



PREDICTORS OF RUMINATION REFLECTION AND RUMINATION BROODING: THE SELF-DETERMINATION THEORY PERSPECTIVE

RUMİNASYONUN YANSITMA VE KÖTÜMSER DÜŞÜNME BOYUTLARININ YORDAYICILARI: ÖZ-BELİRLEME KURAMI PERSPEKTİFİ

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Makale Bilgisi

Türü: Araştırma makalesi
Gönderildiği tarih: 21 Mayıs 2022
Kabul edildiği tarih: 21 Kasım 2022
Yayınlanma tarihi: 20 Aralık 2022

Article Info

Type: Research article
Date submitted: 21 May 2022
Date accepted: 21 November 2022
Date published: 20 December 2022

Anahtar Sözcükler

İhtiyaç Tatmini; İhtiyaç Tatmini Engellenmesi; Özerklik; İlişkiselilik; Yetkinlik

Keywords

Need Satisfaction; Need Frustration; Autonomy, Relatedness; Competence

DOI

10.33171/dtcfjournal.2022.62.2.31

Abstract

Past research has shown that rumination is a multifaceted construct and two forms of rumination were distinguished reflection and brooding. Although they are related, brooding and reflection are considered different constructs. Self-determination theory states that three basic psychological needs, namely autonomy, competence, and relatedness, are essential for human functioning and well-being. The frustration of these needs can create an incongruity between actual and ideal states of goal attainment (need satisfaction), which initiate rumination about unattained goals. Grounded on self-determination theory, the goal of the current study is to investigate the link between need satisfaction and frustration and the dimensions of rumination with a cross-sectional design. Undergraduate university students ($N = 464$, female 69%, $M_{age} = 21.90$, $SD = 2.88$) from a major state university in Turkey participated in the current study. Ruminative Response Scale-Short Form and Basic Psychological Need Satisfaction and Frustration Scale were administered via an online survey tool. Results showed that while the frustration of autonomy, relatedness, and competence need satisfaction positively predicted the brooding dimension of rumination, the reflection dimension was positively predicted by relatedness and competence need frustration. Need frustration explained unique variance in brooding and reflection. Although the reflection dimension of rumination is considered adaptive, the results showed that it might be a maladaptive coping strategy under a highly controlling and uncertain environment. The findings of the present research suggest that supporting need satisfaction has critical importance in decreasing rumination.

Öz

Geçmişte yapılan araştırmalar, ruminasyonun çok yönlü bir yapı olduğunu ve iki tür ruminasyonun ayırt edildiğini göstermiştir: yansıtma ve karamsar düşünme. İlişkili olmalarına rağmen, karamsar düşünme ve yansıtma farklı yapılar olarak kabul edilmektedir. Dolayısıyla bu çalışmada her iki boyut kullanılmıştır. Öz-Belirleme kuramı, insanın sağlıklı işleyişi ve esenlik hali için gerekli olan özerklik, yeterlilik ve ilişkiselilik olmak üzere üç temel psikolojik ihtiyaç olduğunu öne sürmektedir. Bu ihtiyaçların tatmininin engellenmesi, hedeflere ulaşma açısından (ihtiyaç tatmini) gerçek ve ideal durumlar arasında bir tutarsızlık yaratabilir ve bu da ulaşılmamış hedefler hakkında derin düşünmeyi başlatabilir. Öz-belirleme kuramına dayanan bu çalışma, ihtiyaç tatmini ve ihtiyaç tatmini engellenmesi ve ruminasyonun boyutları arasındaki ilişkiyi kesitsel bir desen ile incelemeyi amaçlamaktadır. Bu araştırmaya Türkiye'deki büyük bir devlet üniversitesinin farklı bölümlerinden lisans öğrencileri ($N = 464$, kadın %69, $ORT_{yas} = 21.90$, $SS = 2.88$) katılmıştır. Ruminatif Tepki Ölçeği-Kısa Form ve Temel Psikolojik İhtiyaç Tatmini ve Engellenmesi Ölçeği çevrimiçi bir anket aracılığı ile uygulanmıştır. Sonuçlar özerklik, ilişkiselilik ve yetkinlik ihtiyaçlarının tatmininin engellenmesinin karamsar düşünme boyutunu pozitif yordadığını, yansıtma boyutunun ise ilişkiselilik ve yetkinlik ihtiyaçlarının tatmininin engellenmesi tarafından pozitif bir şekilde yordandığını göstermiştir. İhtiyaç tatmininin engellenmesi hem yansıtma hem de karamsar düşünme boyutunda varyans açıklamıştır. Ruminasyonun yansıtma boyutu faydalı olarak kabul edilse de bu çalışmadan elde edilen sonuçlar yüksek kontrol içeren ve belirsiz bir ortamda uyumsuz bir başa çıkma stratejisi olabileceğini göstermektedir. Mevcut araştırmanın bulguları ruminasyonun azaltılmasında ihtiyaç tatmininin desteklenmesinin kritik öneme sahip olabileceğini iddia etmektedir.

Introduction

Rumination refers to repetitive thoughts evolving around an instrumental theme and it recurs in the absence of environmental demands requiring these persistent thoughts (Martin and Tesser, 1996; Nolen-Hoeksema et al., 2008). Rumination is related to several negative psychological outcomes such as distress (Nolen-Hoeksema, 1991), depression (Boyes et al., 2016), negative affect (Blanke et al., 2021), and well-being (Harrington and Loffredo, 2010). It was argued that perceived incongruities between one's actual and desired states in terms of goal attainment could cause rumination (Martin and Tesser, 1996). Until one takes action to close the gap between actual and ideal states, the rumination continues. Goal pursuit and attainment have been one of the key topics of self-determination theory (SDT; Deci and Ryan, 1985; Ryan and Deci, 2017) concerning psychological "need satisfaction". According to SDT, there are three basic psychological needs, namely autonomy, competence, and relatedness, which need to be met for essential human functioning and well-being (Deci and Ryan, 2000; Ryan and Deci, 2017). Drawing on self-determination theory, the present study aimed to test the link between need satisfaction and frustration, and rumination, specifically brooding and reflection dimensions with a cross-sectional design. The literature regarding the direct relationship between rumination and need satisfaction/frustration is scarce. This study aimed to contribute to this gap and improve present knowledge of the link between these constructs. Given the negative effects of rumination on well-being and optimal functioning, it is essential to explore its associations with need satisfaction and frustration, which are considered eudaimonic indicators of well-being recently (Martela and Ryan, 2021). It was proposed that higher levels of "need frustration" would be associated with increased rumination since need frustration implies a lack of attainment of desired states/goals, which may turn into rumination.

Rumination Brooding and Reflection

The response styles theory states that rumination is a type of distress response and individuals focus on self and past experiences recurrently and passively. Repetitive thoughts about the symptoms of distress, its likely causes, and the consequences of these symptoms are characteristics of rumination. Rumination doesn't bring about active solutions to problems since individuals are fixated on problems and their feelings without proactive action (Nolen-Hoeksema et al., 2008). The theory proposes that rumination impedes the effective problem-solving process

partly because it makes the thinking process more pessimistic and fatalistic. Despite this, people who are ruminating believe that persistently thinking about an instrumental theme is beneficial for themselves (Kubiak et al., 2014).

Previous research has documented that rumination is a multifaceted construct (Trapnell and Campbell, 1999) and two types of rumination were distinguished, reflection (adaptive contemplation) and brooding (pessimistic thinking style) (Schoofs et al., 2010; Treynor et al., 2003). The reflection component of rumination was proposed as having an adaptive pondering effect (Joormann, Dkane and Gotlib, 2006). It points to a deliberate inward turn to perform cognitive problem-solving to mitigate one's depressive symptoms. Thus, one can analyze her/his thoughts to take action to solve the problem in reflection. However, the evidence is mixed on whether reflection is truly an adaptive emotion-regulation strategy (Nolen-Hoeksema et al., 2008). Brooding, on the other hand, represents a passive comparison of one's existing circumstance to some unachieved or unachievable standard (Treynor, Gonzalez and Nolen-Hoeksema, 2003, p. 256). It impedes individuals from taking action by making them perseveringly focus on obsessive and passive thoughts about their current situation (Treynor et al., 2003). Although they are related (Takano and Tanno, 2009, brooding and reflection are different constructs and differently relate to psychological outcomes such as depression (Treynor et al., 2003) and self-compassion (Bugay-Sokmez et al., 2021). Furthermore, Kim and Kang (2022) found that while brooding was negatively associated with life satisfaction, reflection was positively associated with life satisfaction.

Past research claims that reflection can be the starting point of rumination, which turns into brooding over time (Kim and Kang, 2022; Miranda and Nolen-Hoeksema, 2007). When individuals are unsuccessful in generating solutions while attempting to solve the problems, their attempts can turn into negative, inflexible, and passive persistent thoughts (Miranda and Nolen-Hoeksema, 2007). Moreover, since rumination predicted the likelihood of escape behaviors involving self-regulatory deficits (Nolen-Hoeksema et al., 2007), individuals become unable to engage in goal-directed behaviors over time, which results in a discrepancy between current states of unattained goal(s) and desired states of attained goal(s) (Martin and Tesser, 1996). The role of psychological need satisfaction and frustration on rumination can be crucial to examine at this point since need satisfaction and

frustration represents a crucial expression of human functioning regarding goal-directed behavior (Deci and Ryan, 2000).

Psychological Need Satisfaction and Frustration

Self-determination theory proposes that for healthy human functioning and well-being, the satisfaction of three basic psychological needs, namely autonomy, competence, and relatedness, is essential (Deci and Ryan, 2000; Ryan and Deci, 2017). These needs should be satisfied to promote well-being, healthy functioning, and development across cultures (Deci and Ryan, 2000). Autonomy corresponds to the volitional experience and internal locus of causality while performing actions. Individuals seek a sense of integrity attained via self-directed actions to satisfy autonomy needs. Competence refers to feelings of mastery and effectiveness in actions and achieving desired goals. People value excelling in their skills and optimal challenges while meeting competence need. Lastly, relatedness satisfaction is the experience of genuine caring and connection in relationships. Individuals value caring and being cared for by significant others (Deci and Ryan, 2000; Vansteenkiste, Ryan and Soenens, 2020).

Although the need satisfaction concept was mainly utilized in past research, the need frustration concept has started to be utilized recently. The main reason for this change is that it has recognized that the lack of need satisfaction is not equivalent to need frustration, which refers to a state of active obstruction and undermining of needs for autonomy, competence, and relatedness. Need frustration is a distinct concept that refers to an active threat to the satisfaction of needs. Need frustration was found to be linked with negative health consequences., such as burnout and negative affect (see Vansteenkiste and Ryan, 2013; Vansteenkiste et al., 2020). Briefly, autonomy frustration is associated with feelings of being controlled through external or self-imposed restraints (Deci and Ryan, 1985). Competence frustration refers to feelings of inadequacy and self-doubts about one's capabilities (Bartholomew et al., 2011). Lastly, relatedness need frustration refers to feelings of exclusion from the relationships that one cares about (Deci and Ryan, 1985). Although the unique role of need satisfaction and frustration has been proven, there is still limited research employing both measures together. Following the recent line of research, it was important to utilize the need frustration concept in addition to the need satisfaction concept in the present study. As far as we are aware, there is no study that directly examined the link between dimensions of rumination and need satisfaction and frustration to date. Thus, supporting

evidence is still needed to understand the unique role of the need frustration and satisfaction in brooding and reflection.

The Link between Rumination and Need Satisfaction

According to Martin and Tesser (1996), when a series of frustrating experiences occur and lower-order goals of individuals are influenced by this, it is likely that rumination is initiated. Following this, an unattained goal becomes more salient for the individuals. In other words, an entire succession of events frustrating goal attainment can be the initiator of the rumination.

The SDT states that the threats to the daily life of individuals may prevent need satisfaction and increase need frustration. The frustration of needs can create a discrepancy between actual and ideal states of goal attainment (e.g., the satisfaction of the needs), which initiate rumination about unattained goals (frustration of these needs) in one's daily life. However, there is limited research in the literature testing the link between rumination and need satisfaction and frustration. A recent diary study showed that competence need satisfaction mediated the link between unfinished tasks and work-related rumination, which was defined as persistent thoughts about work-related issues (Weigelt et al., 2019). This finding can be considered as evidence that need satisfaction (or frustration) may precede rumination. Thwarted needs can create a discrepancy for individuals in terms of their actual states and desired states (i.e., the satisfaction of autonomy, competence, and relatedness). In particular, Weigelt et al. (2019) demonstrated that the discrepancy between the desired image of the self and the actual competence satisfaction can result in negative self-evaluations, which in turn are followed by persistent negative thoughts about this discrepancy.

In light of the information mentioned above, it was expected that the need frustration would be positively associated with both brooding as well as reflection components of rumination. When engaging in reflection, which refers to analyzing thoughts to take action to solve problems, may not bring proper solutions to these problems, individuals might continue to ruminate, namely, engage in brooding, as suggested by Kim and Kang (2022) and Miranda and Nolen-Hoeksema (2007). Following this line of reasoning, it was also expected need satisfaction would be negatively associated with brooding and reflection.

The Present Study

According to a recent proposition of SDT, psychological needs should be included as indicators of eudaimonic well-being for a comprehensive assessment of well-being (Martela and Ryan, 2021). Thus, the need satisfaction and frustration were measured in the course of the current study as the latter was also examined less frequently in the literature. Need frustration may create a gap between active and desired states of goal attainment in individuals' daily life, which may lead to rumination. Thus, based on SDT, the present study sought to understand the link between need satisfaction and frustration and the two dimensions of rumination, brooding, and reflection. It was expected that both reflection and brooding dimensions would be positively associated with need frustration and negatively associated with need satisfaction. The data of the current study were collected during the global Pandemic. Given the widespread social media during the Pandemic to follow the news about the Pandemic (Tsao et al., 2021) and the link between rumination and gender (Johnson and Whisman, 2013), the average duration of social media use and gender were controlled in the analyses.

METHOD

Participants and Procedure

Undergraduate university students ($N=464$) from a variety of departments of a major state university in Turkey participated in the current study. They were offered extra course credit for their participation. More than half were female (69%), and the average age was 21.90 years ($SD = 2.88$). The majority of the participants were living in big cities (83%). Approximately 40% of participants indicated they use Facebook, 70% Twitter, 88% Instagram, and 26% Snapchat. Among the participants, 18% were using all these social media accounts, 36 % were using at least three of them, and 25% were using at least two of them.

Ethical approval was attained from Middle East Technical University's institutional review board. The data of the present study were collected between April 2021 and March 22 while the Pandemic was continuing. However, different vaccines for the COVID-19 virus were available at that time. The governmental restrictions (home confinements, travel restrictions, physical distancing rules, and so forth) applied to prevent the spread of the virus were relieved from time to time, depending on the number of cases during that period. Participants completed

surveys online. Participants completed the informed consent form before starting the survey.

Materials

Ruminative Responses Scale-Short Form (RRS-SF: Treynor, Gonzales and Nolen-Hoeksema, 2003) was administered to measure rumination. The scale was adapted to Turkish by Erdur-Baker and Bugay (2010). It is a 10-item measure and scored on a 4-point Likert scale, ranging from 1 (*almost never*) to 4 (*almost always*). It has two dimensions, reflection and brooding. Example items from the scale: "Go someplace alone to think about your feelings" (reflection), and "Why do I always react this way?". The valence of the reflection items is neutral and described as performing contemplation to mitigate negative mood. Brooding items, on the other hand, are negatively valenced and used to describe "moody pondering". Cronbach's α is .78 for reflection and .79 for brooding in the present study.

Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) was used to measure satisfaction and frustration of three needs, autonomy, competence, and relatedness in the general domain of life. The Turkish version of the BPNSFS was used (Mouraditis et al., 2018) in the present study. The scale contains 24 items and items are rated on a Likert scale of 1 (*completely disagree*) to 7 (*completely agree*). Every dimension includes four items. Example items from the scale: "I feel that my decisions reflect what I really want." (autonomy satisfaction), "I feel forced to do many things I wouldn't choose to do." (autonomy frustration), "I feel capable at what I do" (competence satisfaction), "I feel disappointed with many of my performances." (competence frustration), "I feel connected with people who care for me, and for whom I care." (relatedness satisfaction), and "I feel that people who are important to me are cold and distant towards me." (relatedness frustration). Cronbach's α is .83 for autonomy satisfaction, .81 for autonomy frustration and relatedness satisfaction, .87 for relatedness frustration, .94 for competence satisfaction, and .86 for competence frustration in the current study.

Demographic information included questions about age, gender, department of study, the average time spent on social media, type of used social media, and type of living place (big city, small city, town/village).

Analytical Approach

A series of hierarchical regression analyses (two-steps-based) were run using SPSS Version 25 to investigate the associations between rumination and need satisfaction and frustration. Separate regression analyses were performed to predict the brooding and reflection components of rumination. Gender and the average social media use time (in minutes) were entered in the first step to control their effects. Need satisfaction and frustration were entered in the second step. The univariate normality assumption was tested utilizing skewness and kurtosis. Results showed that skewness values ranged from -.51 to .68 and kurtosis values ranged from -.53 to -.44 for brooding and reflection. All items of the Ruminative Responses Scale had sufficient normality based on the criteria proposed by Curran et al. (1996).

RESULTS

Descriptive statistics of the study variables were presented in Table 1. Briefly, results showed that while brooding was correlated positively with the average duration of social media use and autonomy, relatedness, and competence frustration, it was correlated negatively with gender and autonomy and competence need satisfaction. Similarly, reflection was correlated positively with need frustration and correlated negatively with gender and autonomy and competence need satisfaction.

Table 1

Descriptive statistics and intercorrelations of the study variables.

	M	SD	α	1	2	3	4	5	6	7	8	9	10
1. Gender				-									
2. Average Duration	178.15	107.76		-.21									
3. Autonomy S.	4.91	1.06	.83	.07	-.08								
4. Autonomy F.	4.24	1.30	.81	-.12*	.15**	-.43**							
5. Relatedness S.	5.41	1.07	.81	-.14**	.06	.33**	-.13**						
6. Relatedness F.	2.85	1.41	.87	.04	.06	-.35**	.37**	-.40**					
7. Competence S.	4.77	1.40	.94	.16**	-.16**	.55**	-.40**	.22**	-.36**				
8. Competence F.	3.76	1.42	.86	-.18**	.17**	-.48**	.51**	-.18**	.48**	-.74**			
9. Brooding	2.98	.88	.79	-.15**	.14**	-.28**	.46**	-.13**	.46**	-.42**	.56**		
10. Reflection	3.17	.88	.78	-.28**	.07	-.15**	.22**	-.07	.31**	-.21**	.35	.54**	

Note. Average Duration: The average time spend on social media in minutes. S. = satisfaction; F. = frustration;

* $p < 0.05$; ** $p < 0$

Hypothesis Testing

It was hypothesized that the need frustration would be positively associated with both brooding as well as reflection components of rumination. It was also hypothesized that need satisfaction would be negatively associated with brooding and reflection. The results are presented in Table 2 for brooding and Table 3 for reflection. Findings showed that both gender ($\beta = -.13$, $SE = .09$, $p < .001$, 95% $CI = [-.40, -.09]$) and the average duration of social media use ($\beta = .11$, $SE = .04$, $p < .01$, 95% $CI = [.02, .18]$) were significant in predicting brooding in the first step [$F(2, 461) = 8.50$, $p < .001$]. Specifically, being high on the average duration of social media use and being female are associated with increased brooding. Need satisfaction and frustration variables were added to the equation and gender and duration of social media use became nonsignificant in the second step. Autonomy ($\beta = .20$, $SE = .03$, $p < .001$, 95% $CI = [.08, .20]$), relatedness ($\beta = .25$, $SE = .03$, $p < .001$, 95% $CI = [.10, .21]$), and competence frustration ($\beta = .33$, $SE = .04$, $p < .001$, 95% $CI = [.13, .28]$) were significant predictors of brooding [$F(8, 455) = 36.95$, $p < .001$]. Specifically, those who reported higher levels of need frustration engaged in more brooding.

Table 2
Summary of Regression Analyses for the Variables Predicting Brooding

	b	SE	β	t
Step 1				
Constant	3.29	.12		27.64***
Gender	-.23	.09	-.13	-2.77**
Duration	.10	.04	.11	2.42*
Step 2				
Constant	.99	.38		2.63**
Gender	-.09	.07	-.05	-1.23
Duration	.02	.03	.03	.73
Autonomy S.	.05	.04	.06	1.21
Autonomy F.	.14	.03	.20	4.55***
Relatedness S.	.03	.04	.03	.80
Relatedness F.	.15	.03	.25	5.47***

Competence S.	-.02	.04	-.03	-.49
Competence F.	.21	.04	.33	5.46***
Total R^2	.39***			
F	36.95***			
N	464			

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. S. = satisfaction; F. = frustration

The same regression analysis was performed for reflection and the results were presented in Table 3. According to the findings, gender ($\beta = -.28$, $SE = .08$, $p < .001$, 95% CI = [-.67, -.34]) was significant in predicting reflection in the first step [$F(2, 461) = 20.09$, $p < .001$]. Specifically, being female is associated with increased reflection. In the second step, need satisfaction and frustration variables were added. Gender ($\beta = -.24$, $SE = .08$, $p < .001$, 95% CI = [-.59, -.28]) was still a significant predictor together with relatedness ($\beta = .19$, $SE = .03$, $p < .001$, 95% CI = [.05, .18]) and competence frustration ($\beta = .30$, $SE = .04$, $p < .001$, 95% CI = [.27, .27]), [$F(8, 455) = 15.09$, $p < .001$]. Specifically, people who reported higher levels of relatedness and competence frustration also reported higher levels of reflection.

Table 3
Summary of Regression Analyses for the Variables Predicting Reflection

	b	SE	β	t
Step 1				
Constant	3.84	.12		33.31***
Gender	-.50	.08	-.28	-6.14***
Duration	.01	.04	.01	.26
Step 2				
Constant	2.22	.43		5.17***
Gender	-.44	.08	-.24	-5.57
Duration	-.02	.04	-.03	-.59
Autonomy S.	.02	.04	.03	.50
Autonomy F.	.02	.03	.04	.68
Relatedness S.	-.01	.04	-.01	-.26

Relatedness F.	.12	.03	.19	3.58***
Competence S.	.07	.04	.12	1.80
Competence F.	.19	.04	.30	4.35***
Total R ²	.21***			
F	15.09***			
N	464			

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. S. = satisfaction; F. = frustration

DISCUSSION

The present cross-sectional study examined the link between need satisfaction and frustration and the dimensions of rumination. The obtained results were largely in line with the expectations. While brooding was predicted by the frustration of autonomy, relatedness, and competence, reflection was predicted by only relatedness and competence frustration. Contrary to expectations, the satisfaction of autonomy, relatedness, and competence needs predicted neither brooding nor reflection dimensions of rumination. The hypothesis of the current study received partial support. The current study extends the previous literature by demonstrating that the reflection component of rumination can be maladaptive. Moreover, reflection and brooding dimensions have started to be distinguished recently (e.g., Bugay-Sokmez et al., 2021; Cole et al., 2015). Thus, including the measure of need frustration together with the need satisfaction and distinguishing reflection and brooding dimensions of rumination are strengths of the present study.

The Link between the Dimensions of Rumination and Need Frustration

As expected, brooding was predicted by autonomy, relatedness, and competence frustration. In brooding, individuals compare their current situation passively with some unachieved standard or some ideal situation (Treyner et al., 2003). Moreover, as it was argued by Martin and Tesser (1996), unaccomplished goals initiate rumination. In our case, thwarted needs represent unaccomplished goals regarding the satisfaction of the needs. For example, if an individual wants to be included in a social group but s/he is rejected or the behaviors of others in that group towards the person are superficial, the person can start to ruminate about the gap between her/his actual situation and ideal situation. It should be noted that individuals may try to find alternative ways of satisfying their needs through the reflection dimension of rumination. However, they may be unsuccessful if they

do not have the necessary means or they have limited opportunities in the surrounding environment.

Although all frustrated needs predicted the brooding dimension as expected, the reflection dimension was predicted by relatedness and competence frustration but not by autonomy frustration in the present study. As already mentioned, autonomy satisfaction refers to experiencing a sense of personal choice and freedom and congruence between one's actions and the self (Ryan and Deci, 2017). The finding of Schewinger et al. (2020) showed that the declines in autonomy need satisfaction leads to stronger decreases in well-being than declines in relatedness satisfaction. This finding shows the fundamental position of autonomy satisfaction in well-being. Although it is speculative, the ongoing COVID-19 Pandemic may play a role in this finding. With the restrictions imposed in 2020, 2021, and some parts of 2022, the lives of people worldwide have been influenced drastically. Travel bans, closure of borders, home quarantines, distancing rules, mask and hygiene rules, curfews, and closure of facilities such as schools, restaurants, shopping centers and so on, has left no room to decide for individuals by themselves in many areas of their lives such as family, work, and leisure. As a result, daily routines have been disrupted (Petzold et al., 2020). Thus, individuals may even stop thinking about decreasing the gap between their current situation and the ideal situation during this extreme situation. It can be asserted that it is more challenging to satisfy autonomy needs, so individuals may simply stop reflecting on their frustrated autonomy needs.

The same situation may not be the case or less critical for relatedness and competence need frustration since it is easier to find some new ways to fulfill them despite restrictions. For example, Dimmock et al. (2021) demonstrated that while technology-based social interactions satisfied relatedness needs, face-to-face social interactions satisfied autonomy needs. Although need satisfaction and frustration are related but distinct concepts, still the finding of Dimmock et al. (2021) provides indirect evidence that meeting the needs for relatedness and autonomy depends on different means. There is still some room to meet the frustrated relatedness need through online interactions, as evidenced by Dimmock et al. (2021) during the Pandemic. Thus, participants in the current study may continue to reflect on relatedness and competence needs frustration but not on autonomy need frustration. However, it should be noted that there is no direct measurement of the

COVID-19 Pandemic regarding its effect on rumination in the present study. These speculations should be evaluated with a certain degree of caution.

For competence frustration, it is also more likely to find some ways to satisfy it as compared to autonomy. It has been suggested that competence frustration might be associated with unfamiliarity with COVID-19 (van der Goot et al., 2021). Because of the time period in which the data of the current study were collected, it is likely that individuals' familiarity with the new normal increased over time. They may begin to reflect on how to act effectively in this changing environment to satisfy their frustrated competence need. However, it should be indicated that the present study did not provide any direct supporting evidence on whether engaging in reflection about the frustrated needs was conducive to goal attainment. It was shown that reflection was associated with more internalized forms of self-regulation and goals (Thomsen et al., 2011) because it may play a crucial role in reaching accurate self-knowledge and includes more curiosity and epistemic interest in self (Trapnell and Campbell, 1999, p. 297). However, if they have limited access to opportunities and little control over the sources in an uncertain and constantly changing environment, individuals may fail to achieve desired goals even if they reach accurate self-knowledge. Although it is speculative, stressful environments may rule out the potential benefits of reflection. The findings of Takano et al. (2011) seem to support this speculation. They demonstrated that although self-reflection aids the maintenance of relationships in usual times, it hampers problem-solving and emotional regulation in difficult or stressful situations.

Implications and Conclusion

Although the two dimensions of rumination were shown as positively correlated, they also have distinct aspects and the brooding dimension predicted pathological outcomes (e.g., Joorman, Dkane and Gotlib, 2006; Miranda and Nolen-Hoeksema, 2007). However, in the present research, the relationship between the need frustration and reflection has a pretty similar pattern to the link between brooding and the need frustration. Thus, the neutral or less negative role of reflection may change in times of extreme crisis like to global Pandemic. As it was claimed, it may turn into brooding (Kim and Kang, 2022; Takano and Tanno, 2009), especially when the goals are not accomplished or become unattainable due to environmental pressures. Moreover, since reflectors engage in rumination simultaneously, it is also likely that the adaptive function of reflection may be contaminated by brooding (Takano and Tanno, 2009). The findings of the present

research support these claims. However, there is a need for more research to truly understand the nature of these two different but related dimensions of rumination. Finally, the findings of the present research suggest that to be able to stop or decrease rumination, decreasing the need frustration has critical importance. The idea is that closing the gap between one's current state and actual state in terms of attaining desired outcomes through need satisfaction can prevent individuals from excessively thinking about this gap.

Limitations

Despite its strengths, the current study has some limitations to mention. First, the study is correlational and causal conclusions cannot be drawn between the variables. Although it was decided to put need satisfaction and frustration variables as antecedents of brooding and reflection depending on previous research (Weigelt et al., 2019) and theoretical evidence (Martin and Tesser, 1996), the likelihood of opposite sequence or bidirectionality cannot be completely ruled out. Experiments should be conducted to draw causality between variables. Second, as mentioned before, reflection and brooding tend to co-occur. Thus, moderators and mediators may be useful to be utilized in future studies to further improve the current understanding of the differential roles of need satisfaction and frustration on brooding and reflection. Third, asking about the average duration of social media use may not be ideal because even if participants were instructed to check the screen time for social media on their phones, they might provide this information without checking it. Fourth, since there is limited research testing the link between need satisfaction and frustration and the dimensions of rumination, the generalizability may be limited. There is a need for further research, experimental and longitudinal, to draw more firm conclusions. Finally, there was no COVID-related psychological construct measured to control their effect in the present study even though they might be associated with the outcomes.

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Summary

Introduction: Rumination relates to several negative psychological outcomes such as distress (Nolen-Hoeksema, 1991), depression (Boyes et al., 2016), negative affect (Blanke et al., 2021), and well-being (Harrington and Loffredo, 2010). It was argued that the perceived disparity between one's existing and ideal conditions in terms of goal attainment can lead to rumination (Martin and Tesser, 1996). One needs to take some action to close this gap. According to self-determination theory (SDT; Deci and Ryan, 1985; Ryan and Deci, 2017) three basic psychological needs, namely autonomy, competence, and relatedness, which need to be met for essential human functioning and well-being (Deci and Ryan, 2000; Ryan and Deci, 2017) are positively associated with goal attainment. Drawing on SDT, the present study aimed to test the link between need satisfaction and frustration and rumination, specifically brooding and reflection dimensions with a cross-sectional design. Since there is limited research in the literature examining the direct link between rumination and need satisfaction/frustration, this study aimed to contribute to closing this gap and improve the existing knowledge of the relationship between these constructs. Given the negative effects of rumination on well-being and functioning, it is essential to explore its associations with need satisfaction and frustration, which are considered eudaimonic indicators of well-being recently (Martela and Ryan, 2021). It was proposed that higher levels of need frustration would be associated with increased rumination since need frustration implies a lack of attainment of desired states/goals, which may turn into rumination.

Method: Undergraduate university students ($N=464$) from a variety of departments of a major state university in Turkey participated in the current study. They were offered extra course credit for their participation. Participants completed surveys online. Participants completed the informed consent form before starting the survey. Ruminative Response Scale-Short Form and Basic Psychological Need Satisfaction and Frustration Scale were administered along with demographic information questions.

Results: A two-step hierarchical regression analyses were conducted separately to investigate the predictors of brooding and reflection depending on need satisfaction and frustration in SPSS Version 25. Gender and average duration social media use were controlled in the first step to control their effects. Autonomy ($\beta = .20$, $SE = .03$, $p < .001$, 95% $CI = [08, .20]$), relatedness ($\beta = .25$, $SE = .03$, $p < .001$, 95% $CI = [10, .21]$), and competence frustration ($\beta = .33$, $SE = .04$, $p < .001$, 95% $CI = [13, .28]$) were significant predictors of brooding [$F(8, 455) = 36.95$, $p < .001$]. Specifically, people who reported higher levels of need frustration are also higher in brooding.

The same steps were repeated for predicting reflection component of rumination. Analysis showed that relatedness ($\beta = .19$, $SE = .03$, $p < .001$, 95% $CI = [05, .18]$) and competence frustration ($\beta = .30$, $SE = .04$, $p < .001$, 95% $CI = [10, .27]$), [$F(8, 455) = 15.09$, $p < .001$] were significant in predicting reflection. Specifically, people who reported higher levels of relatedness and competence frustration are also reported higher levels of reflection.

Discussion: The present cross-sectional study tested the link between need satisfaction and frustration and the dimensions of rumination. The obtained results were largely in line with the expectations. While brooding was predicted by the frustration of autonomy, relatedness, and competence, reflection was predicted by only relatedness and competence frustration. Contrary to expectations, the satisfaction of autonomy, relatedness, and competence needs predicted neither brooding nor reflection. The hypothesis of the current study received partial support. The current study extends the previous literature by documenting that the reflection component of rumination can be maladaptive. Moreover,

reflection and brooding dimensions have started to be distinguished recently (e.g., Bugay-Sokmez et al., 2021; Cole et al., 2015). Thus, including the measure of need frustration together with the need satisfaction and distinguishing reflection and brooding dimensions of rumination are the strengths of the current study. It should be noted that the data of the present study were collected during the Global COVID-19 Pandemics.

Conclusion: According to the findings of the current research, to be able to stop or decrease rumination, decreasing the need frustration has critical importance. The idea is that closing the gap between one's current state and actual state in terms of attaining desired outcomes through need satisfaction can prevent individuals from recurrently thinking about this gap. Moreover, the associations between need satisfaction and frustration and components of rumination may be exaggerated due to the stressful and unpredictable nature of the Pandemic. Findings should be evaluated by taking this issue into consideration.