the participants have middle income level. (163 Low, 889 Middle and 137 High). It has been observed that many of the participants have received education in private universities (506 State and 683 Private).

Table 1 Descriptive Statistics

		f	%	M	SD
Age				22.18	14.68
Gender					
	Female	790	66.4		
	Male	399	33.6		
Family Income					
	Low	163	13.7		
	Middle	889	74.8		
	High	137	11.5		
University Type					
	State	506	42.6		
	Private	683	57.4		

Correlations, reliabilities, means, standard deviations, skewness, kurtosis

Table 2 shows the results of normality, reliability, mean, standard deviation and correlation analysis of the variables. The correlations between the variables are less than 0.90 and it is seen that there is no multicollinearity problem (Pallant, 2013). Skewness and kurtosis values are between -1.5 and $+1.5$ and indicate a normal distribution (Hair et al., 2014). According to this table, family support is positively correlated with friend support (r = 0.60, p < 0.01), special friend support (r = 0.40, p < 0.01), and ikigai (r = 0.59, p < 0.01), and negatively correlated with problematic smartphone use (r = -0.14, p < 0.01). Friend support was positively correlated with special friend support (r = 0.43, p < 0.01) and ikigai (r = 0.52, p < 0.01), and negatively correlated with problematic smartphone use (r = -0.06, p < 0.01). There is a positive correlation between special friend support and ikigai (r = 0.52, p < 0.01). A negative relationship emerged between ikigai and problematic smartphone use (r = -0.19, p < 0.01).

Table 2 Correlations, Reliabilities, Means, Standard Deviations, Skewness, Kurtosis

Factors	1	2	3	4	5
1. Family Support	1				
2. Friend Support	0.60**	1			
3. Special Friend Support	0.40**	0.43**	1		
4. Ikigai	0.59**	0.52**	0.52**	1	
5. Problematic Smartphone Use	-0.14**	-0.06*	-0.04	-0.19**	1
Cronbach's Alpha	0.86	0.88	0.94	0.76	0.74
Mean	3.24	3.26	3.47	2.10	1.86
Standard Deviation	0.69	0.68	1.23	0.40	0.57
Skewness	-0.88	-0.93	-0.49	-0.53	-0.09
Kurtosis	0.73	0.89	-0.98	-0.51	-0.41

Note. *p<0.05, **p<0.01

Hypotheses testing results

A structural equation modeling (SEM) was used to analyze the hypothesized relationships. In Table 3, hypothesis test results are shown separately for women, men, and the whole sample. Family support, friend support, and special friend support have a positive and significant relationship with ikigai for the entire sample ($\beta = 0.30$; $p < 0.001$; %95 CI [0.15; 0.24]; $\beta = 0.18$; $p < 0.001$; %95 CI [0.08; 0.15]; $\beta = 0.26$; $p < 0.001$; %95 CI [0.08; 0.12], respectively). Thus, H1, H2 and H3 are accepted. Support for family, friends, and special friends is not associated with problematic smartphone use. Ikigai showed a negative and significant relationship with problematic smartphone use ($\beta = -0.15$; $p < 0.01$; %95 CI [-0.31; -0.11]). In this context, H4 was supported. In addition, the results showed that ikigai mediated the relationship between family, friend and special friend support and problematic smartphone use ($\beta = 0.05$; $p < 0.05$; %95 GA [-0.06; -0.02]; $\beta = 0.3$; $p < 0.05$; %95 GA [-0.04; -0.01]; $\beta = 0.2$; $p < 0.05$; %95 GA [-0.03; -0.01], respectively). Thus, H8, H9 and H10 are also accepted.

The direct and indirect effects shown in Fig. 1 were tested. Obtained coefficients and significance levels are given in Fig. 2. The results obtained as a result of the hypothesis tests are listed in Table 4. According to the research results, H1, H2, H3, H4, H8, H9, H10 were fully supported. In the discussion part, all hypotheses and research questions were evaluated in detail.

Discussion

Today, smartphones have become an indispensable part of daily life as a necessity (Hou et al., 2021). Many studies discuss the negative, subjective and social effects of smartphones rather than their positive features (Chan, 2018; Chen

Table 3 Hypotheses Testing Results

Paths	Female				Male				All			
	β	B	SE	p	β	B	SE	p	β	B	SE	p
Family S. ◊ Ikigai	0.30	0.19	0.03	***	0.31	0.19	0.05	***	0.30	0.19	0.03	***
Friend S. ◊ Ikigai	0.19	0.12	0.03	***	0.16	0.09	0.04	*	0.18	0.11	0.03	***
S. F. S. ◊ Ikigai	0.24	0.09	0.02	***	0.30	0.10	0.02	***	0.26	0.10	0.01	***
Family S. ◊ PSU	-0.16	-0.14	0.05	**	0.08	0.06	0.07	0.40	-0.08	-0.07	0.05	0.11
Friend S. ◊ PSU	0.06	0.05	0.05	0.32	0.04	0.03	0.07	0.65	0.04	0.04	0.04	0.39
S. F. S. ◊ PSU	0.04	0.02	0.03	0.43	0.01	0.00	0.04	0.91	0.05	0.03	0.02	0.20
Ikigai ◊ PSU	-0.14	-0.20	0.09	*	-0.17	-0.23	0.13	0.08	-0.15	-0.22	0.08	**
Fa. S. ◊ Ik. ◊ PSU	-0.04	-0.04	0.02	*	-0.05	-0.04	0.05	0.12	0.05	-0.04	0.02	*
F. S. ◊ Ik. ◊ PSU	-0.03	-0.02	0.01	*	-0.03	-0.02	0.03	0.12	0.03	-0.03	0.01	*
S. F. S. ◊ Ik. ◊ PSU	-0.03	-0.02	0.01	*	-0.05	-0.02	0.04	0.14	0.04	-0.02	0.01	*

Note. S. F. S.: Special Friend Support, F. S.: Friend Support, Fa. S.: Family Support, Ik.: Ikigai PSU: Problematic Smartphone Use ***p<0.001, **p<0.01, *p<0.05 (β=Standardized Estimate, B=Estimate, SE=Standard Error).
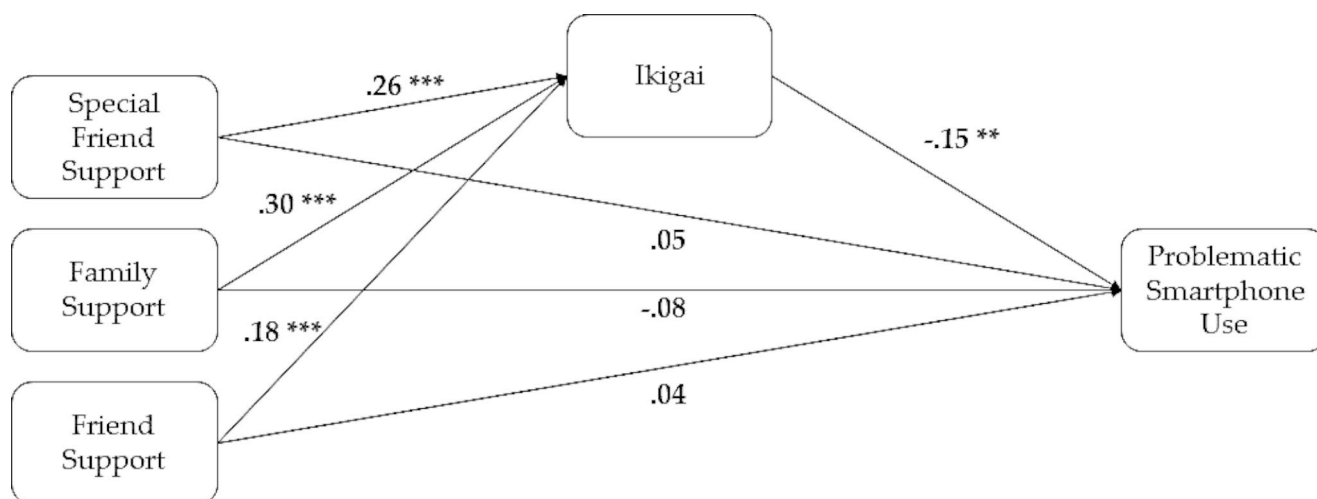
Fig. 2 The Structural Model with Standardized Estimates

Table 4 Summary of Hypothesis Test Results

No.	Relationship	Proposed Relationship	Support
H1a	Family S. ◊ Ikigai	Positive	**Yes**
H1b	Friend S. ◊ Ikigai	Positive	**Yes**
H1c	S. F. S. ◊ Ikigai	Positive	**Yes**
H2	Ikigai ◊ PSU	Negative	**Yes**
H3a	Family S. ◊ PSU	Negative	No
H3b	Friend S. ◊ PSU	Positive	No
H3c	S. F. S. ◊ PSU	Positive	No
H4a	Fa. S. ◊ Ik. ◊ PSU	Mediation	**Yes**
H4b	F. S. ◊ Ik. ◊ PSU	Mediation	**Yes**
H4c	S. F. S. ◊ Ik. ◊ PSU	Mediation	**Yes**
H5a	Fa. S. ◊ Ik. ◊ PSU	Gender Group Comparison	**Yes**
H5b	F. S. ◊ Ik. ◊ PSU	Gender Group Comparison	**Yes**
H5c	S. F. S. ◊ Ik. ◊ PSU	Gender Group Comparison	**Yes**

Note. S. F. S.: Special Friend Support, F. S.: Friend Support, Fa. S.: Family Support, Ik.: Ikigai PSU: Problematic Smartphone Use

& Li, 2017; Horwood & Anglim, 2019; Hughes & Burke, 2018; Lapierre & Lewis, 2018; Rotondi et al., 2017; Toda et al., 2016). This study was conducted in order to understand the relationship of ikigai between problematic smartphone use and social support (family, friend, and special friend) that supports coping skills. Social support is defined as resources provided by other people (Cohen & Wills, 1985). The social support obtained from social relationships improves the emotions and feelings of individuals and contributes to their ability to solve problems and manage negative behaviors such as problematic smartphone use. In this respect, the role of social support and ikigai are important against the increasing negative effects of smartphones (Aker et al., 2017; Billieux et al., 2015; Çevik et al., 2020; Koç & Turan, 2020; Kumcağız and Gündüz, 2016; Ishida

2012a). The current study examined the mediating effect of ikigai in the effect of social support (support of family, friends, and special friends) on problematic smartphone use. According to the analysis results, H1a, H1b, H1c, H2, H4a, H4b, H4c, H5a, H5b, H5c were fully supported. According to the results of the H1 hypothesis, ikigai increased as family support increased. Family relationships play a central role in the well-being of individuals throughout their lifetime (Merz et al., 2009). The mechanism of family support, which supports the coping capacity and increases ikigai, is consistent with the findings obtained from the literature (Blau et al., 2018; Fukuzawa & Sugawara, 2022; Goodman et al., 2019; Kunio, 2015; Park, 2015; Yamamoto-Mitani & Wallhagen, 2002). The results of the H1b hypothesis show that increased friend support increases ikigai. Social networks have positive reflections for individuals' quality of life and views (Lakey & Heller, 1988). Friend support, which positively affects ikigai in the desired direction, is in harmony with the findings obtained from the literature (Blau et al., 2018; Dobríková et al., 2015; Dunn & O'Brien, 2009; Kim & Lee, 2010; Weinhardt et al., 2019). The H1c hypothesis, which suggests a positive correlation between special friend support and ikigai, was supported as a result of the analysis. The support of a special friend, such as a partner, regulates psychosocial well-being and reinforces feelings about the purpose and meaning of life (Ilska & Przybyła-Basista, 2017). The present results are supported by findings from the literature (Blau et al., 2018; Dobríková et al., 2015; Dunn & O'Brien, 2009; Gustavsson-Lilius et al., 2006; Sormanti & Kayser, 2008). As a result of the H2 hypothesis analysis, a negative relationship is seen between ikigai and problematic smartphone use. Ikigai is associated with a variety of health outcomes and plays a vital role in preventing negative behaviors (Arslan et al., 2022; Ishida, 2012a, 2013; King et al., 2006; Nakao et al., 2021; Seki,

2001; Wilkes et al., 2022). We were not able to find a specific research or literature that examines the relationship between ikigai and problematic smartphone use. However, in general, research on the topic of problematic smartphone use has found that problematic smartphones use can negatively impact various aspects of an individual's life, such as their mental and physical health, relationships, and overall well-being. Additionally, having a clear sense of purpose or fulfillment in life, as expressed by the concept of ikigai, may act as a buffer against developing problematic smartphone use. The present negative relationship between ikigai and problematic smartphone use is supported by previous similar literature (Çevik et al., 2020; Hu et al., 2022).

A negative relationship was expected between family support and problematic smartphone use according to the H3a hypothesis, a positive relationship between friend support and problematic smartphone use according to the H3b hypothesis, and a positive relationship between special friend support and problematic smartphone use according to the H3c hypothesis. According to the results of the analysis applied to the whole sample, although H3a, H3b and H3c did not give significant results, family support (H3a) for the female sample showed a negative effect on problematic smartphone addiction. It is emphasized in the literature that individuals with low social support from the family prefer non-face-to-face communication tools such as smartphones to meet this need (Kim, 2017). It is also seen in the literature that those who prefer smartphones, which are easy and inexpensive in order to meet this need, have a higher risk of addiction (Jeong et al., 2016). Although hypotheses 3a, 3b, and 3c were rejected, previous research suggests that low social support drives problematic smartphone use (Aker et al., 2017; Billieux et al., 2015; Jennifer, 2018; Kim, 2017; Kwon et al., 2016; Lu et al., 2011). Moreover, it is known that the use of smartphone is preferred to communicate with someone special, such as a friend or lover (Lapierre & Lewis, 2018; Yang et al., 2022).

The current study revealed that social support mechanisms such as family, friends, and special friends have a positive relationship with ikigai, and ikigai has a negative interaction with problematic smartphone use. Moreover, it is seen in the present study that social support does not have a direct effect on problematic smartphone use. As a mediator for these relational processes, ikigai suggested by hypotheses H4a, H4b, and H4c. According to the results of this proposed indirect effect analysis, ikigai has a mediating effect between social support mechanisms such as family, friend and special friend support and problematic smartphone addiction. This proves that social support together with ikigai affects problematic smartphone use. Furthermore, this effect is particularly greater in females than in males in the sample of the current study. The comparison

proposed by H5a, H5b, and H5c is supported by previous similar literature (Gökçearslan et al., 2018; van Deursen et al., 2015). Previous similar studies have analyzed direct relationships between social support and ikigai, and between ikigai and problematic smartphone use (Chu et al., 2010; Fukuzawa & Sugawara, 2022; Kono & Walker, 2020; Kumcağız & Gündüz, 2016; Shintaro & Kazuo 2015; Park, 2015). Moreover, some studies have explored ikigai as a mediator between various variables (Eshak et al., 2022; Iida & Oguma, 2013; Kato et al., 2022). Previous literature and current study have shown that ikigai is predictive for social support and problematic smartphone use. Despite analyzes of these direct and indirect relationships, previous studies have not explored how or to what extent ikigai influences the relationships between social support and problematic smartphone use. Many researchers have wondered "How" the proposed relationships between X and Y come about (Hayes, 2013). In this context, a new variable M has emerged, and this new variable M has been proposed as an answer to the question of "How" the relationship between X and Y occurs. The mediation analysis in the current study is an answer to the "How" of the relationship between social support and problematic smartphone use. In this context, we produced a research question. RQ1: "How does social support affect problematic smartphone use in Turkish society?". Many studies report a negative relationship between social support and problematic smartphone use. Indicators for this issue are expected and not surprising. Because social support helps individuals to renew their feelings, thoughts, and beliefs and to prevent problematic behaviors. Especially in the stressful modern world, the need for social support may increase and social support may reduce vulnerabilities towards addictive habits. Outputs on this subject may vary according to the period. The Covid-19 process has had a direct and indirect effect on the change of many thoughts and habits. It is known that especially the isolated lifestyle pushes people to more non-face-to-face communication tools. The communication need in the pandemic process was mainly provided by smartphones and smartphones were perceived as a tool to meet these needs. On the other hand, the increase in deaths triggered the revision of thoughts on ikigai. It has been predicted that these habits will continue in the post-pandemic period and the effect of ikigai between social support and problematic smartphone use has been tried to be understood. In this context, in the current study, a mediating role of ikigai was determined between social support and problematic smartphone use.

Limitations and suggestions for future studies

In this study, the effect of social support on problematic smartphone use, and the mediating role of ikigai in this relationship were examined. Since this research was conducted with a cross-sectional research method, this should be taken into account when interpreting the results. As the study was conducted with limited participants and only university students, the results should not be generalized. In addition, the male population in the sample is almost half of the females, which constitutes an important limitation for the study. Future studies may work with larger sample sizes for more general results. We have identified ikigai and problematic smartphone use as a global issue. However, factors such as culture, values, beliefs, and religion can cause different results. Therefore, the results should not be generalized. Moreover, the research data was collected only online and quantitatively, and therefore the thoughts, attitudes and reactions of the participants could not be understood.

Conclusion

This study proved the positive effects of ikigai on social support (support of family, friends, and special friends) and a decrease in problematic smartphone use under these conditions. The current results of the study help to shed light on policymakers, academics, and practitioners, and it will be useful to make future plans according to these results. Although steps have been taken for social support, the most important thing to prevent problematic smartphone use is to provide ikigai. Plans made for this purpose should be supportive on ikigai. At this stage, the role of social support, that is, family, friend, and special friend, is important. Providing positive change processes that will increase social support will strengthen the positive perception of ikigai and reduce problematic smartphone use. Therefore, our research topic is important for the sustainability of public health and the prevention of social problems.

Studies highlight ikigai among variables such as feeling excluded and problematic smartphone use and individuals with ikigai are known to experience lower exclusion and problematic smartphone use (Kumcağiz & Gündüz, 2016; Seko & Hirano, 2021). Policies that focus on the healthy maintenance of family, friend, and intimate relationships are needed because they can support ikigai, and as a result, reduce negative behaviors.

Declarations

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