An investigation of the relationship between heart rate variability, mindfulness and resilience in the context of emotion regulation

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Abstract

Introduction. Emotion regulation seems to be the connection between the physiological concept of heart rate variability (HRV) and the psychological concepts resilience and mindfulness. It is shown that there is a strong correlation between emotion regulation and the two psychological factors mindfulness and resilience. The role of HRV regarding mindfulness, emotion regulation and resilience is not clearly investigated. HRV, mindfulness and resilience reflects to some extent self regulatory processes. Therefore the purpose of this study was to investigate the relationship between HRV, mindfulness and resilience.

Method. The data from this study were already collected by the Saxion University, School of Health in Enschede, Netherlands. 106 students participated in this study. The HRV scores of the participants were measured via emWave Pro Plus. The scores on mindfulness and resilience were obtained through questionnaires (MAAS, BRS). It is a cross-sectional correlational design. To investigate the relationship between the variables multiple Pearson's r correlation analyzes were applied.

Results. The formulated hypotheses could not be confirmed. There are no significant correlations between HRV and mindfulness as well as between HRV and resilience.

Discussion. This study has indicated that there is no support for the formulated hypotheses. This may be reasoned by some weaknesses of this study. Only young healthy student take part and provide data for mindfulness and resilience with low diversity. Further, MAAS and BRS may lack to adequately represent the scores of mindfulness and resilience. Both measurements are focused on one aspect of the whole construct. Nevertheless, the study of emotion regulation is still important, due to a lack of understand of the underlying mechanisms.

Inhoudsopgave

Introduction

The regulation of emotions is a fundamental part in our everyday lives. It forms an important factor of mental health and psychopathology (Shaffer et al., 2014). Nevertheless, this field of research is relatively new and there is still a need for deeper insight in mechanisms contributing to emotion regulation. It is suggested that mindfulness contributes to emotion regulation (Chamber, Gullone and Allen, 2009; Hayes and Feldman, 2004). According to their research mindfulness appeared to represent a balance of emotions. Another psychological construct that is assumed to be related to emotion regulation is resilience. It is assumed that emotion regulation strategies are predicted by the resilience of people (Tukade and Fredrickson, 2007). Furthermore, it is assumed that heart rate variability (HRV) is related to emotion regulation through physiological self-regulation mechanisms (Thayer et al., 2012). Many studies with the focus on mindfulness meditation suggested that mindfulness and HRV are positively correlated (Krygier et al., 2013; Delgado-Pastor et al., 2013; Segerstrom et al., 2007; Delizonna et al., 2009). In addition it is suggested that HRV is a marker of stress and therefore positively related to resilience (Thayer et al., 2012). Hereafter the conceptual frameworks of mindfulness, resilience and HRV will be introduced.

Heart Rate Variability. In a healthy individual there exists a balance between the parasympathetic nervous system (PNS) and sympathetic nervous system (SNS) to regulate the heart. PNS activity prevails at rest so that there is an average heart rate (HR) of 75 beats per minute (bpm). Further, PNS activity is responsible to reduce the HR. In contrast SNS activity is responsible for raising the HR. According to Shaffer et al. (2014)

a healthy heart is not a metronome. Fluctuations of 100 milliseconds in the sequence of heartbeats occur as a natural way of the functioning of the heart. Indeed, physiological and psychological regulatory systems are never at rest and never static. Thus, a healthy function of the heart consist of a steady and dynamic fluctuation. It is evident that a normal resting rhythm of the heart is variable and not monotone. This balance within the autonomic nervous system (ANS) assumes that the sympathetic and parasympathetic activities have a competitively function to adjust the HR.

The heart rate variability (HRV) is a measure of the neurovegetative activity and autonomic function of the heart and indicates the fluctuation of the heart rate over a shorter or longer period when analyzing successive heartbeats. Therefore, HRV reflects the capability of the autonomic nervous system to adjust the heart rate to environmental factors (McCraty and Shaffer, 2015). From the physiological and electrocardiographic point of view the HRV is defined as the spontaneous variation of heart rate. HRV investigates the beat-to-beat-interval (Shaffer et al., 2014). The relationship between HR and amount of HRV is noticeable. In the case of an increase in HR, the amount of time between heartbeats is reduced. This results therefore in a decrease in HRV. Logically, at lower HRs the span between heartbeats is higher and therefore the chance of variability increases (McCraty and Shaffer, 2015). Research have shown that respondents with higher HRV show more often adequate emotional responses to a presented context (Thayer et al., 2012).

Mindfulness. The concept of mindfulness is rooted in a more than 2,500 year old eastern tradition, which is expressed by meditation such as Vipassana or insight-meditation. Notwithstanding that there is a long history of mindfulness, the interest in this

topic recently increased, caused by a positive association with physiological and psychological health. The term mindfulness refers to the ability to focus the attention on the present and to be aware of the moment (Palmer and Rodger, 2009). The most commonly cited definition of mindfulness is "an awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience" (Kabat-Zinn, 2003, p. 145). In other words, by means of mindfulness, individuals don't try to actively control their feelings and emotions. Instead, they simply accept that these feelings and emotions are present at a particular moment. This leads to the perception of individuals that these thoughts and emotions are temporarily by nature. Research has shown that mindfulness is an important factor of emotional processing and that it's related to an improvement of emotion regulation. Thus, mindfulness has been identified as an important factor to develop effective emotion regulation (Mankus et al. 2013). Furthermore, mindfulness is also associated with an impact on the activity of the neural structures, especially parasympathetic activity, which are related to effective emotion regulation (Mankus et al., 2013; Tang et al. 2009; Thayer et al., 2012). In addition, then, mindfulness can also be defined as a self-regulation process which regulates emotions to react on specific stressful events to avoid or reduce the effect of these stressful events (Palmer and Rodger, 2009).

Resilience. The concept of resilience has been defined as a capacity of individuals for positive adjustments regardless of challenging or threatening circumstances. It is an ability to recover quickly after an exposure to a stressor (Keye and Pigeon, 2013. It could be further defined as a sort of learning proces. Through challenging and threatening situation, individuals gain knowledge to actively cope with comparable situations (Ahern,

Kiehl, Sole, & Byers, 2006). Factors associated with resilience consists of positive attitudes, healthy emotion regulation and the ability to use failure as a source of helpful feedback (Ryff & Singer, 2003). It has been stated that resilience is a psychological capacity to adequately react on change. Further, distressed by change is requisite to learn to cope with future stressful events. Thus, resilience is a self-regulatory strength to cope with stressful situations (Keye and Pigeon, 2013).

   Relation to emotion regulation. HRV reflects the ability of the autonomic nervous system to adapt the heart rate to meet environmental needs. Thus, it is a sort of an autonomous physiological regulation process (Krygier et al., 2013). HRV does not only provide information about the state of the heart, it also gives insight in the state of the brain. HRV is strongly related to the regulation of emotions, because it is suggested that in the dynamic patterns of physiological activity is further information encoded (McCraty and Childre, 2010). Emotion regulation is needed to adaptively react and respond on experiences and on changing contexts (Thayer et al., (2012).

   The psychological constructs mindfulness and resilience reflect the capacity to adaptively cope with stressful situations (Keye and Pidgeon, 2013). These two constructs are also related to emotion regulation (Krygier et al., 2013; Keye and Pidgeon, 2013). In the last decades there is an increase in interest in these topics, because both are associated with the prevention of developing psychopathology and maintaining optimal physical and psychological functioning (Ryff & Singer, 2003). However there is a lack of knowledge and research about the relationship between these constructs (Keye and Pidgeon, 2013).

   Most of these topics were independently reviewed without a strong focus on the

relation between them. Therefore, there is still a lack of research about the relationship between HRV, mindfulness and resilience. Furthermore, with regard to mindfulness there is a shortcoming in operationalizations of this construct (Palmer and Rodger, 2009) and little work has been done to investigate the relation between HRV and mindfulness (Mankus et al. 2013). Emotion regulation seems to be the connection between the physiological concept of HRV and the psychological concepts resilience and mindfulness. There is already evidence for a strong correlation between emotion regulation and the two psychological factors mindfulness and resilience (Chamber, Gullone and Allen, 2009; Tukade and Fredrickson, 2007). Whereas the role of HRV regarding to mindfulness, resilience and emotion regulation is not that clear. The findings of this study can provide information about the exact relation between these constructs and it can help to investigate if HRV measurements provide a physiological parameter for emotion regulation.

Current study. HRV Can be an essential part to understand psychological constructs such as emotion regulation (Thayer et al., 2012). In the context of this study mindfulness and resilience are further investigated. These constructs are highly correlated with emotion regulation (Chamber, Gullone and Allen, 2009; Tukade and Fredrickson, 2007). Therefore, the current study aims to answer the research question: *What is the relationship between heart rate variability and mindfulness and resilience amongst dutch university students?* In the light of literature research mentioned above it was hypothesized that HRV is significantly positive correlated to mindfulness. The second hypothesis stated that HRV is also significantly positive correlated to resilience.

Method

Design and Participants

The current study is a cross-sectional correlational design with HRV (SDNN measurements) as dependent variable and the two psychological constructs mindfulness and resilience as independent variables. The data for this study were provided by the Saxion Universities of Applied Sciences, School of Health in Enschede, Netherlands. It consist of data from 109 dutch first up to third years students of the Saxion University. The age of the participants differs between 17 - 61 years (M = 24.10; SD = 10.18). 55 women and 54 men participated in this study. It was a convenient sample because only students of the Saxion University have taken part and it was obligatory to participate.

The data used in the current study consist of different questionnaires and variables in order to answer the research question. The HRV scores of the participants were received through EmWave a Hardware/Software. Mindfulness and Resilience were assessed through questionnaires.

Measurements

Heart Rate Variability. In this study EmWave Pro is used to gather HRV data from participants. In detail, HRV was measured by means of an ear sensor that provides real-time measurements of HRV variables. The HRV data consist of different variables such as High frequency (HF), Low frequency (LF), the proportion (HF/LF) and SDNN (Standard deviation of all NN intervals) as an estimate of overall HRV. In the current study a time domain measurements of HRV were used, namely the standard deviation of normal to normal intervals (SDNN 5min) In addition frequency domain measurements

such as low-frequency band (LF) and very-low-frequency band (VLF) have also been used (Trainer, n.d.). SDNN measurements reflect the overall HRV of individuals (Shaffer et al., 2014). It is measured in milliseconds and quantifies the amount of variance in the inter-beat-intervals (IBI). In this case, through a continuous recording (5 minutes) steep rises of an early ventricular polarisation (R-waves) and the time interval between successive R-waves were detected (Trainer, n.d.). LF and VLF measurements reflect the activity of sympathetic nervous system and they are attributed to emotion regulation. LF and VLF is measured in square milliseconds (Trainer, n.d.).

Mindfulness Attention Awareness Scale (MAAS). The MAAS measures the awareness and attention of the participants to what is happening in the present. It consist of 15 items. This scale has a strong psychometric quality and was extensively validated in several samples. An example item of this questionnaire is: *"I find it difficult to stay focused on what's happening in the present.".* The answer is given through a six-point-Likert-scale, which ranges from 1 = Always almost to 6 = Almost never. The scoring of the scale consist of computing a mean of the 15 items. The scores can range from 1-6. This scale approximately needs 10 minutes to complete (Brown and Ryan, 2003). The cronbach's alpha in this study was relatively high with .80.

Brief Resilience Scale. The BRS was designed to assess the ability of individuals to recover from stress. This scale consist of six items. The psychometric characteristics of the BRS has been shown as reliable and consistent to measure the ability of resilience. An example item is: *"I tend to bounce back quickly after hard times".* The items are answered by means of a five-point-Likert scale. It ranges from 1 = strongly disagree to 5 = strongly agree (Smith et al., 2008). To score the scale the

responses were added up giving a range from 6-30. Cronbach's alpha for the six BRS items in this study was relatively high with .83.

Procedure

Before the study started all students were informed about the research and asked to give voluntary agreement for using their data in research. This took 4 minutes. Hereafter every participant were anonymized by a code consisting of the date, initials, date of birth and gender. First and second years students of the Saxion University were participants. Third years students participated as researcher in groups of three. One of these students had the function of a 'Host' and accompanied the participants during the research process. One student accomplished the questionnaire measurements. The last student did the HRV-measurement. These different researcher roles rotated within these groups of three. The third years students were trained as test leader in a one hour session.

The participants filled in the questionnaires (MAAS, BRS and Baecke). This step took 8 minutes and it took place in an open classroom.

The HRV assessment took in total 15 minutes. During the first two minutes the goal of the HRV measurement were explained and the anonymized code were imported in the emWave Pro Plus software to create an account for each participant. During the following 12 minutes the 5-minute test and after that the 1-minute test were assessed. For this purpose, the third years students select these tests in the software environment of emWave Pro Plus. Before starting the test, the third years students attached the ear sensor to the participating students' ear and attached a clip halfway down to the clothing. The participating students were instructed to sit calmly and breath as deeply as possible. After this, the test were started by the third years student. After every test session the

measurement were checked. In the case of poor measuring quality the measurement were repeated. After every measurement the sensor was cleaned with alcohol on a piece of cotton by the researchers.

Data analysis

Previously, three students were removed in the analysis due to possible distortion of the analyzes. One student has stopped by reason of too much noise. Another student had a divergent low heart rate and the last student drank coffee right before data were collected. These circumstances can negatively influence the outcomes of the HRV measurements. Therefore, the analysis were applied with n = 106 students. There were no outliers in the data, as assessed by inspection of boxplots. Further the data for mindfulness and resilience were normally distributed, as assessed by a Shapiro-Wilks test (p>.05). Whereas the HRV measurements (SDNN, LF and VLF) were not normally distributed (p<.05). In order to examine the relationship between the HRV variables SDNN, LF and VLF and the psychometric variables mindfulness and resilience Pearson's r correlation analyzes were applied. Even if it is not recommended to use Pearson's r with not normal distributed data, it was used and reported in this study, because Spearman's correlation as well as Kendall's tau correlation showed similar outcomes.

RESULTS

The participants showed relatively high scores on every variable. In table 1 meanscores and standard deviations of every variable are presented. The global heart rate variability (SDNN) was relatively high (M=83.82, SD=36.79). SDNN values between 50 and 100 are positively correlated with healthiness (Kleiger et al., !987). The SDNN scores ranged from 23.4 to 258.9. The same applies to the HRV scores of low frequency band and the

scores of very low frequency band. The LF scores were high (M=999.51, SD=1607.56) and ranged from 37.30 to 11162.4. The VLF scores were also high (M=400.78, SD=339.40). They ranged from 16.00 to 2319.60. The evaluation of the LF and VLF scores is based on normal values given in literature (Löllgen, 1999). The scores on mindfulness (M=4.03, SD=.56) and resilience (M=21.10, SD=3.88) were high as well (Table 1).

Table 1

Meanscores SDNN, LF, VLF, mindfulness and resilience

SDNN (N = 106)	LF (N = 106)	VLF (N = 106)	Mindfulness (N =106)	Resilience (N =106)
M = 83.82	M = 994.51	M = 400.78	M = 4.03	M = 21.10
SD = 36.79	SD = 1607.56	SD = 339.40	SD = .56	SD = 3.88

Notes. M = mean; SD = Standard Deviation

The results of the Pearson's r analysis indicated no significant correlation between the HRV variable SDNN and mindfulness (r=.03, N=106; p>0.05). There was a non-significant correlation of .10 (N=106; p>0.05) between SDNN and resilience, as well. The variables LF and mindfulness were not correlated (r=.03, N=106; p>0.05). Between LF and resilience was likewise a non-significant correlation (r=.02, N=106; p>0.05). The same applies to the correlations between VLF and mindfulness (r=-.01, N=106; p>0.05) and between VLF and resilience (r=.11, N=106; p>0.05). Thus, it is indicated that there are non-significant correlations between HRV on the one hand and mindfulness and resilience on the other hand. The three physiological variables of HRV (SDNN, LF, VLF) were significantly correlated. Between the mindfulness and resilience was also a significant correlation (r=.21, N=106; p<0.05) (Table 2).

Table 2

Correlations between the variables SDNN, LF, VLF, Mindfulness and Resilience

Measure	1	2	3	4	5
1. SDNN	-				
2. LF	.66	-			
3. VLF	.50	.31	-		
4. Mindfulness	.03	.03	-.01	-	
5. Resilience	0.10	.02	.11	.21	-

Discussion

The purpose of this study was to investigate the relationship between HRV and mindfulness and resilience. In contrast to the formulated hypotheses no significant correlations were found between HRV variables and mindfulness and resilience. Increases in HRV variables such as SDNN, LF and VLF do not significantly relate to increases in mindfulness or in increases in resilience.

Research about the relationship between HRV, mindfulness and resilience is still not extensively investigated (Mankus et al. 2013). This study was built up around the concept of emotion regulation. Emotion regulation refers to processes by which individuals try to influence the way, the intensity or the duration of emotions. There is already evidence for a strong correlation between emotion regulation and the two psychological factors mindfulness and resilience (Chamber, Gullone & Allen, 2009; Tukade and Fredrickson, 2007). Whereas the role of HRV regarding to mindfulness,

resilience and emotion regulation is, up till now, not that clear. Nevertheless, some assumptions were made. HRV as well as mindfulness and resilience are seen as self-regulation processes (Thayer et al., 2012). Many studies about mindfulness meditation showed strong correlations between HRV and mindfulness. The same applies to resilience and HRV (Krygier et al., 2013; McCraty and Shaffer, 2015). Thus, each of these variables seems to stand in some connection with emotion regulation. One big advantage of HRV over mindfulness and resilience consist in the opportunity of a valid and reliable physiological measurement of vegetative regulation. The higher the SDNN, LF or VLF increases, the greater the variability, the better is the adaptability of the autonomic nervous system. The other way around, the lower the SDNN, LF and VLF, the lower the variability, and thus restricting the vegetative regulation (Shaffer et al., 2014).

Therefore, it was concluded that there should be positive correlations between HRV and mindfulness as well as resilience. The results of this study conflicts with these assumptions mentioned in literature. No significant correlation were found at all. This leaves us with somewhat unexpected findings.

The lack of significant results may be caused by the distribution of the results of HRV, MAAS and BRS. The students show on average on every variable relatively high results. The HRV variables SDNN, LF and VLF showed a broad diversity in the distribution of scores. Whereas the results of mindfulness and resilience were concentrated around the mean scores. This becomes apparent in the comparison of the standard deviations. Thus, with respect to mindfulness and resilience it is shown that there was a low variance in scores. This difference in the variation of scores between the HRV variables and mindfulness as well as resilience may have led to the absence of

significant relations between them. With clustered scores at one variable and diverse scores at another it is unlikely to find a linear correlation between them (Field, 2009).

Another weakness of this study may also be ascribable to homogeneity of the sample. This weakness may consist of the representativeness of the participants. This study has a small sample size and it only consist of young healthy dutch students. Therefore, the sample does not accurately reflect a larger entity, so that the results do not represent the results that would be obtained from the entire population. Further, this sampling error may be the reason for the clustered data of mindfulness and resilience.

Further reason of the clustered data of mindfulness and resilience may be explained by the chosen questionnaires themselves. MAAS and BRS are reliable measurements to indicate the level of mindfulness and resilience, but the weakness is that they measure only certain aspects of the whole constructs of mindfulness and resilience. The MAAS is only focused on the awareness and the attention in the present. In literature it has been shown that mindfulness consist of more than that. It is a diverse construct with multiple facets (Baer et al., 2006). The BRS only assess the ability to bounce back. Thus, it focus on resilience at the level of the individual, whereas resilience is a broad construct with multiple influential factors. Ideally, it should be operationalized as a dynamic process of adaptation to adversity, which includes the measurement of domains such as family and community (Windle et al., 2011). Therefore it may be the case that these two questionnaires do not adequately represents and reflects the whole concepts of mindfulness and resilience. Thus, this possibly results in clustered scores in this homogeneous sample.

Regarding to mindfulness in special, the studies which suggest a relationship between HRV and mindfulness were based on meditation (Krygier et al., 2013; Delgado-Pastor et al., 2013) . Mindfulness meditation includes respiratory instructions such as breath calmly. The way of respiratory can influence HRV. Described as respiratory sinus arrhythmia. It means that heart rate variability is synchronous to respiration. It is a physiologic phenomenon reflecting respiratory-circulatory interactions. In other words respiration is strongly correlated to the heart rate in general (Krygier et al., 2013; Delgado-Pastor et al., 2013). Maybe, is the impact on HRV less influenced by the extent of mindfulness as a personal ability than by respiration itself. Therefore it is possible that the assumptions about the relation between HRV and mindfulness is based more on respiratory than on mindfulness.

An additional weakness of this study may consist in the comparisons between objective and subjective measurements. In this context objective means physiological measurements such as HRV and subjective means psychological self inventory measurements. These measurement are different by nature therefore it is difficult to compare them accurately. According to Shedler et al. (1993) these comparisons between physiological and psychological measurements has often led to mistaken conclusions.

Despite the weaknesses of the current study and their lack of significant results, research about HRV, mindfulness and resilience in the context of emotion regulation is important. It is a relatively new field of research and there is a need for operationalizations and deeper insight in emotion regulation. HRV, mindfulness and resilience have separately been associated with emotion regulation (McCraty and Childre, 2010; Krygier et al., 2013; Keye and Pidgeon, 2013). It remains unanswered, in which

way these constructs are interrelated. As well HRV as mindfulness and resilience are extensively investigated but more or less independently from each other. HRV is well known in the medical area and in medical diagnostics. The same lack of research applies to the relationship between HRV and resilience. Even if Shedler et al. (1993) stated difficulties in comparing objective measurements with more subjective psychological measurements, he also suggest that both types together can play a major role in meaningful psychological research.

Recommendations. It is to mention that this study was built up around the context of emotion regulation, but emotion regulation were not directly involved in this study. Therefore, it is recommended to add emotion regulation in some way as a direct variable in future research and not only as an underlying variable. Therefore it is recommended to extent future research with the Emotion Regulation Questionnaire (ERQ). It is a rational developed questionnaire with clear items to measure emotion regulatory processes such as items about emotional life and in particular, how emotions are controlled, regulated and managed. This questionnaire showed high reliability in research (Gross and John, 2003). This would lead to a more accurate statistical model, in which one can better investigate the interrelationships between all of these variables.

Further, it should be aimed for more diversity in the results of mindfulness and resilience and it should be aimed to enhance the representativeness of the sample. This study was characterized by a homogenous sample and homogeneity of the results. Higher diversity can possibly leads to a clearer investigation of the underlying relationships between the investigated variables. In this study mindfulness and resilience were assessed through scales which only are focused on one specific factors of the related construct.

Therefore, it is recommended to exchange the MAAS and BRS scales with more broader measurements. In comparison, the resilience scale for adults (RSA) includes measurements of six subordinate factors associated with resilience (Hjemdal et al., 2011). The five facet mindfulness questionnaire (FFMQ) provides five factors that appear to represent mindfulness adequately as it is currently conceptualized (Baer et al., 2006). The use of these alternative measurements may provide more diverse data, caused by more extensive scales. To enhance the representativeness of the sample it is recommended to expand the sample, in way that do not only include data of healthy young students. This may lead to more diverse scores on each variable.

Another recommendation is to force the attempt to exclude the influence of respiration in this kind of research. Most of the assumptions about the relation between mindfulness and HRV are based on findings by means of mindful respiratory mediation techniques. Therefore, it is recommended to include these techniques in a control variable in future research to investigate the influence of respiration on HRV in comparison to the influence of mindfulness on HRV.

In conclusion, it can be said that even if the results are unexpected, the results do not reduce the importance of this research. The hypotheses were logically justified. No significant correlations were found. Nevertheless the investigation of the relation between the physiological variables of HRV and the psychological variables of mindfulness and resilience is still important. All of these variables reflects in some specific way, self regulatory processes. This study was an attempt to find new ways of understanding emotion regulation. Although, this study offers no significant relation, it may offers opportunities to find some in future research.

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Appendix:

Appendix 1.

Brief Resilience Scale (BRS)

Please respond to each item by marking <u>one box per row</u>	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BRS 1 I tend to bounce back quickly after hard times	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
BRS 2 I have a hard time making it through stressful events.	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
BRS 3 It does not take me long to recover from a stressful event.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
BRS 4 It is hard for me to snap back when something bad happens.	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
BRS 5 I usually come through difficult times with little trouble.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
BRS 6 I tend to take a long time to get over set-backs in my life.	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

Scoring: Add the responses varying from 1-5 for all six items giving a range from 6-30. Divide the total sum by the total number of questions answered.

My score: _____ item average / 6

Appendix 2.

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6