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Desired attachment and breakup distress relate to automatic approach of the ex-partner

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ABSTRACT

Background and objectives: Romantic relationship breakups can lead to severe emotional disturbances including major depression. Anxious attachment and desired attachment with the ex-partner are hypothesized to elicit repetitive thought about the breakup and the former partner and attempts to reunite with (i.e. approach) the ex-partner, which fuel breakup distress. Since prior research on this topic has mostly used survey methodology, the study aim was to examine the relations between above-mentioned variables employing a behavioral measure of approach of the ex-partner.

Methods: Automatic approach-avoidance tendencies toward the former partner were assessed with an Approach Avoidance Task (AAT). Sixty-two students (76% female) moved a manikin towards or away from stimuli pictures (ex-partner, matched stranger, landscape) as fast as possible based on the stimulus frame color (blue, yellow). Participants also completed questionnaires assessing anxious attachment, desired attachment, repetitive thought about the breakup (rumination) and the ex-partner (yearning), and breakup distress (prolonged grief symptoms).

Results: Anxious attachment related positively to rumination and breakup distress. Desired attachment related positively to yearning, automatic approach bias toward the ex-partner, and breakup distress. Both anxious and desired attachment, rumination, yearning, and approach bias related positively to breakup distress.

Limitations: The use of a student sample may limit generalizability. A correlational design precludes causal conclusions.

Conclusions: Together with prior work, results suggests anxious attachment hampers psychological adaptation to a breakup by increasing the use of ruminative coping. Desire to retain an attachment bond with the ex-partner, expressed in yearning and approach of the ex-partner, may also worsen breakup distress.

1. Introduction

Romantic relationship dissolution is a negative life-event that may prompt substantial life-changes, such as moving, changing jobs, and social alienation (Davis et al., 2003). Breakups can be a major source of distress for young adults, eliciting various emotional disturbances, including anger and sadness (Sbarra, 2006). Generally, such emotional reactions are a natural and transient response to an interpersonal loss. In a minority, romantic relationship dissolution elicits high levels of anxiety, depression, and posttraumatic stress (e.g., Boelen & Reijntjes, 2009; Chung et al., 2002; Field et al., 2009; Saffrey & Ehrenberg, 2007). Moreover, for some adolescents, a breakup precedes the onset of major depression and suicidal tendencies (Monroe et al., 1999). To help those experiencing severe mental health problems after a breakup, it is

important to understand which mechanisms may make it more likely to develop these problems.

Some researchers have examined associations between sociodemographic and breakup characteristics and mental health problems after relationship dissolution. For example, Field et al. (2009) showed that being female (vs. male), a shorter time since breakup, non-initiator status, feeling rejected and betrayed, and experiencing the breakup as unexpected (vs. expected) related positively to breakup distress (i.e., break-up related grief). Other researchers have confirmed that putative maladaptive traits (e.g., neuroticism), cognitions (e.g., negative beliefs), and coping strategies (e.g., rumination) relate to worse mental health outcomes after breakup (e.g., Boelen & Reijntjes, 2009; Chung et al., 2002; Davis et al., 2003; Del Palacio-Gonzalez et al., 2016; Saffrey & Ehrenberg, 2007). Within the current investigation, we aimed to shed

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light on the role of another individual difference variable presumed critical in psychosocial adaptation to relationship dissolution, namely attachment.

Coping theories hold that attachment is a central factor in the development of mental health problems after interpersonal loss (e.g., LeRoy et al., 2019; Maccallum & Bryant, 2013; Shear et al., 2007). According to attachment theory, an infant's relationship with their primary caregiver influences their attachment in social relationships later in life (Bowlby, 1973). Originally, researchers distinguished between three distinct attachment styles: secure, anxious, and avoidant (Ainsworth et al., 1978). These different attachment styles translate into dimensions of attachment anxiety and attachment avoidance (Fraley & Shaver, 2000). A person with an anxious attachment style tends to be preoccupied with the partner, fears rejection, and worries about abandonment. A person with an avoidant attachment style tends to feel uneasy with closeness, maintains emotional distance, and strives for excessive independence. A securely attached person scores low on both dimensions, keeping a healthy balance between dependence and independence.

In adulthood, infant and caregiver bonds reflect in romantic relationships; individual differences in attachment styles are expressed in relation to the romantic partner instead of a parent (Fraley & Shaver, 2000; Hazan & Shaver, 1987). According to attachment theory, people in adults' social environment serve attachment-related functions (Bowlby, 1982). Bowlby defined key attachment-related functions as proximity seeking (i.e., seeking the proximity of an attachment figure and resisting separation from this person), safe haven (i.e., an attachment figure reduces distress and offers support during difficulties), and secure base (i.e., providing a core sense of emotional and psychological security) (Hazan et al., 2004). Among adults, a long-term romantic partner is typically a primary attachment figure at the top of their attachment hierarchy. Often, the partner fulfills most attachment-related functions whilst secondary attachment figures such as parents, siblings, and/or close friends are on the lower levels of the attachment hierarchy (Trinke & Bartholomew, 1997). Primary attachment figures play an important role in maintaining felt security and help regulate a variety of bodily processes, including the control of body temperature, sleep-wake cycles, and general physiological activity (Polan & Hofer, 1999).

The loss of a primary attachment figure often implies the loss of an important person towards one can direct one's attachment needs and can elicit similar responses in adults to those seen in infants separated from their caregiver (Weiss, 1988; Leroy et al., 2019). For example, relationship dissolution may result in persistent recurrent thought about the loss (i.e., rumination) and the lost person (i.e., yearning), psychological disorientation, and separation distress. Some people may engage in searching behavior or repeated attempts to reunite with the ex-partner to restore the lost attachment bond (e.g., Davis et al., 2003; Weiss, 1988). Being unable to reunite with the ex-partner can recurrently elicit severe distress. Therefore, attachment theorists consider the restructuring of the attachment hierarchy in a way that one no longer *desires* to use the lost person for attachment-related functions critical for healthy adaptation to interpersonal loss (Bowlby, 1979; Hazan et al., 2004).

In line with the above, people with an anxious attachment style, who are preoccupied with themes of rejection and abandonment, are more likely to ruminate about their ex-partner and the breakup which relates to more severe breakup distress (Davis et al., 2003; Saffrey & Ehrenberg, 2007). Anxiously attached individuals also more often experience the desire to re-establish a relationship with an ex-partner (Cope & Mattingly, 2021) and engage more in excessive attempts to reunite with the ex-partner (Davis et al., 2003). Notably, research on adult attachment and breakup outcomes has predominantly focused on attachment styles (i.e., how one generally relates to other people). Research on more dynamic aspects of attachment bonds following separation (i.e., how individual attachment bonds between persons change after breakup) is

less common (for a review: Leroy et al., 2019). Nevertheless, such studies have yielded valuable information. For instance, they have shown that people often report the desire to direct needs for security, support, companionship, and reassurance towards a former partner, even when they were aware that these needs will no longer be met by this person (Perilloux & Buss, 2008; Sbarra & Emery, 2005). Furthermore, desired attachment, the extent to which one still desires the ex-partner to fulfill attachment related functions (i.e., proximity-seeking, safe haven, secure base) relates to more rumination and poorer psychological adjustment (Fagundes, 2012).

In summary, both trait-like attachment constructs (e.g., attachment anxiety) and more dynamic attachment constructs (e.g., desired attachment), as well as related negative thinking styles (e.g., rumination) and behaviors focused on retaining closeness to the ex-partner (e.g., attempts to reunite), may contribute to breakup distress. Improving understanding of how these constructs interrelate may help identify who is at risk of breakup distress and what strategies may reduce breakup distress. To provide such an improved understanding, we identified limitations in the literature on this topic, which we aim to address.

First, since past breakup research has generally focused exclusively on trait-like attachment constructs instead of dynamic attachment constructs, we use measures of both attachment anxiety and desired attachment. Second, given the strong phenomenological similarities in behavioral and emotional responses to breakups and bereavement (e.g., Burger et al., 2020; Papa et al., 2014), we apply validated measures to assess loss-related repetitive thinking (e.g., rumination, yearning) and distress (prolonged grief symptoms) to the context of breakups (cf. Field et al., 2009; O'Connor & Sussman, 2014). Third, breakup research suffers from an overreliance on survey methodology. Surveys are subject to various biases, such as recall biases (for a review: Choi & Pak, 2005). Surveys generally do not take into account that some people may not accurately remember, or may be insufficiently able to report their actual behavior. Therefore, we will uniquely employ a behavioral measure to assess approach tendencies toward the ex-partner: a reaction time based Approach Avoidance Task (AAT; De Houwer et al., 2001; Krieglmeier & Deutsch, 2010; Rinck & Becker, 2007). The AAT appears useful to study approach of the ex-partner following relationship dissolution, as it has been employed successfully to study the automatic approach (and avoidance) of stimuli related to a lost person in bereaved samples. For example, grief rumination related to an avoidance bias for pictures of the deceased combined with loss words in an AAT, consistent with the notion that rumination serves as a strategy to avoid the loss (Eisma et al., 2015). Another AAT study provided preliminary evidence of an association between prolonged grief symptoms and approach tendencies toward names of deceased persons (Maccallum & Bryant, 2019).

So, we aim to shed further light on the associations between attachment, breakup-related repetitive thought, automatic approach of the ex-partner, and breakup distress following recent romantic relationship breakups. First, we hypothesize that more anxiously attached people, as well those with a stronger desire to use the former partner as an attachment figure, will experience more breakup-related repetitive thought. Specifically, we expect them to ruminate more frequently about the causes and consequences of the breakup (e.g., "What could I have done to prevent the breakup?") (e.g., Eisma & Stroebe, 2017; Fagundes, 2012; Saffrey & Ehrenberg, 2007) and to yearn more strongly for reunion with the ex-partner (e.g., "I imagine how wonderful we would be together right now") (e.g., Cope & Mattingly, 2021; Eisma et al., 2020). Second, based on the theoretical and empirical link between anxious and desired attachment and self-reported attempts to reunite with the ex-partner (Davis et al., 2003; LeRoy et al., 2019), we expect these attachment constructs to relate positively to automatic approach of the ex-partner assessed with an AAT. In line with prior theorizing and research, we further predict that all aforementioned variables relate positively to breakup distress.

2. Methods

2.1. Participants

We recruited university students because they frequently experience romantic relationship breakups, which can be the source of severe distress (e.g., Boelen & Reijntjes, 2009; Field et al., 2009; Del Palacio-Gonzalez et al., 2016). Participants were recruited in three ways: a) an online participant pool for undergraduate psychology students at the first author's institution, b) advertisements on information boards at the same university, and c) digital versions of the advertisements adjusted to Facebook Ads (presented to Facebook and Instagram users in the region). Participants were considered eligible if they experienced a romantic relationship dissolution over the past 12 months. We chose this 12 month time limit because breakup distress reduces over time (e.g., Field et al., 2009). By including people who experienced a breakup recently, we ensured that the sample consisted of people with varying levels of breakup distress. Additionally, they had to be willing to send two portrait pictures of their ex-partner via a secure platform (www.wetransfer.com). We chose this platform over email because it can easily process large picture files. An a priori power analysis indicated that for a point-biserial correlation using a one-tailed test, with a medium effect size ($r = .30$; Cohen, 1977), and an alpha of .05, G*Power3 (Faul et al., 2007) a sample size of 64 participants was necessary to achieve a power of .80. Near the end of the study, the lab had to be closed due to COVID-19. Therefore, we could only include 62 of the desired 64 participants. Forty-seven participants (76%) were female and the mean age of all participants was 20.89 years ($SD = 2.50$). To retain optimal power, three people who experienced a breakup longer than 12 months ago were also allowed to participate: two experienced a breakup 14 months previously, one 24 months previously. Table 1 shows all sample characteristics.

2.2. Procedure

The study was approved by Internal Ethical Review Board of the first author's institution (Registration number: PSY-1920-S-0128). Undergraduate psychology students could register for a 1-h time slot via a participant pool website. Other participants could use a scheduling website. After registration, participants were reminded by email to send the researcher two portrait photos of their ex-partner. To protect the

Table 1
Sample Characteristics (N = 62).

Demographic variables	
Gender ^a	
Female (%)	47 (76%)
Mean age ^b	20.89 (2.50)
Breakup-related variables	
Gender of ex-partner ^a	
Male (%)	46 (74%)
Expectedness of breakup ^a	
Expected (%)	34 (55%)
Unexpected (%)	16 (26%)
Both or neither (%)	12 (19%)
Mean duration of relationship in months ^b	20.47 (16.23)
Mean time since breakup in months ^b	6.73 (4.28)
Who decided to end the relationship? ^a	
I did (%)	31 (50%)
My ex-partner (%)	18 (29%)
Both of us (%)	13 (21%)
Psychological variables ^b	
Attachment anxiety	16.97 (4.67)
Desired attachment	1.74 (1.17)
Rumination	34.40 (9.20)
Yearning	18.55 (8.22)
Breakup distress	40.89 (14.25)

^a Frequency with valid % in parentheses.

^b Mean with standard deviation in parentheses.

privacy of the ex-partner, we asked the participants to send the files via www.wetransfer.com, a secure file sharing system through which the recipient gains access only for a limited time after which the files are deleted. Participants also had to remove any details that could reveal the identity of the ex-partner (e.g., a person's name in the file name) and were informed that the pictures would be deleted immediately after participation.

In the laboratory, participants first read an information letter about the procedure of the study, including information on e.g., general study aims, data handling, and voluntariness. They could ask any questions they might have about the study. Subsequently, they provided written informed consent. First, participants filled out questionnaires about demographic and breakup characteristics. Second, they completed a series of psychological measures. Third, they completed an Approach Avoidance Task (AAT). Lastly, participants were asked how they had experienced the study, were debriefed about the research goals, and were offered either course credit or 15 euros for participation. Counseling was available to participants, but no one showed strong emotional reactions or indicated a need for professional help.

2.3. Questionnaires

Sociodemographic and breakup-related variables. A self-constructed background questionnaire was used to assess demographic characteristics (gender and age) and characteristics of the breakup (ex-partner's gender, expectedness of the breakup, relationship duration, time since breakup, and initiator status).

Attachment anxiety. We used six items from the short form of Experiences in Close Relationships Scale (ECR-S; Wei et al., 2007) to assess attachment anxiety. Participants indicated how they generally experience close relationships (e.g., "I need a lot of reassurance that I am loved by my partner."). Participants indicated their agreement with items on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Please note that the 5-point scale resulted from an administrative error and diverges from the original 7-point scale. Research supports the reliability and construct validity of ECR-S (Boelen & Reijntjes, 2009; Wei et al., 2007). Subscale item scores were summed to create a total score (ranging from 6 to 30). In our study, the reliability of this subscale was acceptable, $\alpha = 0.78$.

Desired attachment. To assess the extent to which participants still desired to use their ex-partner as an attachment figure, we used the WHOTO (Hazan & Zeifman, 1994). The items of the WHOTO assesses three attachment-related functions proposed by Bowlby (1982), i.e., proximity seeking (e.g., "Who is the person you most like to spend time with?"), safe haven (e.g., "Who is the person you want to be with when you are feeling upset or down?"), and secure base (e.g., "Who is the person you would want to tell first if you achieved something good?"). The WHOTO can test participants' desire to use their ex-partner, compared to other close people, as an attachment figure (Fagundes, 2012). Participants were asked to list up to five people (but no less than two) in the order of importance in response to six questions (two items per function). Next, to assess desired attachment, participants answered the following question for each item: "Even if you know you cannot or should not, if you could place your former romantic partner anywhere on the above list, where would you desire to put him or her?" Assigning the ex-partner to the first place, results in a score of 5 for the item. Assigning the ex-partner to the fifth place, results in a score of 1 for the item. If they exclude the ex-partner altogether, zero points are allocated for the item. Following Fagundes (2012), we used scores from all six questions to calculate an average desired attachment score. Several studies have offered support for the reliability and validity of different versions of the WHOTO (e.g., Fagundes, 2012; Fraley & Davis, 1997). In our study, the reliability was acceptable, $\alpha = 0.78$.

Rumination. To the best of our knowledge, there are no well-validated measures of breakup-related rumination. Therefore, we adapted a validated measure of grief rumination, the Utrecht Grief

Rumination Scale (UGRS; Eisma, Stroebe et al., 2014b), to assess breakup-related rumination. The adapted UGRS comprises 15 items to assess recurrent and repetitive thinking about the causes and consequences of the breakup. On a 5-point Likert scale (1 = *never*; 5 = *very often*), participants were requested to indicate the frequency of experiencing specific thoughts during the previous month. For example: “How often in the past month did you think about the consequences that the breakup has for you?” Research supports the reliability and construct validity of the UGRS to assess grief rumination (Eisma et al., 2012; Eisma, Stroebe et al., 2014b). In our study, the internal consistency of the UGRS was good, $\alpha = 0.84$.

Yearning. To assess yearning for the ex-partner, we used the Dutch Yearning in Situations of Loss Short Form (YSL-SF; Eisma et al., 2020), a shortened 8-item version of the Yearning of Situations of Loss Scale (YSL; O'Connor & Sussman, 2014). The original YSL was developed to assess yearning following multiple types of interpersonal losses, including breakup. On a 5-point Likert scale (1 = *never*; 5 = *always*), participants were asked to indicate how often they feel what is described in the statements, e.g. “I find myself wishing that things could be the way they were when I was with ...”. Research has supported the reliability and construct validity of the YSL-SF in bereaved individuals (YSL-SF; Eisma et al., 2020). In our study, the reliability of the YSL-SF was excellent, $\alpha = 0.93$.

Breakup distress. In line with the work of a variety of researchers of relationship dissolution, we conceptualized breakup distress as breakup-related grief (e.g., Field et al., 2009; Marshall et al., 2013; Del Palacio-Gonzalez et al., 2016). The adaptation of grief measures has yielded valid measures of breakup distress (Field et al., 2009). Specifically, we adjusted the Traumatic Grief Inventory-Self Report (TGI-SR; Boelen & Smid, 2017). The original TGI-SR contains 18 items. We adapted and used all the items except one (“I experienced a desire to die in order to be with the deceased”) because this would not apply after breakups. Participants indicated to what extent they experienced breakup-related distress on a 5-point Likert scale (1 = *never*; 5 = *always*). An example item is: “I had trouble accepting the breakup”. Research has supported the reliability and validity of the TGI-SR. In our study, the adapted 17-item scale’s reliability was excellent, $\alpha = 0.92$.

2.4. Approach-avoidance task

Briefly, in an AAT participants are repeatedly presented with

different stimuli on a computer screen and instructed to move towards a given stimulus (i.e., approach) or move away from it (i.e., avoid) as fast as possible based on an unrelated characteristic of a stimulus (e.g., tilt of the frame) (Krieglmeyer & Deutsch, 2010; Rinck & Becker, 2007). A frequently used version of the AAT involves participants pressing keys on a keyboard to move a manikin toward or away from the stimulus (Krieglmeyer & Deutsch, 2010). A comparison is made between how fast one approaches and how fast one avoids the stimulus of interest versus comparator stimuli. The response time difference on approach and avoidance trials for stimuli of interest indicates the participants’ automatic approach (i.e., faster approach than avoidance) and avoidance (i.e., faster avoidance than approach) tendencies towards the stimulus.

Structure. The AAT is shown in Fig. 1. Participants were instructed to move a manikin towards or away from three different picture types (ex-partner, matched stranger, neutral) based on an unrelated stimulus characteristic (yellow frame, blue frame) in 144 trials. Stimuli were presented in pseudorandom order. Picture types were presented equally often and half of the stimuli were presented with a yellow frame and the other half were presented with a blue frame. The manikin-based AAT was chosen as prior research demonstrated that it is more reliable than a joy stick version of the AAT (Krieglmeyer & Deutsch, 2010). A break of 30 s followed each set of 24 trials. Before the main task, participants completed a training round of six trials to practice the task with neutral pictures (i.e., stock photos of averaged male and averaged female faces). The mean completion time for the full AAT was 8 min.

Stimuli. Three main picture types in portrait orientation were used: pictures of an ex-partner, pictures of strangers matched on age and gender with the ex-partner, and pictures of landscapes, which served as neutral stimuli. Pictures of strangers allow us to compare the effects of looking at pictures of the ex-partner versus pictures of another person. Pictures of landscapes allow us to compare the effects of looking at pictures of people compared to pictures without people. The pictures of ex-partners only displayed the ex-partner and were cropped if necessary to ensure that the face was centered. The pictures of strangers were selected from stock portrait photos of prior research on approach and avoidance tendencies in bereaved people (Eisma, Schut et al., 2014a; Eisma et al., 2015). The stock photos of strangers were selected from the following age groups: age 15–20, age 20–25, age 25–30, and age 30–35 (ex-partners ages ranged from 16 to 31 years). Lastly, two stock landscape pictures, were selected as neutral stimuli. All pictures were resized to 354 × 532 pixels.

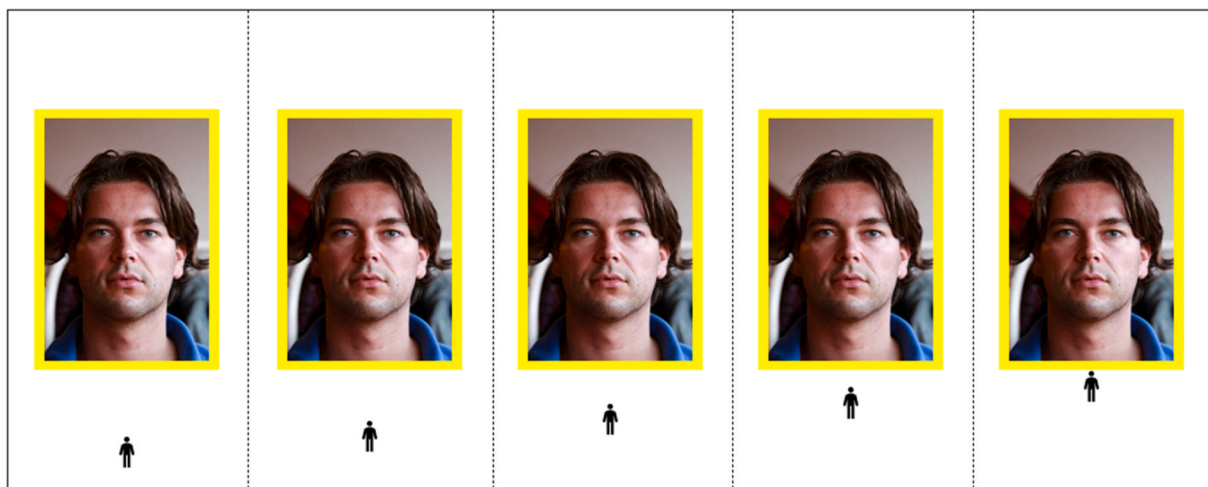


Fig. 1. Picture series illustrating the required movement sequence from the beginning to the end of an approach trial – participant had to use the upward arrow key to move the manikin towards the picture of a stranger. *Note.* Participants used arrow keys to move a manikin towards or away from a picture of an ex-partner, a stranger, or a landscape. A yellow frame required moving towards the picture, a blue frame required moving away from the picture. In a randomized order, the manikin appeared an equal amount of times below and above the picture. The figure is illustrative of an approach trial, i.e. taking 4.5 steps to reach the frame, towards a picture of a stranger. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

Computer task. In the AAT, participants use the index fingers of both hands to press the upward arrow key or downward arrow key (i.e., ↑ or ↓) to move a manikin towards a picture (approach) or away from a picture (avoid). The picture stimuli were presented to the participants on a 27-inch computer screen with a pixel resolution of 1920 × 1080. Whereas the pictures themselves have the dimensions 354 × 532 pixels, the pictures are always embedded in a frame with the dimensions 405 × 540 x 4 pixels for width, height, and thickness, respectively. As mentioned, the color of the frame was either yellow (RGB: 255, 255, 0) or blue (RGB: 0,128,255) which signals whether the participant should move towards or away from the picture: pictures with a yellow frame indicated approach, pictures with a blue frame indicated avoidance. The space above and below the image is a quarter of the screen’s height. The manikin appears halfway between the spaces above or below the image, at 1/8th or 7/8th of the screen height. The manikin’s endpoint is reached in 4.5 steps (i.e., pushing an arrow key 5 times). In the approach trials, the manikin crosses the border of the picture with the 5th step; in avoidance trials, the manikin crosses the border of the screen with the 5th step. The manikin appears an equal number of times either above or below the pictures in a pseudo-randomized order.

Data reduction. We used reaction times (milliseconds until the first response) from the AAT task for our analysis. Following Veenstra and de Jong (2010), we excluded error trials (first response in the wrong direction) and trials with reaction times below 200 ms to have meaningful response times. To minimize the impact of outliers, we used the median reaction times from the trials of each picture type (see e.g., Neimeijer et al., 2017). For each picture category, we averaged the median reaction times for both approach trials and avoidance trials per participant, which resulted in an approach score and an avoidance score for all three picture types for each participant. Lastly, we calculated an approach bias for each type of picture for each participant by subtracting the approach score from the avoidance score (i.e., avoidance minus approach). For example, if a participant approaches pictures of the ex-partner faster than they avoid them, this results in a positive score, indicating an approach bias for the ex-partner. Conversely, a negative score would indicate an avoidance bias for the ex-partner.

2.5. Statistical design

Prior to the main analyses, we checked the assumptions of correlation analyses. We visually inspected scatterplots for linearity and examined the existence of outliers with boxplots. To test our main hypotheses, correlations were calculated with SPSS, version 25.0 (IBM Corporation, 2017). Data and syntax for the analyses in this article are available via <https://doi.org/10.34894/ZPXUTA>.

3. Results

3.1. Preliminary analyses

Approach Avoidance Task. The mean approach score, avoidance score, and approach bias for ex-partners, strangers, and landscapes are displayed in Table 2. Spearman-Brown split-half reliability was calculated between approach bias measures calculated of both AAT halves. It was acceptable for the approach bias towards the ex-partner, $\rho_{12} = 0.75$,

Table 2
Avoidance and approach scores and approach bias for ex-partners, strangers and landscapes.

	Avoidance score (Mean (SD))	Approach score (Mean (SD))	Approach bias (Mean (SD))
Ex-partner	648.19 (128.02)	569.24 (101.58)	78.95 (88.74)
Stranger	623.64 (120.59)	597.95 (103.59)	25.69 (61.16)
Landscape	656.88 (130.47)	594.04 (110.25)	62.83 (66.21)

yet very low for the approach biases toward pictures of landscapes and strangers, both ρ_{12} 's < 0.10.

Assumption checks. Scatterplots between the independent and dependent variables did not reveal violations of the linearity assumption. No outliers were identified for any of the main variables under investigation.

Associations of background variables with breakup distress. For exploratory purposes, we examined the associations between all socio-demographic and breakup-related variables and breakup distress. One significant effect emerged: A longer time since the breakup related to less breakup distress, $r(60) = -0.29, p = .02$.

3.2. Main analyses

Associations between all psychological variables are shown in Table 3. Anxious attachment related significantly and positively to rumination, but not to yearning and automatic approach of the ex-partner. Desired attachment was positively related to yearning and automatic approach of the ex-partner. Additionally, rumination, yearning, and automatic approach of the ex-partner were all significantly positively related to breakup distress.

As a sensitivity analysis, we also calculated the relations between anxious attachment, desired attachment, and breakup distress, on the one hand, and automatic approach of the landscape pictures, and automatic approach of pictures of strangers, on the other hand. No significant effects emerged.

4. Discussion

The present study aimed to elucidate the associations between attachment, repetitive thought (rumination, yearning), automatic approach tendencies toward the ex-partner, and breakup distress. Main findings were that attachment anxiety was positively associated with rumination and breakup distress. Desired attachment to the ex-partner related positively to yearning, automatic approach bias toward the ex-partner, and breakup distress. Attachment anxiety, desired attachment, rumination, yearning, and automatic approach tendencies toward the ex-partner were positively related to breakup distress.

The significant associations of attachment anxiety, rumination and breakup distress align with research demonstrating that attachment anxiety is a major contributor to psychopathology, in part due to increased engagement in maladaptive coping strategies in stressful times (for a review: Mikulincer & Shaver, 2012). More specifically, results converge with prior studies demonstrating that after separation anxiously attached adults are more inclined to engage in ruminative thought about the breakup, which in turn results in poorer psychological adaptation (e.g., Davis et al., 2003; Marshall et al., 2013; Saffrey & Ehrenberg, 2007). The lack of associations between attachment anxiety and yearning for the ex-partner and automatic approach of the ex-partner is more difficult to explain. It appears that a tendency to focus on themes of rejection and abandonment within close relationships in general does not relate to yearning for a specific lost person or to automatic behavioral approach toward the ex-partner. Scales measuring general attachment styles are designed to assess how people generally relate to others (e.g., Collins & Read, 1990; Wei et al., 2007). However, they do not sufficiently take into account potential interpersonal variation in attachment relations (e.g., someone could be securely attached to the mother, but insecurely attached to the partner) (Fraley et al., 2011). Additionally, they not reflect dynamic changes in attachment relationships or thoughts and feelings toward specific persons. Therefore, the findings regarding desired attachment, based on the changes in attachment hierarchies following breakup, appear more relevant to understand such changes.

In line with our hypotheses, desired attachment (i.e., the extent to which one still wishes to use the ex-partner for attachment functions) related positively to yearning, automatic approach toward the ex-

Table 3

Correlations between desired attachment, attachment anxiety, breakup distress, rumination, yearning, approach bias towards the ex-partner, approach bias towards strangers, and approach bias towards landscapes.

	Attachment anxiety	Breakup distress	Rumination	Yearning	Appr bias: ex-partner	Appr bias: landscape	Appr bias: stranger
Desired attachment	-.11	.28*	.14	.34**	.29*	-.13	.06
Attachment anxiety		.29*	.35**	.10	-.07	.06	-.18
Breakup distress			.76**	.64**	.28*	.13	.05

Note. Approach bias was computed by subtracting median reaction times on approach trials from median reaction times on avoidance trials (i.e., avoidance minus approach).

* = $p < .05$ (2-tailed); ** = $p < .01$ (2-tailed).

partner, and breakup distress. The association between desired attachment and yearning is logical. Yearning consists of both recurrent thoughts on how much better it would be if one would be reunited with the lost person and feelings of longing (Eisma et al., 2020). Moreover, yearning is considered a motivational aspect of seeking proximity to a lost person (Bowlby, 1980). The positive association between desired attachment and breakup distress supports the idea that the restructuring of the attachment hierarchy so that one no longer *desires* to use the lost person as an attachment figure facilitates healthy adaptation to interpersonal loss (Bowlby, 1979; Hazan et al., 2004). It also corroborates prior research by Fagundes (2012) who previously demonstrated this association in a larger survey of adults who had experienced a recent breakup. The positive relationship between desired attachment and automatic approach bias toward the ex-partner was also notable. To our knowledge, this is the first time a positive association between desired attachment and a lab-based behavioral measure of approach of the ex-partner is demonstrated. We also found that automatic approach tendencies toward the ex-partner, as well as yearning, related positively to breakup distress. This complements work suggesting positive relationships between insecure attachment and searching for the ex-partner, attempts to reunite with the ex-partner, and breakup distress (e.g., Cope & Mattingly, 2021; Davis et al., 2003; Weiss, 1988).

A notable null-result was the non-significant association between desired attachment and breakup-related rumination. Whilst counterintuitive, it seems compatible with prior research demonstrating no relations between desired attachment and reflection after a breakup (Fagundes, 2012). However, reflection is considered an adaptive rather than maladaptive type of depressive rumination (Trenor et al., 2003). Therefore, these findings may be difficult to compare. The non-significant association between desired attachment and rumination more broadly aligns with research in bereaved samples demonstrating that grief rumination is associated with avoidance of painful aspects of a loss, rather than approach tendencies (for a review: Eisma & Stroebe, 2017).

Clinically, findings suggest that it could be worthwhile to pay more attention to the “addictive” character of primary attachment relationships and the consequences that this may have for coping with interpersonal loss (for a review of neurological studies: Kakarala et al., 2020). Human beings are conditioned to seek closeness, with primary attachment figures serving as important sources of social rewards (e.g., validation, safety) (Leroy et al., 2019; cf. Boddez, 2018). Our findings corroborate the view that people experiencing severe distress after separation may need to reshape attachment hierarchies and thereby reduce desire for (and approach tendencies toward) the ex-partner. On the one hand, this suggests that it might be useful to confront these individuals with the fact that reunion may be difficult or impossible (cf. Boelen et al., 2006). On the other hand, it could imply that it may be worthwhile to encourage them to choose and rely more on other or new attachment figures for the support previously provided by their ex-partners. The strong association between rumination and yearning with breakup distress further suggests that treatments targeting repetitive thought may be helpful in reducing breakup distress (for a review of such treatments in other contexts: Querstret & Cropley, 2013).

4.1. Strengths and limitations

Strengths of our study include a comprehensive assessment of attachment-related and cognitive variables, as well as a reliable implicit behavioral measure of approach of the ex-partner in a sample of young adults who recently experienced a breakup. This enabled a unique, fine-grained examination of correlates of both attachment style (reflecting trait-tendencies in how one relates to others) and desired attachment (reflecting changes in individual attachment relations) after breakup.

This study also had some limitations. First, our sample size was modest, implying that we lacked power to conduct complex multivariate analyses. Nevertheless, we had sufficient power to test our hypotheses and our sample size was comparable to other studies employing the AAT in samples who had experienced interpersonal loss (e.g., Eisma et al., 2015; Maccallum & Bryant, 2019). Second, our sample predominantly consisted of heterosexual, highly educated females. It remains to be established if the present findings hold in older participants with lower education levels, different genders, and sexual orientations. Relatedly, attachment tendencies and individual responses to breakup may vary across social class, cultural backgrounds, and life-experiences. For example, students appear less likely than people from lower social classes to experience maltreatment during their youth (e.g., May-Chahal & Cawson, 2005). Therefore, the students within our sample can be expected to have more secure attachment styles (e.g., Stronach et al., 2011) resulting in relatively less severe breakup distress. Third, a correlational design precluded conclusions about causal effects. While true experiments on the results of attachment styles are difficult to conduct, longitudinal designs may be possible. For example, using a repeated-measures design could enable the examination of interrelations between temporal changes in desired attachment and approach bias toward the lost person. Fourth, since we did not randomize the presentation of our scales answering some questions may have influenced responses to other questions. For example, questions on breakup characteristics could have influenced answers on desired attachment. Fifth, while the present study provided preliminary evidence of the reliability and criterion validity of our newly-developed AAT measure, a more comprehensive psychometric evaluation is warranted. One line of inquiry could be to assess the associations between automatic approach of the ex-partner and social interactions with the ex-partner, as such interactions predict higher distress (O'Hara et al., 2020).

4.2. Conclusion

In summary, this study provided a comprehensive inquiry into the relations between attachment anxiety, desired attachment, rumination, yearning, automatic behavioral approach tendencies towards the ex-partner, and breakup distress. Results support positive associations between attachment anxiety, ruminative coping and breakup distress. Additionally, we demonstrated that a continued desire for an attachment bond with the ex-partner relates to intense, recurrent yearning for the presence of the missing person, automatic approach tendencies toward the ex-partner, and breakup distress. Our research highlights the potential importance of attending to both trait-like and more dynamic

aspects of attachment in psychological adaptation to interpersonal loss. Moreover, this study demonstrated that combined use of self-report and reliable behavioral measures can add unique insights into psychosocial adaptation to interpersonal loss in young adulthood.

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Author statement

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Declaration of competing interest

The authors of this manuscript have no conflicts of interest.

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