Evaluation of the Psychometric Properties of the Generic Sense of Ability to Adapt Scale in the Context of the COVID-19 Pandemic.

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Master Thesis

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August 25, 2021

Abstract

Background: Adaptation is fundamental when facing challenges or new life conditions. Within the context of the COVID-19 pandemic the need to adapt to new life conditions has proven its relevance. Even though adaptation processes have shown its positive impact on mental health it is still an emerging concept that lacks validated measures. The present study aims to validate the recently developed Generic Sense of Ability to Adapt Scale (GSAAS) among a non-clinical population who has experienced lowered well-being due to the COVID-19 pandemic. **Methods:** The study draws on baseline data from a randomized controlled trial about the efficacy of a gratitude app. The GSAAS and scales concerning depressive symptoms, well-being and positive reinterpretation and growth were scored by Dutch speaking individuals ($N = 849$). To evaluate the GSAAS, its factor structure, reliability and validity was explored. Construct validity was assessed by testing for correlations between the GSAAS and the constructs mentioned above. Incremental validity was investigated by exploring how much variability in well- being scores can be explained by the GSAAS beyond the scale of positive reinterpretation and growth. **Results:** Eigenvalues of the items, factor loadings ($>.40$) and a significant goodness of fit test (X^2 (35, $N = 849$) = 242.39, $p < .001$) showed the appropriate-ness to retain one factor. Further, the GSAAS has high internal consistency ($\alpha = .90$) and scores of the GSAAS were moderately to strongly correlated with the scores of convergent measures. Incremental validity showed that the GSAAS explained additional 16% of the variance in well-being scores beyond the scale of positive reinterpretation and growth. **Conclusions:** The study has proven that the GSAAS is a valid and reliable tool to measure the generic ability to adapt within the present sample. Having a valid measure for this competence is of use for clinical and research settings. It can be used as outcome measure to test for the efficacy of interventions that are in development or used in practice. Further, the GSAAS can strengthen and facilitate the evaluation of theories and models of adaptation. However, limitations of the study concerning biases due to the study design and recruitment processes need to be acknowledged.

Introduction

The COVID-19 pandemic has created burdensome conditions that affect our daily and social life. Measures to fight the spreading of the virus have led to social distancing and isolation. Recent research shows that these conditions have the potential to attack mental health (Fitzpatrick et al., 2020; Mazza et al., 2020; Stankovska et al., 2020). The World Health Organization (WHO) defines mental health as 'a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community.' (WHO, 2004). However, the understanding of mental health defined by the WHO seems to have some shortcomings. Researchers criticize that the idealization of a stable state of high well-being dismisses that life will entail periods of suffering and adversity (Galderisi et al., 2015; Huber et al., 2011; The Lancet, 2011; Manwell et al., 2015). All humans will experience fluctuations on the dimension of well-being throughout life, including temporary periods of lowered well-being (Galderisi et al., 2015; Bohlmeijer & Westerhof, 2021). Therefore, assessing mental health by measuring the current state of well-being can be misleading. We should be aware that fluctuations on the dimension of well-being are not necessarily connected to fluctuations on the dimension of ill-being (psychopathology; Keyes, 2002). Consequently, it is suggested to look at mental health more as a process in motion than as a state (Galderisi et al., 2015; Huber et al., 2011; Bohlmeijer & Westerhof 2021).

To implement this idea, researchers have proposed to introduce the *ability to adapt* within a dynamic model of mental health (Bohlmeijer & Westerhof, 2021; Huber et al., 2011; "What is health?", 2009). Adaptation in this sense means applying strategies of managing adversities and regulating levels of well-being and ill-being (Aduluv et al., 2016; Bohlmeijer & Westerhof, 2021). Therefore, knowing that a person has a sufficient degree of the *ability to adapt* provides the information to which degree this person is able to self-regulate fluctuations on the two dimensions of well-being and ill-being (Galderisi et al., 2015; Bohlmeijer & Westerhof, 2021; Huber et al., 2011). Consequently, adaptation seems to be an important component to be implemented in models of mental health.

Yet, adaptation is still an establishing concept, lacking valid measures (Aduluv et al., 2016). The recently introduced Generic Sense of Ability to Adapt Scale (GSAAS) aims to fill this gap via measuring the perceived ability to adapt (Schuffelen et al., in press). The present study aims to contribute to its validation. Psychometric properties are tested with a sample that experienced lowered well-being due to the COVID-19 pandemic but did not suffer from severe

psychopathological conditions.

There are existing models and theories about adaptation processes that show its potential to maintain or re-establish well-being (e.g Roy Adaptation Model, Cognitive Adaptation Theory; Helgeson et al., 2014; Nayback, 2009; Roy, 2009; Taylor, 1983). However, these models are specific to nursing and medical contexts. In response to the critique on the current WHO definition, a more general model of mental health, including adaptation processes was developed: the model of Sustainable Mental Health (Bohlmeijer & Westerhof, 2021).

The model of Sustainable Mental Health provides insight on how people regulate and sustain mental health across the life course (Bohlmeijer & Westerhof, 2021). Further, the model integrates a complaint focused approach (psychopathology) with a strength focused approach (well-being). The dimensions of well-being and psychopathology represent the outcome level of the model. These two dimensions are based on the idea that mental health is not only the absence of mental illness, but also the presence of well-being (Bohlmeijer &Westerhof, 2021; Keyes, 2005). Well-being and psychopathology are associated, nevertheless they can also vary independently. As a core component of the model the *ability to adapt* is introduced depending on adaptation related sources and barriers within the individual. The *ability to adapt* is enhanced by having sources for adaptation that can increase well-being (functional thoughts, emotions and behaviour; Bohlmeijer & Wsterhof, 2021; Helgeson et al., 2014; Mayordomo et al., 2016). It is limited by barriers for adaptation that can increase psychopathology (dysfunctional thoughts, emotions and behaviours). These adaptation processes can regulate fluctuations on the dimensions of psychopathology and well-being (Bohlmeijer & Westerhof, 2021). Further, the model acknowledges the role of contextual and cultural factors that can affect mental health. Social systems (relationships, parents, organizations, communities) can promote resources for adaptation but they can also maintain or increase barriers of adaptation (Aduluv et al., 2016; Bohlmeijer & Westerhof, 2021; Londono & McMillan, 2015). Lastly, the model suggests that psychological treatment can focus on reinforcing the sources for adaptation, on weakening the barriers for adaptation or on both (Bohlmeijer & Westerhof, 2021). Consequently, interventions can target the increase of well-being, the reduction of symptoms of mental illness or both.

In order to strengthen the model of Sustainable Mental Health and enable the development of interventions that reinforce adaptation, the *ability to adapt* needs to be a measurable construct. So far research concerning adaptation has been using tools assessing aspects related to adaptation, for example sense of mastery, optimism and life satisfaction (Helgeson et al, 2014; Livneh et al., 2004). Additionally, there are specified tools assessing adaptation to medical conditions (Aduluv et al., 2016; McNulty et al., 2004). However, a

measure to assess a more generic ability to adapt is missing. The GSAAS is a recent attempt to provide the missing valid measure (Schuffelen, et al., in press). It is a measure based on self-reports assessing the 'perceived competence to readjust and actively deal with the psychosocial consequences of personally challenging events while maintaining life satisfaction' (Schuffelen et al., in press). The items focus on assessing whether individuals perceive to have functional thoughts, emotions and behaviour that reinforce their ability to adapt. Therefore, the GSAAS offers a tool to best possibly approach the assessment of adaptation by measuring the self-perceived ability to adapt.

The initial study that developed the scale found preliminary validity and reliability (Schuffelen et al., in press). Next to confirming a unidimensional factor structure, measurement invariance, internal consistency, construct validity and incremental validity were found to be of satisfactory level. The initial study was conducted with a clinical sample. However, focusing solely on a clinical population is too specific to evaluate whether the GSAAS can meet its goal to be generic and applicable in various contexts (Schuffelen et al., in press). Therefore, the current study aims to replicate the findings of reliability and validity of the GSAAS with a non-clinical sample. So, a sample of people is needed who are confronted with considerable adversities in life but nevertheless, do not display severe clinical symptoms. The COVID-19 pandemic has shown to be a good chance to recruit such a sample in the general population. All humans have faced challenges posed by the pandemic (Fitzpatrick et al., 2020; Mazza et al., 2020; Stankovska et al., 2020). Participants of this study had experienced lowered well-being due to the COVID-19 pandemic, but they did not show severe psychopathological symptoms. Psychometric properties of the GSAAS are assessed by conducting exploratory factor analysis, testing the model's fit and evaluating its internal consistency. Further, construct validity concerning well-being, depressive symptoms and positive reinterpretation and growth is assessed. Lastly, incremental validity of the scale is evaluated.

Concerning construct validity, the perceived ability to adapt is expected to show strong positive relations to the core components of well-being. Keyes (2002) identified three core components of well-being to define positive mental health. These components refer to the subjective evaluation of emotional well-being, psychological well-being and social well-being. Emotional well-being is characterized by positive emotions and life satisfaction (Keyes, 2008). Psychological well-being refers to functioning well in life as an individual. It is evaluated via six dimensions: self-acceptance, personal growth, purpose in life, positive relations with others, autonomy, and environmental mastery (Ryff, 1989). Social well-being is characterized by functioning well within society. It is measured via five dimensions: social integration, social

contribution, social coherence, social actualization, and social acceptance (Keyes, 1998; Keyes, 2008).

Literature states aspects of emotional well-being as outcomes of successful adaptation, for instance life satisfaction (Londono & McMillan, 2015; Van Leeuwen et al., 2011). Aspects of psychological well-being, for example finding meaning, environmental mastery and psychological functioning, are also attributed to adaptation (Helgeson et al., 2014; Taylor, 1983; Stanton et al., 2007). Moreover, social well-being can promote successful adaptation (Aduluv, et al., 2016; Londono & McMillan, 2015; Stanton, et al., 2007). Consequently, a strong positive relation between the GSAAS and general well-being is to be expected. This is in line with the model of Sustainable Mental Health, that introduces well- being as an outcome of successful adaptation (Bohlmeijer & Westerhof, 2021). Further, it is in line with findings of the initial study. Schuffelen et al. (in press) found strong relations between the perceived ability to adapt (GSAAS) and the three core components of well-being and general well-being.

Additionally, the perceived ability to adapt is expected to show a strong negative relation with depressive symptoms. This is in line with the model of Sustainable Mental Health stating that psychopathological symptoms are negatively related to resources of adaptation (Bohlmeijer & Westerhof, 2021). Further, the initial study showed a strong negative relation between the GSAAS and psychological complaints which comprise depressive symptoms (Schuffelen et al., in press).

Lastly, it is expected that the perceived ability to adapt shows a strong positive relation to positive reinterpretation and growth. Positive reinterpretation and growth is a coping strategy that deals with emotions elicited by a challenge (Cheshire et al., 2010). It enables individuals to redefine the meaning of events and focus on positive aspects while accepting the difficulties of a situation. The effective use of this strategy can increase positive emotions as joy, contentment and interest which in turn can increase well-being (Cheshire et al., 2010; Fredrickson, 2000; Livingstone & Srivastava, 2012). The frequent experience of positive emotions seems to have benefits for psychological adaptation (Herrman et al., 2011; Livingstone & Srivastava, 2012; Mayordomo et al., 2016). It can build a base for functional cognitions and behaviour reinforcing adaptation. Therefore, positive reinterpretation and growth seems to have the potential to serve as a source for adaptation by evoking functional emotions. As the GSAAS measures the perceived sources for adaptation, it might overlap to some degree with the scale of positive reinterpretation and growth. However, the GSAAS aims to not solely measure perceived emotional sources for adaptation but also the perceived cognitive and behavioural sources for adaptation. Therefore, it is expected that the GSAAS can

show its distinctiveness from the positive reinterpretation and growth scale. So, it is hypothesized that the GSAAS explains additional variability in well-being levels beyond the coping strategy of positive reinterpretation and growth.

The corresponding hypotheses to fulfil the aim of validating the GSAAS are as follows:

H1: The GSAAS comprises one factor.

H2: The GSAAS shows good internal consistency.

H3: Well-being and its three core constructs, emotional, psychological and social well-being show a strong positive correlation with the GSAAS.

H4: Depressive symptoms show a strong negative correlation with the GSAAS.

H5: The adaptive coping strategy 'positive reinterpretation and growth' shows a strong positive correlation with the GSAAS.

H6: The GSAAS shows to have incremental validity with regard to explaining additional variance of well-being scores beyond the subscale positive reinterpretation and growth.

Methods

Design

The current study refers to baseline data from a randomized controlled trial about the efficacy of a gratitude app to increase well-being in times of COVID-19. The baseline data consisted of two screening questionnaires and further online questionnaires. After filling in these questionnaires' respondents were randomly allocated to an intervention and control group. The study was permitted by the ethics committee of the University of Twente (201071).

Participants

Recruitment started in the first week of January 2021. Self-selection sampling resulted in 849 individuals who volunteered their time to participate in the study. The sample comprises 677 (79,9%) females, 169 (19,9%) males and 3 (0,4%) participants who did not want to report their gender. The mean age of the participants was 53 (SD = 14,52). Participants obtained high (77.1%) medium (13,9%), low (4,9%) or other (4.1%) educational levels.

Recruitment and Procedure

Participants were recruited via social media platforms (LinkedIn, Instagram, and Facebook) of the University of Twente and a news press release on the website of the University

of Twente. Additionally, one of the researchers was invited to different radio stations in the Netherlands and in the Flemish region of Belgium to promote participation. No compensation was given for participation.

Recruitment called for individuals who had experienced lowered subjective well-being due to the corona crisis but did not show severe psychopathological symptoms. Furthermore, they had to be willing to take part in a gratitude intervention via an App. To complete the study participants needed to be available for four months. Further, participants had to be at least 18 years old, confirm a valid e-mail address and own a smartphone or tablet with sufficient internet connection. Fluent Dutch skills were needed to be able to fill in questionnaires and use the app. Individuals interested to participate in the study filled in an online application form. They were informed about the procedure, aim of the study, and were asked to give consent. In addition, the application form comprised screening questionnaires detecting the severity of anxiety and depressive symptoms to ensure that only respondents with mild to moderate symptomatology were included. Respondents who reached a score of 15 or higher in one or both screening questionnaires were excluded from the sample. After the application procedure was completed, respondents received an email whether they fulfilled the criteria and can start with the study. In the following, selected participants were asked to fill in a list of questionnaires starting with questions concerning demographical information. Next, they were asked to fill in eight questionnaires concerning well-being, stress levels, ruminative thinking, perceived ability to adapt, positive reinterpretation and growth, and three scales concerning gratitude. For the current study only the measures of depressive symptoms, well-being, the ability to adapt and positive reinterpretation and growth are of interest.

Measures

Ability to Adapt

The Generic Sense of Ability to Adapt Scale is a 10-item measure assessing individuals' perception on their ability to adapt (Schuffelen et al., in press). Respondents specify their indications on a 5-point Likert scale ranging from *not at all* (0) to *always* (5). Included items are for example 'I can handle the stress in my life well' and 'When something unexpected happens, I adapt easily'. The higher the sum score the higher is the respondent's confidence to be able to adjust to daily life challenges and adverse life-events. Whereas low scores suggest low perceived ability to adapt. The initial study showed the scales validity and good internal consistency ($\alpha = 0.84$) (Schuffelen et al., in press).

Well-being

Well-being was measured using the Mental Health Continuum-Short Form (MHC-SF) which consists of 14 items divided into three subscales (Keyes et al., 2008). Respondents indicate how often they encountered certain feelings within the past month on a 6-point Likert scale ranging from *never* (0) to *every day* (5). The first subscale concerns emotional well-being and consists of three items, asking for instance how often the respondent felt 'interested in life' (Keyes, 2008). Secondly, the five-item subscale concerning social well-being including questions concerning the feeling of belongingness to a community (Keyes, 2002). Psychological well-being includes six items, in example asking how often one felt to have 'warm and trusting relationships with others' (Keyes, 2008). Studies evaluating psychometric properties of the MHC-SF show its reliability and validity (Lamers et. al, 2010; Guo et al., 2015). Within the sample of the current study the total scale of well-being and its subscales emotional well-being and psychological well-being have high internal consistency (total α = 0.89;emotional well- being α = 0.81; psychological well- being α = 0.82). The subscale of social well-being shows moderate internal consistency α = 0.71.

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) is a screening tool to assess the severity of depressive symptoms and recognize depression disorder within the primary care context (Kroenke et al., 2001). The nine items of the self-report measure represent the nine criteria of depression disorder described in the *Diagnostic and statistical manual of mental disorders*, fourth edition (DSM-IV) (American Psychiatric Association, 1994). Respondents indicate how often they experience these symptoms for example, 'feeling bad about yourself or that you are a failure'. Indications are placed on a 4-point Likert scale ranging from *not at all* (0) to *nearly every day* (3). Existing studies confirm that the PHQ-9 is a reliable and valid tool to assess levels of depressive symptoms (Hammash et al., 2012; McManus et al., 2005; Lowe et al., 2004). The internal consistency of the tool in the current study is moderate (α = 0.72)

Positive Reinterpretation and Growth

The COPE inventory comprises in total 60 items divided into 15 subscales with four items each. It aims to measure the use of coping strategies (Carver, et al., 1989). The subscale used in this study concerns positive reinterpretation and growth. An example item of this subscale is: 'I look for something good in what is happening'. The frequency of use is determined on a 4-point Likert scale ranging from *I usually don't do this at all* (1) to *I usually do this a lot* (4). The positive reinterpretation and growth scale holds acceptable reliability and validity (Carver et al., 1989). Within the sample of the current study the scale holds good internal consistency (α = 0.85).

Statistical Analyses

The collected data was analysed by using the statistical package for social sciences (SPSS) Version 24 (IBM Corp., Armonk, N.Y., USA) (SPSS). To explore the factor structure of the GSAAS, exploratory factor analysis (EFA) was conducted employing varimax as rotation method and maximum likelihood as extraction method. To test whether the data is appropriate for factor analysis the Kaiser-Meyer-Olkin (KMO > 0.5) criterium was used, the Bartlett's test of sphericity (p < 0.05) and the correlation coefficients were checked (r >.3) (Yong & Pearce, 2013; Pallant, 2010). The factor structure of the scale was explored by considering the Kaiser's criterion (Eigenvalues greater than one). Further, by using a scree plot visualizing the factor structure (Pallant, 2010). The number of factors is shown by the point where the slope of the curve levels off ("elbow"). Factor loadings are relevant if they exceed .4 (Yong & Pearce, 2013). Further, the goodness of fit of the factor structure was tested using a chi square test. A significant value (p < 0.05) confirms that the factor solution suits the data.

Internal Consistency of the scale was assessed by calculating Cronbach's alpha α. To draw conclusions from the alpha value the following guidelines were respected: a Cronbach's alpha value lower than 0.70 is considered as unacceptable, a value between 0.70 and 0.79 as moderate, an alpha ranging between 0.80 and 0.89 as good and above 0.90 as excellent internal consistency (Cicchetti, 1994 as cited in Schuffelen et al., in press). Further, reliability on item level was assessed. Cronbach alpha values in case of deleting items were viewed and scanned for values that exceed the Cronbach's alpha of the total scale. If that is the case these items are suggested to be removed from the scale (Pallant, 2010). Furthermore, the corrected item total correlations need to show sufficient values (r > .3) to support that each item correlates with the total score of the scale.

Construct validity was evaluated by referring to Pearson's correlation coefficients between the GSAAS and measures of well-being, depressive symptoms and positive reinterpretation and growth. A strong correlation exists when the coefficients range between 0.50 and 1.00, moderate between 0.30 and 0.50, a small correlation is indicated by values between 0.10 and 0.30, and a weak correlation if the values are lower than 0.10 (Cohen, 1988 as cited in Schuffelen et al., in press).

To further evaluate the scale, incremental validity was assessed by hierarchical multiple regression analysis. It serves to explore whether the GSAAS adds information to explain the variability in well-being scores beyond the explanation provided by the subscale positive reinterpretation and growth of the COPE inventory. The analysis compares two models and

their ability to explain the variance of well-being scores. The first model includes the subscale positive reinterpretation and growth, and the second model adds the GSAAS. If the analysis showed a significant change (p<0.05) in the explained variance (F-changes) between model one and two, the GSAAS provides additional information about the variability in well-being.

Results

Factor Analysis

Exploratory factor analysis was executed to explore the factor structure of the 10-item scale measuring the perceived ability to adapt (GSAAS). The Kaiser-Meyer-Olkin measure (KMO = .94), the Bartlett's test of sphericity (x^2 (45) = 4002.58, $p < .001$) and the inter item correlation coefficients ($r \geq .37$) support the use of exploratory factor analysis concerning the GSAAS. Looking at the factor matrix and considering the Kaiser's criterion, one factor showed an eigenvalue larger than 1 explaining 54.09% of the total variance of the scale. The scree plot shows a clear break after the first component and confirms the one factor structure (see appendix). All items load on one factor with values above .62 (see Table 1). Further, Table 1 provides information about the single items of the scale and its scoring. Lastly, the goodness of fit test showed a significant chi square value, X^2 (35, $N = 849) = 242.39, p < .001$. Conclusively, the criteria described in the methods section could be fulfilled, proposing a unidimensional scale.

Table 1. Descriptive Statistics of GSAAS Scores, Factor Loadings and Cronbach's α if Item deleted.

Item	M	SD	SE	Factor loadings	Cronbach's α if Item deleted	Item-Total Correlation
1. I can cope well with adverse circumstances	2.2	0.9	0.03	.73	.89	.68
2. I feel decisive	2.2	0.9	0.03	.75	.89	.72
3. I see a lot of interesting challenges	2.1	1.1	0.04	.62	.90	.59
4. I can cope well with the stress in my life	1.8	0.9	0.03	.72	.89	.67
5. I have influence over my personal circumstances	2.3	0.9	0.03	.63	.90	.61

6. I can easily handle setbacks	2.2	1	0.03	.70	.89	.66
7. If something unexpected happens, I can easily adapt	2.1	0.9	0.03	.70	.89	.65
8. I can easily cope with my daily life	2.7	0.9	0.03	.73	.89	.69
9. If I encounter difficulties, I can find a way out	2.4	0.9	0.03	.78	.89	.73
10. If I want something, I go for it	2.3	0.9	0.03	.62	.90	.60

Note. N= 849

Reliability and Validity

Concerning reliability, the GSAAS held excellent internal consistency with a cronbach's α value of .90. Cronbach's α in case of deleting single items did not exceed the α value of the total scale (see Table 1). Further, the item total correlations are all above r=.59 (Table 1). Therefore, no items are deleted to increase the reliability of the scale. Regarding construct validity, the corresponding correlation coefficients can be viewed in table 2. The GSAAS showed to strongly correlate with the general score of well-being (MHC-SF). Concerning the subscales of the well-being measure, the GSAAS correlated strongly with emotional well-being, moderately with social well-being and strongly with psychological well-being. Further, the GSAAS showed a moderate negative correlation with depressive symptoms (PHQ-9) and lastly a strong positive correlation with the subscale positive reinterpretation and growth.

Table 2. Means, Standard Deviations and Correlations of variables with GSAAS

	Mean (SD)	r
General Well-Being (Total Score)	**2.7 (0.8)**	**.61*****
Emotional well-being	3.1 (0.9)	.54***
Social well-being	2.2 (0.9)	.45***
Psychological well-being	2.9 (0.9)	.59***
Depressive Symptoms	**0.7 (0.4)**	**-.39*****
Positive reinterpretation and growth	**2.9 (0.7)**	**.59*****

Note: ***p < .001.

Incremental validity was assessed by hierarchical multiple regression analysis (Table 3). Looking at the model summary of the analysis, positive reinterpretation and growth accounts for 23.8% of the variability of well-being scores (MHC-SF), $F(1,847) = 264,24$, p <0.01, $R^2 =$ .238, adjusted $R^2 = .237$. The second model including the ability to adapt measure (GSAAS) shows that the scale adds 16% of the variance in explaining the variability of well-being (MHC-SF), $F(1,846) = 280,23$, p <0.01, $R^2 = .399$, adjusted $R^2 = .397$. It shows that the GSAAS can provide distinctive additional information in comparison with the subscale of the COPE inventory.

Table 3. Hierarchical regression analysis: GSAAS as predictor of the variability in well-being (MHC-SF) beyond positive reinterpretation and growth

Model	Predictor	B	SE	β	t	R^2
1						.24[***]
	Postive reinterpretation and growth	1.96	0.12	0.49	16.26[***]	
2						.40[***]
	Positive reinterpretation and growth	0.80	0.13	0.20	6.04[***]	
	GSAAS	0.81	0.05	0.49	15.04[***]	

Note: [***]*p < .001.*

Discussion

The present study evaluated psychometric properties of the GSAAS, a self-report measure assessing the perceived ability to adapt. It was aimed to replicate and expand findings concerning validity and reliability of the initial study that developed the GSAAS (Schuffelen et al., in press). Hypotheses were largely confirmed and with that the goal to replicate and expand findings was achieved. Firstly, it was confirmed that a single factor model fits the scale best. Secondly, the hypothesis to find a good internal consistency was confirmed and even expanded by finding excellent internal consistency. Further, the scale showed construct validity concerning theoretically associated measures. Lastly, the GSAAS showed to have incremental validity. It can explain distinctive variability in well-being scores compared to the positive reinterpretation and growth scale.

Concerning construct validity, both studies found strong positive relations between the

GSAAS and general, emotional and psychological well-being (Schuffelen et al., in press). However, unlike hypothesized, the current study found only moderate relations of the GSAAS to social well-being and depressive symptoms. Whereas the initial study found strong relations of the GSAAS to social well-being and psychological complaints.

This deviation seems to be explainable when considering the distinctive characteristics of the people in the initial sample and the people in the present sample. The initial study recruited a sample of individuals who had just entered psychological treatment (clinical; Schuffelen et al., in press). It can be assumed that the majority experienced high distress at the moment of data collection. Therefore, it is likely that this distress had a strong impact on the participants view on life and consequently on their responses on the questionnaires. In a clinical population, especially affective complaints can lead to a generalized negative evaluation of life and of oneself (Everaert & Joormann, 2019). Whereas it was expected that people in the present study (non-clinical respondents) showed less distress at the moment of data collection leading to less generalized negative responses. This might have contributed to the respondents' better capabilities to make distinctive responses on the questionnaires while considering other variables that have an impact on their ability to adapt, social well-being and depressive symptoms. Resulting in more randomness in the scorings on these scales and thus to weakened relations. Conclusively, the less severe psychological complaints are, the more likely it is that other variables might play a role, weakening the direct relationship of the GSAAS to social well-being and depressive symptoms.

Strengths and Limitations

The study shows to have various strengths. The most important strength is that the present study could reach a clear result by confirming most of its hypotheses. Nevertheless, limitations of the study design, that possibly influenced results, need to be considered. Firstly, the data stem from a larger study that examined the effectiveness of a gratitude app. Therefore, it could be that recruited participants were rather motivated to use an app than to respond to a questionnaire. Reduced motivation of the participants could have led to less reflected and less accurate responses on the questionnaires. On the other hand, the voluntary, self-selection sampling method might have led to a very committed sample (Sharma, 2017). This could have resulted in a sample that was intrinsically motivated to answer questions accurately. However, self-selection sampling bears a risk for sampling bias. Due to self-selection sampling and inclusion and exclusion criteria, it is likely that respondents share many characteristics, thus not representing a generic population as it was aimed to. Examples are that the sample was strongly

dominated by female gender of middle age with high educational status. This means that results within a sample showing different characteristics, as for example being of male gender, young aged and having low educational status, could be entirely different. Moreover, due to the cross-sectional design of the study no inferences concerning the constructs' longitudinal relations can be made (Sedgwick, 2014). Relations of the constructs measured at a later point in time might deviate from the relations found in the present study. Lastly, the self-report method is practical and offers access to relevant information about individuals that would be difficult to observe (e.g. thoughts, feelings; Paulhaus & Vazire, 2009). However, response biases inherent to this data collection method need to be considered. These biases might have led to less accurate and truthful responses.

Implications

The finding of the GSAAS being a valid and reliable tool, measuring the perceived ability to adapt, has important implications for research on mental health. The GSAAS has the potential to strengthen the model of Sustainable Mental Health by being the first tool that measures one of its core components (Bohlmeijer & Westerhof, 2021). It serves the evaluation of the model and its promotion to be a sophisticated alternative to the current global understanding of mental health.

Furthermore, the study has implications concerning psychotherapeutic practice. The GSAAS is a quick and easy tool to use as an outcome measure for psychological treatment. Additionally, it can be useful when developing interventions that aim to target the reinforcement of sources for adaptation. Promoting the ability to adapt within psychotherapy is essential as it seems to be a prerequisite to regulate mental health. Further, the ability to adapt has the potential to increase well-being. The impact of increased well-being is demonstrated in studies showing that individuals who experience high levels of well-being are less prone to develop symptoms in the future (Schotanus-Dijkstra et al., 2017; Schotanus-Dijkstra et al., 2019). Conclusively the GSAAS can serve the development and conduction of interventions that target the ability to adapt and thus the potential to prevent the development of psychopathological symptoms.

Future Research

We recommend future research to explore whether the GSAAS can contribute to the evaluation and support of models of adaptation beyond the model of Sustainable Mental Health. For instance, models developed within medical contexts or models that are to be developed (Helgeson et al., 2014; Nayback, 2009; Roy, 2009; Taylor, 1983). Additionally, it is of interest

to investigate what third variables might strengthen the relationship of the GSAAS to social well-being and to depressive symptoms. This might be of value when using the GSAAS in practice. Moreover, we suggest testing psychometric properties of the scale with different target groups to find out whether the GSAAS is as generally applicable as it is expected to be. It would be especially of interest to test the scale with samples from different national or cultural backgrounds, as this study and the initial study focussed solely on participants from the Netherlands and the flemish region of Belgium. In addition, another population of interest are individuals younger than the mean age of the two existing studies. Lastly, it needs to be tested whether the GSAAS is a beneficial tool for clinical practice to measure outcomes of treatments aiming at increasing sources for adaptation. Therefore, a longitudinal study is recommended to show that the GSAAS is a measure sensitive to changes in individuals perceived ability to adapt.

Conclusion

In conclusion the present study showed the validity and reliability of the GSAAS among a population that experienced lowered well-being due to the COVID-19 pandemic beyond severe psychopathological symptoms. The study expands findings of the initial study by testing psychometric properties among a non-clinical population to target the aim of being a generic measure. The GSAAS showed its potential to contribute to revolutionizing the general understanding of mental health by leaving the stable state definition and turning towards the dynamic model of Sustainable Mental Health.

References

Audulv, Å., Packer, T., Hutchinson, S., Roger, K. and Kephart, G., 2016. Coping, adapting or self-managing - what is the difference? A concept review based on the neurological literature. *Journal of Advanced Nursing*, 72(11), pp.2629-2643. https://doi: 10.1111/jan.13034

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders. (4th ed.)

Bohlmeijer, E.T., Westerhof, G.J. (2021) A new model for sustainable mental health: integrating well-being into psychological treatment. In: Kirby J., Gilbert P, editors. Making impact on mental health. The applications of psychological research. 1th ed. New York: Routledge; 2021. p. 153–89.

Carver, C., Scheier, M., & Weintraub, J. (1989). Assessing coping strategies: A theoretically based approach. *Journal Of Personality And Social Psychology*, *56*(2), 267-283. https://doi.org/10.1037/0022-3514.56.2.267

Cheshire, A., Barlow, J., & Powell, L. (2010). Coping using positive reinterpretation in parents of children with cerebral palsy. *Journal of Health Psychology*, *15*(6), 801–810. https://doi.org/10.1177/1359105310369993

Fitzpatrick, K., Harris, C., & Drawve, G. (2020). Living in the midst of fear: Depressive symptomatology among US adults during the COVID-19 pandemic. *Depression And Anxiety*, *37*(10), 957-964. doi: 10.1002/da.23080

Fredrickson, B. L. (2000). *Cultivating Positive Emotions to Optimize Health and Well-Being*. *3*, 1–25.

Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J., & Sartorius, N. (2015). Toward a new definition of mental health. *World Psychiatry*, *14*(2), 231-233. https://doi.org/10.1002/wps.20231

Guo, C., Guo, J., Keller, C., Li, X., Söderqvist, F. & Tomson, G. (2015). Psychometric evaluation of the Mental Health Continuum-Short Form (MHC-SF) in Chinese

adolescents – a methodological study. *Health And Quality Of Life Outcomes*, *13*(1). doi: 10.1186/s12955-015-0394-2

Hammash, M., Hall, L., Lennie, T., Heo, S., Chung, M., Lee, K., & Moser, D. (2012). Psychometrics of the PHQ-9 as a measure of depressive symptoms in patients with heart failure. *European Journal Of Cardiovascular Nursing*, *12*(5), 446-453. doi: 10.1177/1474515112468068

Helgeson, V. S., Reynolds, K. A., Siminerio, L. M., Becker, D. J., & Escobar, O. (2014). Cognitive adaptation theory as a predictor of adjustment to emerging adulthood for youth with and without type 1 diabetes. *Journal of Psychosomatic Research*, *77*(6), 484–491. https://doi.org/10.1016/j.jpsychores.2014.09.013

Herrman, H., Stewart, D. E., Diaz-Granados, N., Berger, E. L., Jackson, B., & Yuen, T. (2011). What is resilience? *Canadian Journal of Psychiatry*, *56*(5), 258–265. https://doi.org/10.1177/070674371105600504

Huber, M., André Knottnerus, J., Green, L., Van Der Horst, H., Jadad, A. R., Kromhout, D., Leonard, B., Lorig, K., Loureiro, M. I., Van Der Meer, J. W. M., Schnabel, P., Smith, R., Van Weel, C., & Smid, H. (2011). How should we define health? *BMJ (Online)*, *343*(7817), 1–3. https://doi.org/10.1136/bmj.d4163

IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

Keyes, C., Wissing, M., Potgieter, J., Temane, M., Kruger, A., & van Rooy, S. (2008). Evaluation of the mental health continuum–short form (MHC–SF) in setswana-speaking South Africans. *Clinical Psychology & Psychotherapy*, *15*(3), 181-192. https://doi.org/10.1002/cpp.572

Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. Journal of Consulting and Clinical Psychology, 73, 539–548. https://doi.org/10.1037/0022-006 X.73.3.539.

Keyes, C. L. (2002). The Mental Health Continuum: From Languishing to Flourishing in Life. Journal of Health and Social Behavior, 43(2), 207. https://doi.org/10.2307/3090197

Keyes, C. L. (1998). Social Well-Being. *Social Psychology Quarterly*, *61*(2), 121. https://doi.org/10.2307/2787065

Lamers, S., Westerhof, G., Bohlmeijer, E., ten Klooster, P., & Keyes, C. (2010). Evaluating the psychometric properties of the mental health Continuum-Short Form (MHC-SF). *Journal Of Clinical Psychology*, *67*(1), 99-110. doi: 10.1002/jclp.20741

What is health? The ability to adapt (2009). The Lancet, *373*(9666), 781. https://doi.org/10.1016/S0140-6736(09)60456-6

Livingstone, K. M., & Srivastava, S. (2012). Up-regulating positive emotions in everyday life: Strategies, individual differences, and associations with positive emotion and well-being. *Journal of Research in Personality*, *46*(5), 504–516. https://doi.org/10.1016/j.jrp.2012.05.009

Livneh, H., Lott, S. M., & Antonak, R. F. (2004). Patterns of psychosocial adaptation to chronic illness and disability: A cluster analytic approach. *Psychology, Health and Medicine*, *9*(4), 411–430. https://doi.org/10.1080/1354850042000267030

Londono, Y., & Mcmillan, D. E. (2015). Psychosocial adaptation: An evolutionary concept analysis exploring a common multidisciplinary language. *Journal of Advanced Nursing*, *71*(11), 2504–2519. https://doi.org/10.1111/jan.12723

Lowe, B., Unutzer, J., Callahan, C., Perkins, A., & Kroenke, K. (2004). Monitoring Depression Treatment Outcomes With the Patient Health Questionnaire-9. *Medical Care*, *42*(12), 1194-1201. doi: 10.1097/00005650-200412000-00006

Mayordomo, T., Viguer, P., Sales, A., Satorres, E., & Juan, C. (2016). Resilience and Coping as Predictors of Well-Being in Adults. *The Journal of Psychology*, *150*(7), 809–821. https://doi.org/10.1080/00223980.2016.1203276

McManus, D., Pipkin, S., & Whooley, M. (2005). Screening for Depression in Patients With Coronary Heart Disease (Data from the Heart and Soul Study). *The American Journal Of Cardiology*, *96*(8), 1076-1081. doi: 10.1016/j.amjcard.2005.06.037

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracuti, S., Napoli, C., & Roma, P. (2020). A nationwide survey of psychological distress among Italian people during the COVID-

19 pandemic: Immediate psychological responses and associated factors. *International Journal of Environmental Research and Public Health*, **17**, 3165

Murray, V., & Ebi, K. (2012). IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). *Journal Of Epidemiology And Community Health*, *66*(9), 759-760. https://doi.org/10.1136/jech-2012-201045

Nayback, A. M. (2009). PTSD in the combat veteran: Using roy's adaptation model to examine the combat veteran as a human adaptive system. *Issues in Mental Health Nursing*, *30*(5), 304–310. https://doi.org/10.1080/01612840902754404

Niemiec, C. P. (2014). Eudaimonic Well-Being. In A. C. Michalos (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 2004–2005). Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_929

McNulty, K., Livneh, H., & Wilson, L. (2004). Perceived Uncertainty, Spiritual Well-Being, and Psychosocial Adaptation in Individuals With Multiple Sclerosis. *Rehabilitation Psychology*, *49*(2), 91-99. https://doi.org/10.1037/0090-5550.49.2.91

Pallant, J. (2010). *SPSS survival manual*. Open University Press/McGraw-Hill.

Roy, C., Whetsell, M. V., & Frederickson, K. (2009). The Roy adaptation model and research: Global perspective. *Nursing Science Quarterly*, *22*(3), 209–211. https://doi.org/10.1177/0894318409338692

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52,* 141–166. https://doi.org/10.1146/annurev.psych.52.1.141

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081. https://doi.org/10.1037/0022-3514.57.6.1069

Samson, A., & Siam, H. (2008). Adapting to major chronic illness: A proposal for a comprehensive task-modSamson, A., & Siam, H. (2008). Adapting to major chronic illness: A proposal for a comprehensive task-model approach. Patient Education and

Counseling, 70(3), 426–429. https://doi.o. *Patient Education and Counseling*, *70*(3), 426–429. https://doi.org/10.1016/j.pec.2007.10.018

Schotanus-Dijkstra, M., Drossaert, C.H.C., Pieterse, M.E., Boon, B., Walburg, J.A., Bohlmeijer, E.T. (2017b). An early intervention to promote well-being and flourishing and reduce anxiety and depression: A randomized controlled trial. Internet Interventions, 9: 15-24.

Schotanus-Dijkstra, M., Pieterse, M.E., Drossaert, C.H.C., Walburg, J.A., Bohlmeijer, E.T. (2019). Possible mechanisms in a multicomponent email guided positive psychology intervention to improve mental well-being, anxiety and depression: a multiple mediation model. The journal of positive psychology, 14: 141-155.

Schuffelen, P.C.J., ten Klooster, P.M., van Doesum, K.T.M., Westerhof, G.J., Bohlmeijer, E.T. (2021). *Development and psychometric properties of the Generic Sense of Ability to Adapt Scale (GSAAS) in adults with mild to moderate psychological complaints* [Unpublished manuscript]. Behavioural Management and Social sciences, University of Twente.

Sedgwick, P. (2014). Cross sectional studies: Advantages and disadvantages. *BMJ (Online)*, *348*, 24–26. https://doi.org/10.1136/bmj.g2276

Sharma, G. (2017). Pros and cons of different sampling techniques. *International Journal of Applied Research*, *3*(7), 749–752. www.allresearchjournal.com

Silverman, A. L., Forgeard, M., Beard, C., & Björgvinsson, T. (2018). Psychometric Properties of the Mental Health Continuum – Short Form in a Psychiatric Sample. *Journal of Well-Being Assessment*, *2*(1), 57–73. https://doi.org/10.1007/s41543-018-0011-3

Stankovska, G., Memedi, I., & Dimitrovski, D. (2020). Coronavirus Covid-19 Disease, Mental Health and Psychosocial Support. *Society Register*, *4*(2), 33–48. https://doi.org/10.14746/sr.2020.4.2.03

Stanton, A. L., Revenson, T. A., & Tennen, H. (2007). Health psychology: Psychological adjustment to chronic disease. *Annual Review of Psychology*, *58*(February), 565–592. https://doi.org/10.1146/annurev.psych.58.110405.085615

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*, *38*(11), 1161–1173. https://doi.org/10.1037/0003066X.38.11.1161

Van Leeuwen C.M., Post M.W., van der Woude L.H., de Groot S., Smit C., van Kuppevelt D. & Lindeman E. (2012) Changes in life satisfaction in persons with spinal cord injury during and after inpatient rehabilitation: adaptation or measurement bias? Quality of Life Research 21(9), 1499–1508. doi:10.1007/s11136-011-0073-7.

World Health Organization. (2004). Promoting mental health: Concepts, emerging evidence, practice (Summary Report). Geneva: WHO.

Yong, A. G., & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology*, *9*(2), 79–94. https://doi.org/10.20982/tqmp.09.2.p079
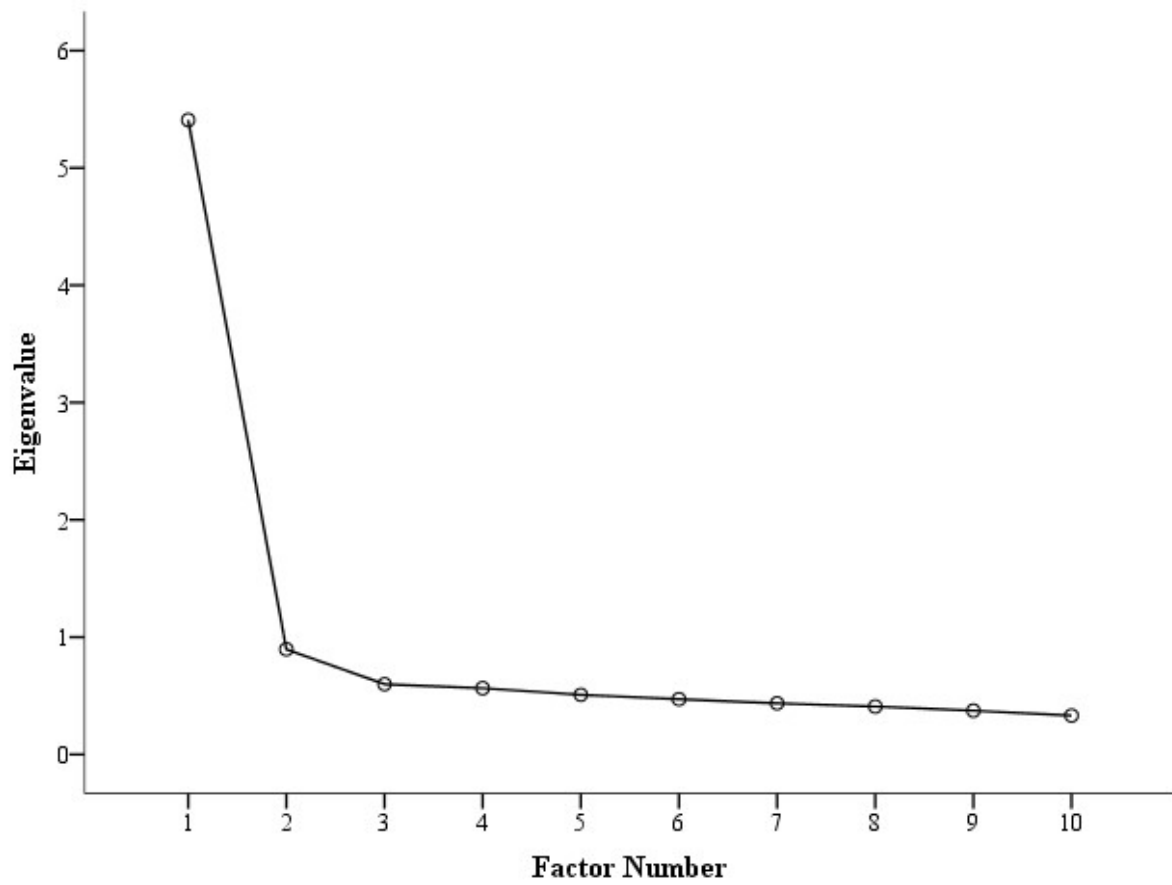
Appendix

Fig. 1 *Scree plot of Eigenvalues of the GSAAS*