Exploring the Moderation of Acceptance on Negative Events and Anxiety in Daily Life - an Experience Sampling Study

Bachelor Thesis – Positive Psychology and Technology

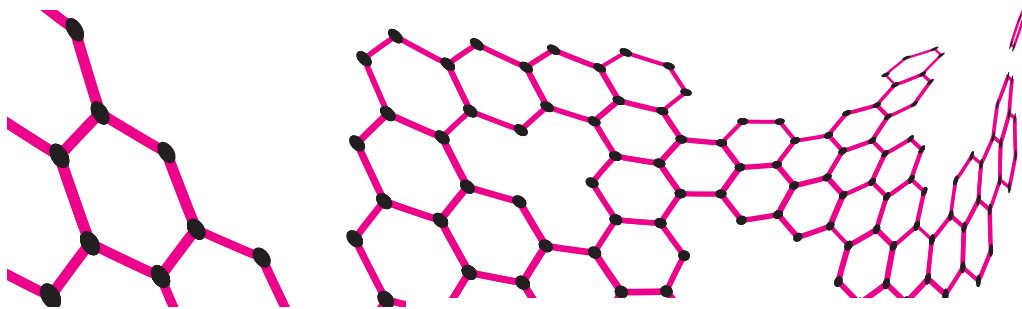Faculty of Behavioural Management and Social Sciences

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Abstract

Aim: Anxiety is experienced by almost everyone in daily life. Previous studies have already tried to explain how Emotion Regulation (ER) strategies, including acceptance, can counteract such interferences while experiencing a negative event. However, no known recent studies have considered acceptance as a moderator nor collected data with the Experience Sampling Method. Therefore, the present study aims to investigate the association between momentary negative events and state anxiety and whether state acceptance can moderate this relationship.

Method: Data was collected using the Experience Sampling Method. Overall, the participants *(N*=60) had to fill in one baseline questionnaire and four momentary questionnaires a day for a period of two weeks, specifically measuring state anxiety, state acceptance and momentary negative events. To conduct the analyses, Linear mixed models were used.

Results: The constructs of momentary negative events and state anxiety were significantly positively related (β=.14, *p*<.005). It was demonstrated that acceptance moderates the association between momentary negative events and state anxiety (*B*=-.11, *p*<.005).

Conclusion: The present study is the first known ESM study taking a closer look into the moderation of acceptance on momentary negative events and state anxiety. Considering the results, state acceptance appears to reduce anxiety when experiencing a negative event. Furthermore, it can be interesting to take a closer look at extended ESM studies and a possible causality of the moderation effect to get a deeper understanding of this moderation.

Exploring the Moderation of Acceptance on Negative Events and Anxiety in Daily Life - an Experience Sampling Study

Anxiety

Imagine you are having a presentation or a job interview. Both could be striking events in your daily life. You do not really know what you can expect and suddenly feel your heart racing, your palms start to sweat, your thoughts are flying by fast, and you cannot stop thinking about it.

Everyone experiences negative, threatening, or stressful life events every now and then. The feeling that you might experience when living through a negative event can be described as anxiety. Probably everyone has already experienced it at least once (Zeidner & Matthews, 2010). Especially since the beginning of the COVID-19 pandemic, increasingly more people experience anxiety in their daily life (Lakhan et al., 2020; Uzunova et al., 2021).

According to Amstadter (2008) anxiety is "a state of diffuse arousal following the perception of a real or imagined threat" (Amstadter, 2008, p. 213). Particularly, the uncertainty that a person feels about future events features anxiety, which can lead to helplessness and withdrawal of an individual (Amstadter, 2008; Zeidner & Matthews, 2010). Anxiety does trigger not only worries and helpless feelings but also physical symptoms, such as a racing heart, sweaty palms, shaking hands and an upset stomach (Vitasari et al., 2010; Zeidner & Matthews, 2010). Anxiety is one of the most frequent psychological interferences; about 32% of the general population suffers from anxiety and the aforementioned symptoms (Salari et al., 2020; Walz et al. 2014).

In general, there are two types of anxiety (Mahmoud et al., 2012; Vitasari et al., 2010). On the one hand, anxiety can be seen as a general characteristic or a trait of a person, which is expressed by being more easily and faster anxious than others in general (Mahmoud et al., 2012; Vitasari et al., 2010; Zeidner & Matthews, 2010). On the other hand, anxiety can be seen as a state. State anxiety refers to a current situation in which a person suddenly feels nervousness and experiences physical tension, for example, when a striking event occurs (Mahmoud et al., 2012; Vitasari et al., 2010; Zeidner & Matthews, 2010).

While experiencing such symptoms, the individual can feel limited in their daily life. Symptoms of anxiety can appear at some point in a day or can be triggered by a striking event, therefore it can happen that symptoms can occur unpredictable (Walz et al., 2014). Furthermore, the individuals appear to struggle with daily things such as making new friends or job-related issues (Zeidner & Matthews, 2010).

Next to that, anxiety can be either clinical, meaning strongly interruptive for daily life or perceived as a state which is familiar to almost everyone regularly (Zeidner & Matthews, 2010). State anxiety would not pair with the amount and or characteristics of clinical symptoms. Additionally, state anxiety feels manageable compared to clinical symptoms (Zeidner & Matthews, 2010).

Anxiety and emotion regulation

State anxiety itself can be very intense, and the time an individual deals with such intense emotions can be highly consuming and disruptive in daily life (Amstadter, 2008; Campbell-Sills et al., 2006). Dealing with such emotions can, for example, result either in talking to friends or just ignoring one's feelings. Nevertheless, it would be beneficial to find the best possible way to deal with such emotion in order to maintain a desired daily life (Campbell-Sills et al., 2006). An appropriate way to deal with anxiety is using Emotion Regulation (ER) strategies.

ER refers to how people try to, consciously or unconsciously, influence their experience or expressions of emotions, either negative or positive, in order to achieve a certain goal (Kraiss et al., 2020; McRae & Gross, 2020; Zhang et al., 2014). ER is a broad concept which is all about regulating emotions by oneself or others or the regulation of the deciding stimuli (Garnefski et al., 2001). ER includes different strategies that can be used to alter or increase emotions (Aldao et al., 2010; Hu et al., 2014; Kraiss et al., 2020). Six regularly scientifically stated strategies are acceptance, problem-solving, reappraisal, suppression, avoidance, and rumination of negative emotions (Aldao et al., 2010; Hu et al., 2014; Kraiss et al., 2020). The following study will focus on the ER strategy acceptance.

Acceptance can be defined as accepting one's own emotions, thoughts, and sensations without being judgmental towards everything that is experienced in a moment, particularly when negatively experienced (Aldao et al., 2010; Bond & Bunce, 2003; Kraiss et al., 2020; Nittel et al., 2018). As stated by Bond & Bunce (2003), acting on acceptance helps the individual to reflect and does not let emotions determine behaviour. Acceptance seems to be of growing clinical interest and gains in importance since it is an adaptive ER strategy, particularly in therapy (Blackledge & Hayes, 2001; Campbell-Sills et al., 2006; Hoffmann et al., 2009). Acceptance and Commitment Therapy (ACT) is one of the most used therapies and works with acceptance. The ER strategy helps patients to react to their feelings in certain situations (Blackledge & Hayes, 2001). In ACT, acceptance is used to explain mental health, but according to Bond & Bunce (2003), it could benefit individuals in daily life. Acceptance helps to regulate negative emotions and gives individuals an opportunity to accept their

uncomfortable emotions, including anxiety (Blackledge & Hayes, 2001; Campbell-Sill et al., 2006; Petzold et al., 2020). Blackledge and Hayes (2001) assume that accepting anxiety will make the individual feel emotions in a more moderate way.

Past research

In the present thesis, the emotion regulation strategy acceptance will be seen in relation to state anxiety and momentary negative events. Recent correlational studies have already examined that low acceptance strategies in specific moments are related to disruptive emotions and anxiety, whereas people with high acceptance skills show a better handling of emotion regulation (Lindsay & Creswell, 2019). Yet, the design of the study connects acceptance with mindfulness, hence the authors recommend investigating how acceptance and emotion regulation change in daily life (Lindsay & Creswell, 2019).

Next to that, Roemer and Orsillo (2002) investigated the role of acceptance and mindfulness for clinical patients who suffer from Generalised Anxiety Disorder and came to the conclusion that acceptance as an isolated phenomenon needs more thorough research in order to see if this element shows contribution to reducing anxiety.

Lennarz et al. (2018) conducted an experience sampling methodology (ESM) study to investigate which emotion regulation strategy is mostly used when experiencing a negative event and found that acceptance appears to be one of the most common strategies. Despite that, the study only included adolescents, was conducted just on weekends and via phone calls, indicating possible limitations (Lennarz et al., 2018).

It can be identified that in most studies (e.g., Amstadter, 2008; Lennarz et al., 2018; Lindsay & Creswell, 2019; Roemer & Orsillo, 2002), acceptance is seen in context with either ACT, mindfulness, or a specific target group (mainly clinical patients). Nevertheless, the studies all came to the conclusion that acceptance appears to be an effective strategy for regulating emotions, for example, fitting to the present study, anxiety. Looking at the limitations that the studies mentioned above share, it would be of advantage to investigate acceptance in relation to momentary negative events and anxiety in a daily setting.

Many studies that examine the effect of acceptance on well-being in daily life are cross-sectional studies (Lennarz et al., 2018). However, since the one-time measurements only give a narrowed insight into specific moments and feelings, the participants mainly rely on retrospectives. There is limited momentary insight concerning the direct emotional reaction of the participants (Lennarz et al., 2018; Petzold et al., 2020; Stieger et al., 2021). Therefore, the results of ER studies in daily lives and on anxiety are mainly seen in a rather narrowed context. Based on the limitations mentioned above, the authors recommend doing

an experience sampling methodology (ESM) study to study individuals' daily life emotions and regulating factors (de Vries et al., 2001; Lennarz et al., 2018). Also, Lennarz et al. (2018) argue that the daily use of ER is mainly related to mental health outcomes, which can be perfectly measured with an ESM study. Especially when examining more than one variable (anxiety, acceptance and momentary negative event), ESM helps to understand each behaviour of the respective variables and how they interact during a longer time span (Amstadter, 2008; Myin-Germeys & Kuppens, 2022).

Experience Sampling Methodology

ESM is a method to "track experiences in the real world and in real-time" (Myin-Germeys & Kuppens, 2022, p. 10). During an ESM study, participants are asked to fill out a form several times a day within a specific time span. The moments in which the participants are asked to fill in the form are either randomised or fixed (de Vries, 2001; Myin-Germeys et al., 2018). The included items mostly concern their feelings and mental state (Myin-Germeys et al., 2018). The main advantage of ESM is that recall biases are minimised, as it is measured several times a day, resulting in shorter response times given for the participants. Also, it is argued that ESM gives more detailed insight into real experienced feelings and thoughts of individuals (de Vries et al., 2001; Myin-Germeys et al., 2018). Additionally, ESM is generalisable and representative because of its ability to measure emotions and behaviour in real-time throughout the daily life of people (Myin-Germeys & Kuppens, 2022). Using a semi-random sampling scheme for an ESM study, the ecological validity is higher and the participant burden is reduced (Myin-Germeys & Kuppens, 2022).

Only a few studies seem to have investigated acceptance as an ER strategy as a response to anxiety. Though, acceptance can be seen as an appropriate coping strategy to reduce negative emotions when experiencing a momentary negative event. Considering that since the beginning of the COVID-19 pandemic, more people seem to suffer from anxiety, it is important to include non-clinical individuals in this study (Lakhan et al., 2020; Uzunova et al., 2021). The limitations of the past studies show that especially an ESM study would be a good fit for investigating associations between state acceptance, state anxiety and negative events. In more detail, acceptance will be investigated as a moderator for the relationship between momentary negative events and state anxiety (for visualisation, see Figure 1). The study will look into individuals' daily life over a longer period of time to get more precise data.

Figure 1

Moderation of Acceptance on Negative Events and Anxiety
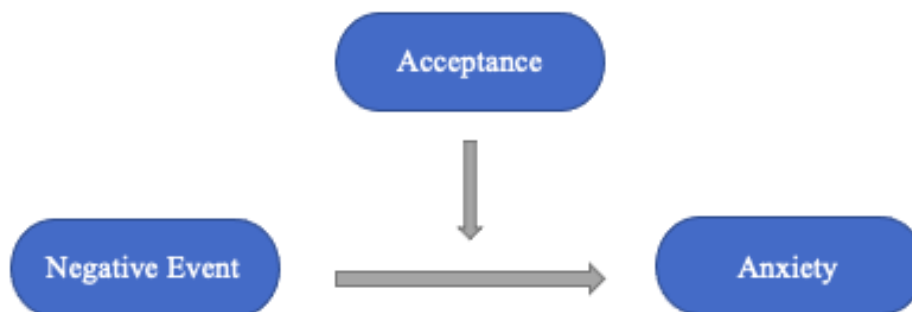
Generally, it is expected that there is a relationship between negative events and anxiety. The data ideally show that acceptance moderates the relationship between the two variables. This can be formulated in questions like the following:

RQ1: What is the relationship between momentary negative events and momentary anxiety?

RQ2: Does momentary acceptance moderate the relationship between momentary negative events and momentary anxiety?

Methods

Participants

Overall, the study included 60 participants from different countries. According to Van Berkel et al. (2017), an ESM study on average contains 53 participants, therefore, the sample of 60 participants appears to have a sufficient size. In order to overcome the participant burden and prevent dropouts, additional rewards were given to University of Twente students (Van Berkel et al., 2017). The Test Subject Pool System (SONA) of the University of Twente was made use of, allowing students to receive credit points, which in turn helps them to meet the obligated number of credit points to graduate. The rest of the participants, such as family and friends, were accessed through convenience sampling, giving the advantage of being easily accessible, available on time and willing to participate in the study (Van Berkel et al., 2017).

Materials

The present study used Experience Sampling Methodology (ESM) and was conducted via the research platform Ethica Data. Ethica Data is a mobile application and is set up via the website www.ethicadata.com. According to Van Berkel et al. (2017), using a mobile device

reduces costs, time and requires low technical knowledge. For that reason, participants are required to have a smartphone and be able to download the app.

The baseline questionnaire asked several questions concerning general anxiety, acceptance and other emotions and feelings. Next to that, four daily questionnaires were implemented, measuring if a negative event had occurred and if the participant felt anxious and reacted with acceptance.

Trait measures

Relevant to this study and included in the baseline questionnaire are two scales, namely the Generalized Anxiety Disorder (GAD-7) scale (Appendix A) and the acceptance subscale of the Cognitive Emotion Regulation Questionnaire (CERQ) (Appendix B). GAD-7 consists of seven items and assesses the health status of the participants during the past two weeks (Williams, 2014). Compared to other anxiety questionnaires, the GAD-7 is more sensitive (Williams, 2014). The GAD-7 showed a Cronbach's Alpha of $\alpha= 0.87$, which shows good reliability according to Zach (2021). The participants are asked to fill in a 4-point Likert scale ranging from "not at all" to "nearly every day".

The acceptance subscale of CERQ contains four items and measures if people accept their feelings and thoughts when a stressful or negative event occurs (Garnefski et al., 2001; Jermann et al., 2006). The subscale was used to measure the ER strategy acceptance and was assessed with a 4-point Likert scale ranging from "almost never" to "almost always" (Garnefski et al., 2001; Jermann et al., 2006). Measuring Cronbach's Alpha, the CERQ shows acceptable reliability ($\alpha= 0.71$) (Zach, 2021).

State measures

In order to be able to measure the relationship between negative events and anxiety, two items were used. To assess a momentary negative event, it was evaluated if the event was pleasant or unpleasant. The participant had to answer the following statements on a 7-point Likert scale ranging from "very negative" (-3) to "very pleasant" (+3): "Think of the most striking event or activity in the last hour. How (un)pleasant was this event or activity?". To measure anxiety, the participant had to evaluate the item "How anxious do you feel right now?" (Kirtley, 2018). Additionally, the acceptance of the participants was measured with the item "In the last hour, I could let go of my negative feelings without acting upon them" (Kirtley, 2018). Both items, for anxiety and acceptance, were answered on a 7-point Likert scale ranging from "not at all" to "very much". These items are retrieved from the ESM Item

Repository (Kirtley, 2018). Nevertheless, after conducting a split-half reliability test, both items show low reliability ($r= .12$).

Procedure

After receiving ethical approval from the Committee of the Faculty of Behavioural Management and Social Science from the University of Twente (220285), the researcher implemented the baseline questionnaire and the daily questionnaires. A pilot test was conducted afterwards to check if any mistakes were made. Shortly after, all participants received an invitation via email to sign up for the app in order to start the study simultaneously on the next day. The participants received an informed consent form after signing up for the app prior to the first daily questionnaire appearing (Appendix C). The study took place between April 13th, 2022, and April 27th, 2022. As evaluated in previous ESM studies, a time period of two weeks results in sufficient response rates and enough data since it is not too short but also not too extensive for the participants (Van Berkel et al., 2017).

The study includes one baseline questionnaire and four daily questionnaires, which are provided via the app on their smartphone. The daily questionnaires, which appear four times a day and consist of 10 questions, are triggered randomly every day between 10 AM and 11 AM, 1.30 PM and 2.30 PM, 17 PM and 18 PM and lastly in the evening between 8.30 PM and 9.30 PM. After half an hour, a reminder was sent in order to check if the questionnaires were answered. One hour after the questionnaires were triggered, the questionnaire disappeared, and the participants were no longer able to complete the questionnaire. The closely spaced triggers and the limited time period for answering reduce the amount of false and incorrect memories, with the participants not being able to access the questionnaire once it is expired, as in comparison to an analogous format (Myin-Germeys & Kuppens, 2022; Van Berkel et al., 2017).

The baseline questionnaire was triggered on the second day during the first trigger for the morning questionnaire and did not expire throughout the study. The decision was made for those who entered the study a bit later than the others and to maintain a higher response rate. Approximately 10 to 20 minutes were needed to finish the questionnaire.

Data analysis

The gathered data was transported from Ethica Data to SPSS (Statistics 27). After taking a look into the data set, necessary variables were renamed. Participants who did not fill in at least 50% of the questionnaire were excluded from the data (Connor & Lehman, 2012). Means, standard deviations and correlations between trait and state measures were calculated with a Pearson correlation coefficient. Further, a dummy variable for negative events was

created. -3 to -1 was recoded into '1', which implies that a negative event happened, and 0 to 3 to '0', implying no negative event occurred. Further, z-scores were created to standardise the variables for negative events, perceived anxiety and acceptance. For the standardised estimates, the following ranking from Cohen (1988) was used: weak (<0.3), moderate (0.3-0.5) and strong (>0.5).

In order to analyse the data properly, a linear mixed model (LMM) was used. LMM is a commonly used data analysis method for analysing longitudinal and multilevel data (Myin-Germeys, & Kuppens, 2022; West, 2009). Additionally, Myin-Germeys and Kuppens (2022) argue that mixed-effect models give the opportunity to disentangle multilevel ESM data into the desired form of interest and can show the variability of the data. To examine the first research question, the relationship between momentary negative events and anxiety was assessed with an LMM. For this, momentary negative events were used as the independent variable and state anxiety as the dependent variable. The second research question, which aims to measure if acceptance moderated the relationship between momentary negative events and state anxiety, was also run with an LMM. Momentary negative events, as well as acceptance, were used as fixed covariates and state anxiety was again entered as the dependent variable. Additionally, to visualise the interaction better, individual cases were plotted and investigated.

Results

In total, 96 individuals signed up for the study. After applying the cut-off score for at least 50% of the answered questionnaires per participant, 36 participants were excluded from the data (Connor & Lehman, 2012). Therefore, the data of 60 participants was used. The mean response rate was 72.93%. The participants' age ranged from 18 to 65 years, while the mean age was 23.38 (*SD*= 8.03). Table 1 shows further sample characteristics, including gender, nationality, and education. It is striking that most of the participants were female and undergraduates. It is also noticeable that most of the participants possess a German nationality.

Table 1

Characteristics of Sample (N=60)

		N	%
Gender	Female	35	58.3
	Male	25	41.7
	Other	0	0
Nationality	Dutch	11	18.3
	German	41	63.8
	Other	8	13.3
Education	Bachelor	4	6.7
	Highschool	52	86.7
	Master	3	5.0
	Other	1	1.7
Occupation	Working	5	8.3
	Self-employed	0	0.0
	Student	34	56.7
	Studying and working	18	30.0
	Not working	2	3.3
	Other	1	1.7

Means and Standard Deviations of Measures

Means, standard deviations and correlations between the trait and state measures were computed with a Pearson correlation coefficient (see Table 2). For the CERQ acceptance subscale, a lower mean (*M*= 6.6, *SD*= 2.51) was found compared to the measured means of a previous study from Jermann et al. (2006) with a mean of 12.62 (*SD*= 3.43). Similar to the present study, the sample of Jermann et al. (2006) was randomised and had a rather young age (*M*= 26.19; *SD*= 4.37). Moreover, the GAD-7 shows a mean of 8.8 (*SD*= 4.85), which is relatively low compared to the study of Spitzer et al. (2006) (*M*= 14.4, *SD*= 4.7). Though, the sample of the study of Spitzer et al. (2006) consists of clinical patients. Next to that, all studies have a higher sample size than the present study. The results imply that the participants generally scored lower in acceptance, as well as lower in anxiety compared to previous studies.

Since the items of state anxiety and state acceptance are retrieved from the ESM Item Repository, the comparison to different means seems to be difficult, so no comparison was

made (Kirtley, 2018). It is assumed that the mean score of state acceptance appears to have a relatively low score (M= 6.59; SD =.97). Next to that, state anxiety with a mean of 2.43 is assumed very low (SD= .96). Nevertheless, these assumptions cannot be scientifically confirmed.

Bivariate correlations

   The correlation between state anxiety and GAD-7 has a strong positive correlation and is the only significant correlation in the table (r(50) = .55, p < .001). The positive correlation indicates that if one variable increases, the other variables also increase. Other correlations do not show significance. Interestingly, observing the correlation between state acceptance and state anxiety shows that the variables are weakly negatively correlated, which implies that one variable decreases while the other variable also increases (r(50) = -.18, p > .001). Other correlations can be seen in Table 2.

Table 2

Mean, Standard Deviation and Correlation between CERQ, GAD-7 and State measures

	Mean	SD	1	2	3	4
1 CERQ*	6.6	2.52	-	-	-	-
2 GAD-7*	8.76	4.51	-.04	-	-	-
3 State acceptance **	6.59	.97	.20	-.22	-	-
4 State anxiety**	2.43	.96	.01	.55***	-.18	-

*Sum scores are used
**Person-mean scores
***Correlation is significant at the .001 level (2-tailed)

Association between State Acceptance, Momentary Negative Events and State Anxiety

   Figure 2 demonstrates the estimated marginal means of the z-scores of state acceptance and state anxiety, as well as negative events per measurement point (x-axis). Besides fluctuations, the graph shows that state acceptance and state anxiety operate in different directions. Momentary negative events show variations along with every measurement point. Based on the graph, it can be assumed that an association exists between the different constructs.

Figure 2

Estimated Marginal Means of Z-scores of State Acceptance, Momentary Negative Event and State Anxiety per Measurement Point
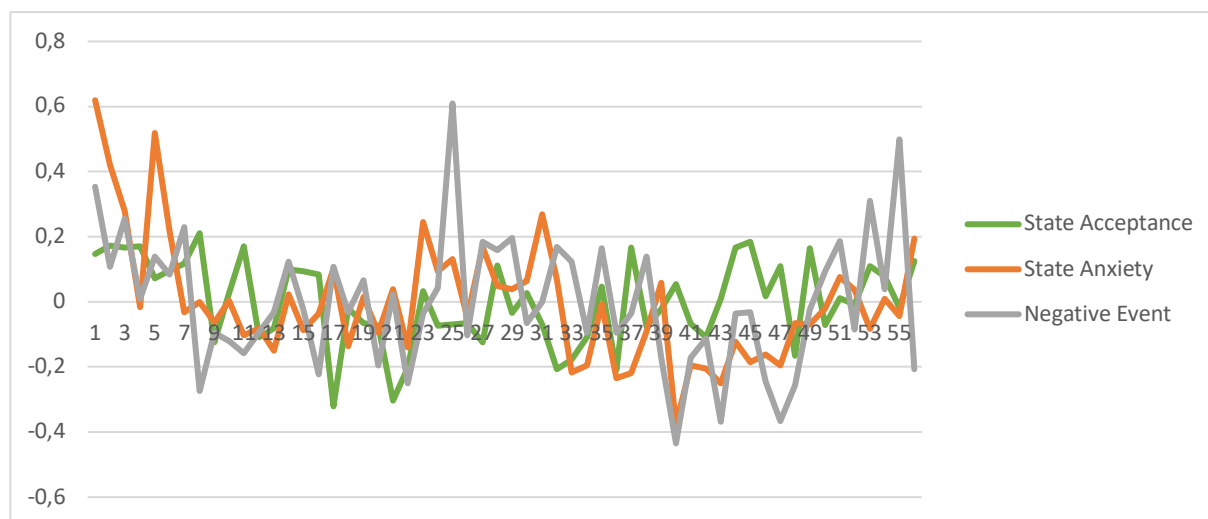
Association between Negative Events and State Anxiety

Estimated fixed effects were calculated to demonstrate the relationship between the two constructs of momentary negative events and anxiety (Table 3). The results presented in Table 3 show that the two constructs are weakly positively related and significant (β= .14, $p<$ .001). This suggests that anxiety increases if a momentary negative event occurs, but rather weakly.

Table 3

*Estimates of Fixed Effects of Negative Event on State Anxiety*

Parameter	Std. Estimate	Estimate	*SE*	*df*	*t*	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Intercept	.02	1.78	.09	1777	29.8	<.001	1.61	1.95
Negative event	.14	.51	.06	2000	8.98	<.001	.4	.62

Figure 3 visualises an example of participant 52859 showing the scores of state anxiety and momentary negative events. The mean score of state anxiety shows that the participants generally scored high in anxiety (*M*= 3.32). It becomes clear that the participant varies in their anxiety level, but when a negative event occurs, the participant often scores high in anxiety. The figure shows that momentary negative events and state anxiety often

covary and are positively related to each other. Nonetheless, the graph shows fluctuations between the relation of momentary negative events and state anxiety. Anxiety at most measurement points is relatively high, even though no negative event has occurred. However, the graph underlines the results of a weak positive relationship between the constructs.

Figure 3

State Anxiety and Momentary Negative Event per Measurement Point of Participant 52859
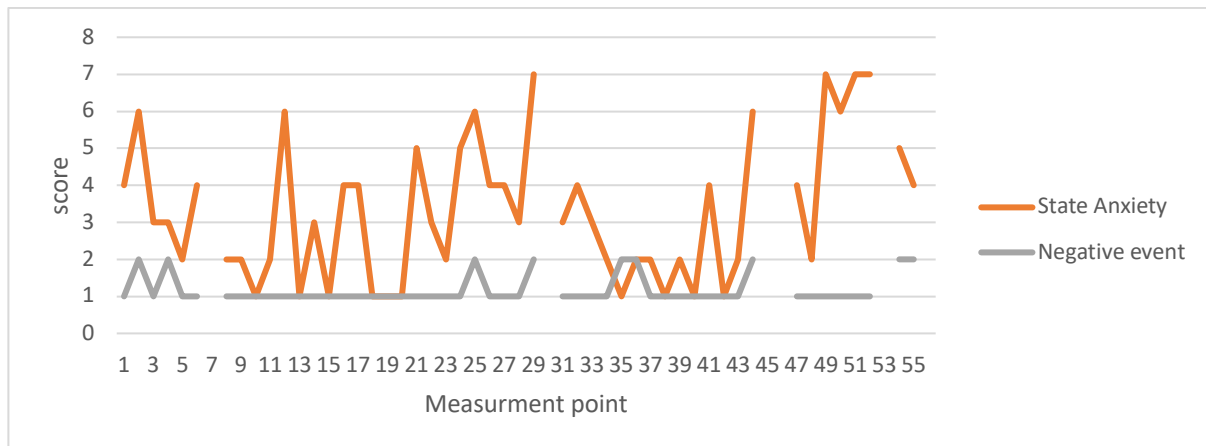
Moderation of State Acceptance on Momentary Negative Events and State Anxiety

In Table 4, the moderation of state acceptance on momentary negative events as the independent variable and state anxiety as the dependent variable was demonstrated. The effect between state anxiety and state acceptance is non-significant. For state anxiety and momentary negative events, the effect was found to be significant (see Table 4). If one variable score is higher, the other variable scores also increase. The findings are in line with the previously mentioned relationship between both constructs. Additionally, the moderation of state acceptance on the relationship between momentary negative events and state anxiety was measured. The interaction effect is shown to be weakly negative but significant ($\beta= -.05$, $p< .005$). This suggests that momentary acceptance moderates the relationship between momentary negative events and momentary anxiety.

Table 4

Estimates of Fixed Effects of the Moderation of State Acceptance on Momentary Negative Event and State Anxiety

| Parameter	Std. Estimate	Estimate	*SE*	*df*	*t*	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Intercept	.01	1.56	.17	2338	9	< .000	1.21	1.89
State Acceptance	-.06	.08	.05	2074	1.83	.068	-.01	.17
Negative event	.13	.84	.12	1997	6.70	< .000	.59	1.08
Acceptance * Negative event	-.05	-.11	.04	1975	-3.14	.002	-.18	-.04

Taking a look at the graphs in Figure 4 indicating the scores of participant 38382, it can be investigated that the participants' scores confirm the findings of the study. It becomes obvious that once the individual scored high in acceptance, anxiety was most of the time low. If the participant experienced a negative event, for example, at measurement point 12, acceptance scored high and anxiety low. During a later measurement point, it is clear that if the participant did experience a negative event but scored low in acceptance, anxiety scores also went up. Furthermore, the scores of participant 45010 in Figure 5 show similar results as the results of Figure 4. It is clear to see that if a negative event occurs, state anxiety is high and state acceptance low. If, on the other hand, a negative event occurs and state acceptance is high, state anxiety is clearly lower. This suggests that individuals who experience a negative event score higher in momentary anxiety if their momentary acceptance level is lower.

Figure 4

Momentary State Anxiety and Acceptance and Momentary Negative Event per Measurement Point of Participant 38382
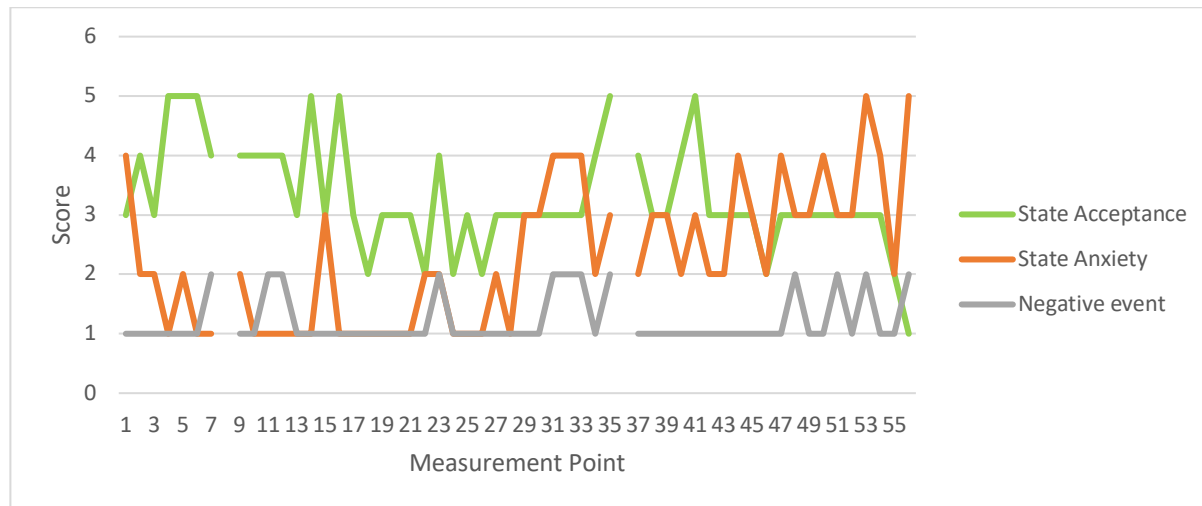
Figure 5

Momentary State Anxiety and Acceptance and Momentary Negative Event per Measurement Point of Participant 45010
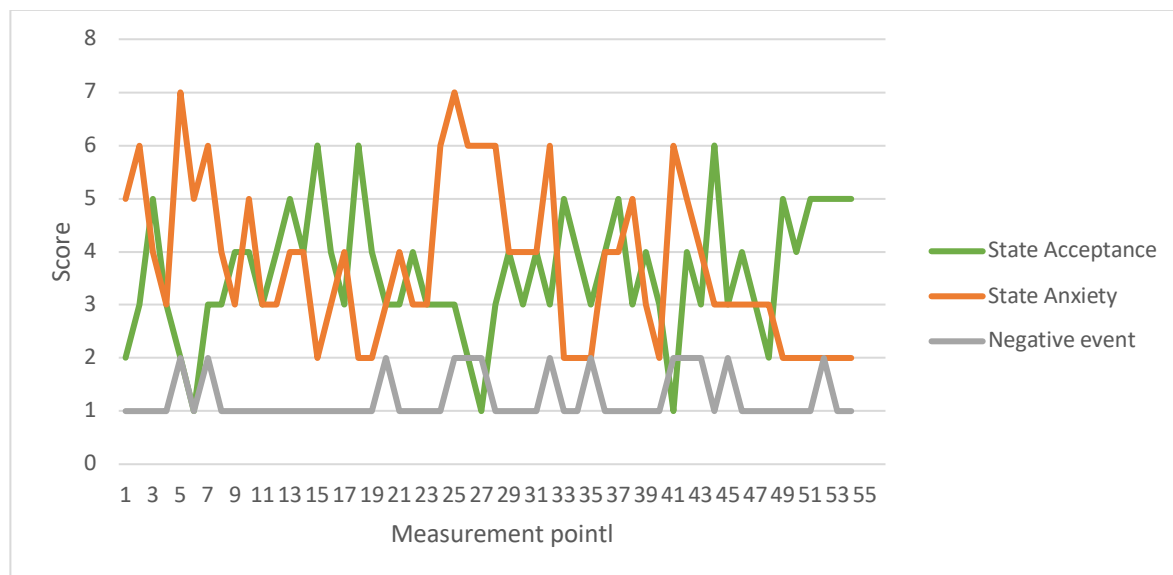
Discussion

The present study aimed to investigate the relationship between momentary negative events and state anxiety, as well as if the ER strategy acceptance moderates the association between momentary negative events and state anxiety. The results showed that momentary

negative events and anxiety are weakly positively related and that acceptance had a significant moderating role in this relationship.

Main findings

Anxiety affects almost everyone on a daily basis, especially since the COVID-19 pandemic emerged (Uzunova et al., 2021). Previous research has already confirmed that anxiety occurs when an individual experiences a negative event (Mahmoud et al., 2012; Vitasari et al., 2010; Zeidner & Matthews, 2010). As expected, the findings of the present study are in line with previous research, which indicates that a relationship between negative events and anxiety exists and that anxiety increases when an individual experience a negative event (Mahmoud et al., 2012; Vitasari et al., 2010; Walz et al., 2014; Zeidner & Matthews, 2010). Nevertheless, most studies used clinical patients as participants, such as the research of Roemer and Orsillo (2002). Therefore, the relevance of investigating non-clinical patients is important in order to get insights into the negative feelings of anyone. Taking this into consideration, a research gap was filled.

Next to that, no known research investigated the relationship between momentary negative events and anxiety with an ESM study. Hence, the current study's findings show that momentary anxiety rises when a negative event occurs. The results can serve as a basis for the second research question of this study.

The second research question investigated if momentary acceptance moderates the aforementioned relationship. The results showed that acceptance moderates the association between both constructs. Previous research, such as Lindsay and Creswell (2019), investigated the relationship between acceptance and disruptive emotions, including anxiety, and confirmed that acceptance reduces anxiety, which is in line with the findings concerning the moderation of the present study. Additionally, other researchers, such as Roemer and Orsillo (2002), confirmed this relationship and concluded that more research needs to be conducted concerning acceptance and the effect on reducing anxiety. Further, Lennarz et al. (2018) used experience sampling in order to investigate which ER strategy is mostly used in the context of mental health and negative events, concluding that acceptance is the one mostly used. While acceptance can be considered as an appropriate strategy to regulate anxiety, no familiar study has highlighted the moderating effect of momentary acceptance on momentary negative events and momentary anxiety by using an ESM study on non-clinical participants. Therefore, the current study fills a research gap and confirms that momentary acceptance moderates this relationship among non-clinical patients.

Previous studies assumed that anxiety, while experiencing a negative event, can be reduced by engaging in acceptance. Thus, acceptance appears to be an effective emotion regulation strategy, and individuals, especially those who experience state anxiety daily would benefit from engaging in acceptance to enhance their general mental health in their daily life.

As mentioned before, ACT is a therapy which uses acceptance as a strategy to reduce anxiety and other disorders (Blackledge & Hayes, 2001). Pull (2009) conducted a review on the effectiveness of ACT and came to the conclusion that ACT reduces anxiety and is more effective than other cognitive therapies. Though ACT aims to facilitate acceptance strategies, especially for clinical patients, the effectiveness of acceptance could now be as well taken into consideration for non-clinical individuals in reducing anxiety.

Another link can be made towards the concept of resilience. Although many definitions exist, resilience can be explained as "the ability to maintain a state of normal equilibrium in the face of extremely unfavourable circumstances" (Ahmed, 2007, p. 370). The results of the present study hint that if an individual is able to regularly reduce anxiety with acceptance while experiencing a negative event, resilience might as well increase over time. Tugade and Frederickson (2006) assume that when repeatedly engaging in ER strategies, it will become an automatic and unconscious process. Therefore, reducing state anxiety with acceptance when experiencing a negative event would enhance the resilience towards such feelings and events in the future.

Feelings change and negative events can occur daily. As seen in the previously displayed individual cases, participants vary in scores of the different variables at every measurement point. States and negative events seem to change frequently, indicating a high variability. Since participants were asked to fill in questionnaires over a longer period, respective emotions and negative events are likely to vary from day to day. Kraiss et al. (2022) investigated the association of the constructs of psychological distress and mental well-being, including the disentanglement of within- and between associations, and found a high inter-individual variability. This is in line with the observed individual cases and can presumably be applied to other sample individuals.

Concludingly, acceptance can be seen as an effective strategy to reduce anxiety when experiencing a negative event, and when practising it daily, it could lead to resilience towards negative events and reduction of inter-individual variability.

Strengths and Limitations

By conducting an ESM study, the subjective feelings and emotions of the participant were accessed and assessed daily (Myin-Germeys & Kuppens, 2022). Thus, generally, ecological validity was a great strength of the current study. Another advantage was that recall biases were reduced by conducting an ESM study, as questionnaires were made available several times a day (de Vries et al., 2001; Myin-Germeys et al., 2018).

Lastly, the study addresses a topic which does not only concern clinical patients but instead can be applied to anyone since state anxiety is fairly common (Salari et al., 2020; Walz et al., 2014).

The present study shows limitations which could have influenced the results. Considering that ecological validity for an ESM study is generally high, a limitation of the study is that not all participants answered every questionnaire. Usually, not every participant is able to fill in every questionnaire throughout the day, but if the number of missed questionnaires increases, the validity of data can decrease (Myin-Germeys & Kuppens, 2022). Another limitation to be addressed is the generalizability of the findings. Stratton (2021) argues that a non-probability sample reduces the generalizability of the findings. The sample was taken with convenience sampling, a cheap and easily accessible method (Etikan et al., 2016). Nevertheless, most of the participants were German and students, which limits the sample to these characteristics. Therefore, selection bias increases as most participants were selected by the researchers or recruited through SONA (Etikan et al., 2016). Lastly, correlations between the three variables were measured. Therefore, conclusions about causality and temporary precedence cannot be drawn.

Future research

The present study gives evidence for the effectiveness of acceptance in reducing anxiety while experiencing a negative event and focuses especially on non-clinical patients, which appears to be a research gap in science. Therefore, focusing on interventions for non-clinical individuals who experience anxiety during a negative event could be an opportunity and would ideally increase the mental health of individuals. Since acceptance has been proven to be effective in reducing anxiety, during therapy, interventions such as ACT could be altered or made easily accessible to anyone, for example, by providing teaching methods in facilities such as universities or workplaces (Blackledge & Hayes, 2001).

In addition, a way to evaluate the effectiveness of acceptance on anxiety and negative events can be an experimental study. For that, an ESM study evaluating momentary acceptance, negative events and anxiety should be conducted in order to measure how the non-clinical participants engage in acceptance. Right after that, an intervention, including

acceptance training, should be included in the design; right after that, another ESM study measuring the same variables should be implemented. By conducting such an experimental study, the effectiveness of acceptance would ideally become even clearer, and a new intervention on how to persuade non-clinical individuals to use acceptance can be tested and evaluated.

As mentioned above, only correlations were measured in the current study; therefore, looking into the causality of the moderation effect could be of interest. It is quite unclear why acceptance does moderate the relationship between momentary negative events and anxiety and why it is effective. Kathpalia and Nagaraj (2021) investigated several causality measures, such as time-series measures, in order to measure causality. These measures can also be included in a potential ESM experimental study, which might give further insight into the moderation of state acceptance on momentary negative events and state anxiety.

Furthermore, it would be interesting to investigate or compare the effectiveness of other ER strategies in relation to state anxiety and momentary negative events, by using network analysis for variables and experience sampling. According to Kraiss et al. (2020), the ER strategy cognitive reappraisal is positively related to well-being. Therefore, comparing the effectiveness of acceptance and reappraisal could be interesting for future research. Also, looking at other or comorbid symptoms/ psychological interferences could display further insights into this moderation effect. Bringmann et al. (2013) investigated that one symptom comes along or triggers another symptom; for example, experiencing anxiety can trigger shaking. The study displays that by collecting data through experience sampling, a larger network of variables and their behaviour towards each other can be investigated (Bringmann et al., 2013). Next to that, assessing if acceptance can increase resilience towards anxiety when experiencing negative events can be of further interest. Tugade and Frederickson (2006) propose that especially ESM studies are useful for examining this relationship.

Conducting a network analysis measuring comorbid symptoms of state anxiety could help to obtain an overview of the different relations and behaviours of different variables and provide a deeper insight into how state acceptance moderates the relationship between state anxiety and momentary negative events by comparing or including other variables. Further, resilience can be integrated into the analysis in order to highlight the effectiveness of state acceptance on state anxiety when experiencing a negative event.

Conclusion

The present study was the first known ESM study investigating the relationship between momentary negative events and anxiety as well as the moderation effect of the ER

strategy acceptance on this relationship in daily life. The results show that both variables, momentary negative events and anxiety, were weakly significantly positively related and that the moderation effect was significant. Future research should focus on possible interventions to reduce momentary anxiety, including most symptoms, by conducting an experimental ESM study using acceptance and considering the causality of the measured relationship. Further attempts, in order to obtain a deeper insight into the moderating effect on the two constructs, are crucial.

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Appendix

Appendix A: GAD-7

GAD-7 Anxiety

Over the <u>last two weeks</u>, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

Column totals _____ + _____ + _____ + _____ =

Total score _____

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day." GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Appendix B: Acceptance items of CERQ

Acceptance

5. I think I have to accept that this has happened

6. I think that I have to accept the situation

7. I think that I cannot change anything about it

8. I think that I must learn to live with it

Appendix C: Informed Consent

INFORMED CONSENT
Dear participant,
Thank you for your participation in this study. Before you participate, it is important that you understand the goal of this research and what the study will ask from you. The purpose of this study is to find out mental health is related to the way you deal with feelings in daily life. To explore this relationship, we want to measure fluctuations in emotions in daily life.

For this study, we will ask you to fill in several questionnaires on your mobile phone. All questionnaires will be completed in the Ethica app. The study will start with a questionnaire concerning your demographics and general mental health. This initial questionnaire will take about 20 minutes to complete. Afterwards, you will receive four questionnaires per day for a period of two weeks. Notifications will remind you about the next questionnaire. One daily questionnaire takes approximately 3 minutes to complete. It is important that you answer the questionnaires as soon as possible. *Please make sure that you turn on the notifications for the Ethica app on your mobile device*.

The information that we collect from this research project will be kept confidential. This means that only the researchers have insight into your answers. All personal data (such as age, gender etc.) will be anonymized and will not be published and/or given to a third party. Your participation in this study is voluntary. You are free to withdraw from this study at any time and without giving a reason.

Contact information
If you have any questions regarding this study, you can contact the researchers of this research project.

Consent
I have read and understood the information provided and had the opportunity to ask questions. I understand that my participation is voluntary and that I am able to withdraw at any time, without a reason or cost. I hereby voluntarily agree to take part in this study.