

# An online positive psychology intervention to promote resilience

Masterthesis

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## Abstract

Psyfit is a positive psychology online mental fitness training for adults with mild symptoms of depression and anxiety. The current study aims at determining whether Psyfit can promote a psychological resilient reaction as well. To do this the research of Bolier et al. (in press) was extended. A comparison was made between participants who experienced a critical life event (N=86) and participants who did not (N=57). In addition, it was assessed if the effectiveness of the intervention depended on the *type* of critical life event. The outcome measures were well-being measured with the WEMWBS and depressive symptoms measured with the CES-D. Online measurements were taken at baseline, two months after baseline at posttest, and after six months at follow-up. It was not proven that the effectiveness of the intervention depended on whether or not participants experienced a critical life event, concerning well-being at posttest ( $F(1,141)=0.52$ ,  $p=0.47$ ) and follow-up ( $F(1,141)=0.12$ ,  $p=0.74$ ) and depression at posttest ( $F(1,141)=0.49$ ,  $p=0.49$ ) and follow-up ( $F(1,141)=0.03$ ,  $p=0.87$ ). No evidence was found that the effectiveness of the intervention depended on the type of critical life event concerning well-being at posttest ( $F(4,81)=0.62$ ,  $p=0.65$ ) and follow-up ( $F(1,86)=0.85$ ,  $p=0.50$ ) and depressive symptoms at posttest ( $F(1,81)=0.89$ ,  $p=0.47$ ) and follow-up ( $F(1,119)=0.41$ ,  $p=0.66$ ). If adversity is defined in a much broader sense Psyfit has the potential to promote resilience. In addition, it looks that the intervention is applicable to a variety of critical life events.

## Samenvatting

Psyfit is een positieve psychologische online training voor volwassenen met lichte tot matige depressieve en angstklachten. Deze studie wil achterhalen of de interventie ook geschikt is voor het bevorderen van veerkracht. Daarvoor werd een extensie uitgevoerd op het onderzoek van Bolier et al. (in press). Er is een vergelijking gemaakt tussen participanten die een ingrijpende levensgebeurtenis hebben meegemaakt (N=86) en participanten die die dat niet hebben (N=57). Bovendien werd onderzocht of de effectiviteit van de interventie afhangt van het *type* ingrijpende levensgebeurtenis die mensen hebben meegemaakt. De uitkomstmaten waren welbevinden gemeten met de WEMWBS en depressieve symptomen gemeten met de CES-D. De online meetinstrumenten werden afgenomen voorafgaand aan de interventie (voormeting), twee maand daarna (nameting) en zes maand na de interventie (follow-up). Het is niet aangetoond dat de interventie effectiever is voor mensen die ingrijpende levensgebeurtenis hebben meegemaakt als het gaat om welbevinden tijdens de nameting ( $F(1,141)=0.52, p=0.47$ ) en follow-up ( $F(1,141)=0.12, p=0.74$ ). Het zelfde geldt voor depressie tijdens de nameting ( $F(1,141)=0.49, p=0.49$ ) en follow-up ( $F(1,141)=0.03, p=0.87$ ). Er is geen bewijs gevonden dat de effectiviteit van de interventie afhangt van het type ingrijpende levensgebeurtenissen die mensen meemaken betreffende welbevinden tijdens de nameting ( $F(4,81)=0.62, p=0.65$ ) en follow-up ( $F(1,86)=0.85, p=0.50$ ) en betreffende depressie tijdens de nameting ( $F(1,81)=0.89, p=0.47$ ) en follow-up ( $F(1,119)=0.41, p=0.66$ ). Als tegenspoed ruim gedefinieerd wordt, lijkt Psyfit de potentie te hebben om veerkracht te bevorderen. Bovendien kan voorzichtig geconcludeerd worden dat Psyfit toepasbaar is op verschillende typen ingrijpende levensgebeurtenissen.

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## Introduction

### Positive psychology and internet interventions

Traditionally, the focus of clinical psychology lays solely on mental illness. The medical model assumes mental health to be nothing more than the absence of illness and there is little attention for positive aspects of functioning. However, the paradigm is now shifting from a narrow medical focus on illness and disease only, to a more positive focus. The World Health Organization (WHO, 2004) assimilates this positive focus in its definition of mental health. It considers mental health to be “a state of well-being in which the 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” (p. 1). Furthermore, according to Keyes (2005) mental illness and mental health are correlated but they do not represent two sides of the same coin. The two-continua model stresses that the absence of mental illness is not sufficient neither necessary for mental health (Keyes, 2005).

So both the WHO definition and the two-continua model tell us not to focus on mental illness only. Instead, clinical psychology should take in account mental health as well, which is sometimes referred to as positive mental health to emphasize the accent on positive aspects of functioning (Lamers, 2012). The concept of positive mental health is closely related to positive psychology which is defined by Seligman (2011) as the study of positive experiences, positive character traits, and the institutions that help cultivate them. As a pioneer he states that positive psychology should teach people effective pathways to improved functioning and well-being. For instance, a positive psychology intervention exercise that is associated with long lasting effects on depression and happiness is keeping a daily focus on positive traits by listing the top five positive character strengths (Seligman, Steen, Park, & Peterson, 2005). Other effective exercises aim at the activation of positive self relevant information by focusing on positive daily events (Mongrain & Anselmo-Matthews, 2012). There is substantial evidence that proves the effectiveness of positive psychology. A meta-analysis of 39 studies shows that positive psychology interventions can be effective in the enhancement of well-being, as well as helping to reduce depressive symptoms (Bolier, Haverman, Kramer, Westerhof, Riper, Smit & Bohlmeijer, 2013).

The current study will combine positive psychology embedded with the internet by extending the research of Bolier, Haverman, Kramer, Westerhof, Riper, Walburg, Boon, & Bohlmeijer (in press). She and her colleges developed an internet-based self-help intervention called “Psyfit”, which successfully aimed at the increase of well-being and reduction of depressive symptoms. Elements in the intervention originate from positive psychology (Seligman, Steen, Park & Peterson, 2005; Sin & Lyubomirsky, 2009), mindfulness (Grossman, Niemann, Schmidt & Walach, 2004), cognitive

behavioral therapy (Riper & Kramer, 2007) and problem-solving therapy (Cuijpers, 2005). In addition, other research has proven that the combination of positive psychology with the internet can significantly enhance well-being and favor symptom reduction (Mitchell, Stanimirovic, Klein & Vella-Brodrick 2009; Parks-Sheiner, 2009; Seligman et al. 2005; Shapira, & Mongrain, 2010).

Besides that it is proven to be effective, the combination of positive psychology with the internet yields a number of other advantages. For instance, online self-help interventions have the potential to be more affordable and accessible for people, in comparison to expensive face-to-face interventions (Munoz, 2012). Self-help online interventions may contribute to individuals' mental health by offering them a way to self-manage their well-being (Bolier et al. in press). Therefore, positive psychology interventions, in self-help format, may be an effective and suitable way to reach a large number of people.

Because of the extensive public reach another advantage of internet interventions is that it can function as prevention. By improving well-being and diminishing depressive symptoms of a large number of people, positive psychology internet interventions can be highly cost effective to prevent symptoms from getting of clinical relevance (Crone, Knapp, Proudfoot, Ryden, Cavanagh, Shapiro, Ilson, Gray, Goldberg, Mann, Marks, Everitt, & Tylee, 2004; Mihalopoulos, Kiropoulos, Shih, Gunn, Blashki & Meadows, 2005).

So, research has shown that positive internet interventions can enhance well-being and reduce depressive symptoms. However, in line with the potential preventive power of internet interventions, an important question remains relatively unexplored. That is whether a positive psychology intervention like Psyfit can promote psychological resilience as well, thereby enlarging its preventive potential.

## Psychological resilience

Consistent with the rise of positive psychology is the tendency for researchers to shift their focus from risk to resilience (Mohaupt, 2008), because the aim now is to emphasize the positive rather than the maladaptive only. However psychological resilience is a widely-used concept, some controversy exists. First, the definition of psychological resilience is rather unclear. Second, the measurement of psychological resilience is far from homogeneous and third, there is some disagreement on whether psychological resilience should be viewed a personality trait or a process. The controversy around these three areas will be discussed sequentially. Then, we focus in more closely on the working mechanism of psychological resilience.

So, first, there is no common underlying theoretical construct and studies vary substantially in their definition (Davydov, Stewart, Ritchie & Chaudieu 2012). Psychological resilience is sometimes defined as the capacity to maintain, or regain, psychological well-being during adversity, like serious stress or trauma (Ryff, Friedman, Morozink & Tsenkova, 2012). Or in an even broader sense it is defined as generalized self-efficacy: “a psychological mechanism that enables successfully coping with adversity, an awareness of one’s strengths or capacities that allows one to better cope with future stressors and to use available resources” (Lightsey, 2006, p. 101). Others add that psychological resilience is more than just to maintain or recover well-being. They state that the experience of adversity can sometimes bring out benefits to the person who experiences it (Affleck & Tennen, 1996; Park, Cohen, & Murch, 1996). Davydov et al. (2012) agree on this by stating that psychological resilience can be viewed as a defense mechanism which enables people to actually thrive in the face of adversity.

Second, a review of resilience measurement scales by Windle, Bennett and Noyes (2011) shows that research on resilience does not only differ in their definition and focus but also in their measurements. They analyzed 15 measurements and found no ‘gold standard’ amongst them. However, despite the differences in formulation and focus, the *bouncing back* aspect is common throughout all definitions and measurement scales.

Third, there has also been disagreement on whether seeing psychological resilience as a personality trait or as a process. According to Jacelon (1997) most authors consider psychological resilience to be a personality trait or characteristic that moderates the negative effect of stress and promotes adaptation (Wagnild & Young, 1993). However more contemporary research stresses the importance of viewing resilience as a process (Rutter, 2007; 2008). In fact, after decades of research Rutter (2007) states that stable individual characteristics do not seem likely to provide a sufficient explanation of the processes leading to resilience. Instead he views resilience as “an *interactive* concept in which the presence of resilience has to be *inferred* from individual variations in outcome among individuals who have experienced significant major stress or adversity” (Rutter, 2012, p. 336). Altogether, from reviewing literature it is clear that the concept of resilience holds controversy.

Research on the working mechanism behind psychological resilience is scarcer, but clearer. The studies which link positive emotional experience to resilience are abundant. The positive emotional experiences that are associated with high-resilient people vary from having a positive and energetic approach to life to being curious and open to new experiences (Klohn, 1996; Masten, 2001; Werner & Smith, 1992). They also use humor as an effective way of coping (Masten, 2001; Werner & Smith, 1992) as well as creativity (Cohler, 1987), relaxation (Anthony, 1987), and optimistic thinking (Masten & Reed, 2002). So, positive emotionality seems to be an important element of psychological resilience. Although the question that remains is why positive emotions are useful. Or as Tugade &

Frederickson (2004) state: “are positive emotions by-products of resilient modes of thinking, or do they serve some function in the ability of resilient individuals to cope effectively in the face of stress?” (p. 320). To answer this question and understand the working mechanism of resilience they used the broaden-and-build theory (Fredrickson, 1998). According to the broaden-and-build theory, positive and negative emotions have distinct functions. The theory states that negative emotions narrow the thought-action repertoire of an individual and in that way enabling the person to behave in a specific way. For example, running away from present danger or attacking when feeling angry. In contrast, various positive emotions (e.g., joy, contentment, interest) broaden the thought–action repertoire of an individual. So, the range gets larger of cognitions and behaviors that come to mind. A person simply perceives more options to deal with the current situation. These broadened mindsets help build psychological resources. In addition, their research supports the idea that positive emotions play a critical role in increasing psychological well-being. Altogether the psychological recourses in combination with the increased well-being are essential for coping effectively with large-scale adversity (Tugade, Frederickson, Barrett, 2004).

The controversy around the definition and measurement leaves an opportunity to approach resilience differently. From Tugade et al. (2004) we know that by enlarging positive emotion and psychological well-being, a resilient reaction gets more likely. The current study will view increased well-being as an indication of resilience. That way we avoid the indistinctiveness of the measurement of resilience.

## Well-being and depression

Originally well-being gets divided in three types. The first is emotional well-being which is defined as a presence of a positive affect, the absence of a negative affect and a positive affective appraisal of life as a whole (Diener, 1984). Second, there is the concept of psychological well-being which focuses more on the optimal functioning of an individual (Ryff, 1989). According to this view striving for personal happiness is not the goal in life, but to obtain meaning and to self-actualize. The third is an expansion which adds a social component. Social well-being refers to the extent to which an individual feels secure and trust others, can function in society, and makes sense out of the world. Often this third concept is called a complete state model (Keyes, 2007). The WHO definition of mental health is clearly rooted in this third concept.

Well-being is not viewed as the only indication of resilience in this study. So is depression. To repeat the two continua model (Keyes, 2005) mental health and mental illness are correlated but do not exclude each other. In addition, although positive psychology interventions are often primarily targeted at increasing well-being, various studies report significant symptom reduction (Bolier, et al.



in press; Mitchell, Vella-Brodrick & Klein, 2010). This suggests that well-being interventions may also have an illness treatment and prevention function. To be in line with the two-continua model and the idea that a positive psychology intervention is double edged sword depressive symptoms will also be taken into account.

## The current study

So, This study is the first in considering enhanced well-being in combination with a reduction of depressive symptoms as indicators of resilience. To assess well-being the Warwick Edinburgh Mental Well-Being Scale (WEMWBS) is used as an addition to Bolier et al. (in press) who used the Mental Health Continuum-Short Form (MHC-SF) and the WHO-Five Well-being Index (WHO-5).

The first research question aims at replicating the findings of Bolier et al. (in press) by determining if Psyfit significantly increases well-being and decreases depressive symptoms at all. Based on the results of Bolier et al. (in press) the hypothesis is that the intervention group demonstrates a significant increase in wellbeing and a reduction of depression compared to the control group.

Secondly, to focus in on resilience a comparison will be made between subgroups of people within the experimental group. These participants were asked to indicate whether or not they experienced a critical life event prior and or during the intervention. The question addressed whether the intervention differs in effectiveness for those who did and those who did not experience a critical life event. Put differently, is the intervention helping people to bounce back from adversity as well? The hypothesis is that at the start of the intervention people who experienced a critical life event show lower levels of well-being and more symptoms of depression in comparison to those who did not. Then after they underwent the intervention it is expected that people who experienced a critical life event recover their well-being and decreasing their depressive symptoms up to a level similar to those who did not experience a critical life event. This would be consisted with the bouncing back aspect of resilience which is so common throughout the literature.

Third, and in addition to the second question it was investigated if the type of critical life event that people experienced influenced the effectiveness of the intervention. The types of critical life events varied from 'close related death', 'illness or injury', 'work related problems', 'relational problems' to a 'combination' of those. We hold the hypothesis that the intervention is not equally effective for all types of critical life events that people have experienced. This is because the types of critical life events differ in their seriousness. For example, it is not hard to imagine that the death of a close family member has higher impact than problems experienced at work. Consistently, the social readjustment scale (SRRS) presents a clear hierarchy of critical life events ranging from low to high seriousness (Holmes & Rahe, 1967). Psyfit as a positive psychology intervention with a preventive

character might be too light for adversity of high impact. Those instead might need a more mental illness based approach.

## **Method**

The first step of this study is to replicate the finding of Bolier et al. (in press), whether Psyfit can enhance well-being and decrease depressive symptoms. As an extension to her study, well-being was measured in a different way, which will be described more thoroughly in the instrument section. The second and main step included resilience by determining if Psyfit would be recommendable to people who experience a critical life event. The final objective included a comparison between different types of critical life events. It was assessed if the intervention differed in effectiveness from one type of critical life event to another. Since this study is an extension, for more extensive procedural information we refer to Bolier et al. (2012).

### **Participants**

In total 284 people were included in the study, from which 143 were assigned to the experimental group and 141 to the control group. The mean age of participants was 43 years and there were more females (79.6%) than males (20.4%). A large percentage of the participants were highly educated (73.2%) and most had paid employment (75.4%). Most participants lived with their partner either with or without children (62%). Of all participants 54% percent experienced a major negative life event. Concerning the baseline characteristics no difference was found between the experimental condition and the control condition during the pretest. For an overview see Table 1.

### **Attrition**

Response was defined as filling in the whole questionnaire at posttest or follow-up. The response rate was 75.4% (N=214) at posttest and 69.7% (N=198) at follow-up. There were significantly more drop-outs in the experimental group compared to controls at posttest (33.6% vs. 15.6%,  $\chi^2=12.34$ ,  $p<0.001$ ) and follow up (37.8% vs. 22.7%,  $\chi^2=7.63$ ,  $p=0.01$ ). Loss to follow-up was thus not completely at random.

Table 1.

<i>Background characteristics at baseline</i>					
	Psyfit (n=143)	Control group (n=141)	All (N=284)	Statistics	P value
Age				$t_{282} = 0.49$	0.63
Mean	43.5	42.8	43.2		
Sd	11.7	11.9	11.8		
Age in categories n, (%)				$\chi^2 = 1.61$	0.45
21-34 year	36 (25.2)	37 (26.2)	73 (25.7)		
35-64 year	100 (69.9)	101 (71.6)	201 (70.8)		
65-100 year	7 (4.9)	3 (2.1)	10 (3.5)		
Female gender (%)	114 (79.7)	112 (79.4)	226 (79.6)	$\chi^2 = 0.84,$	0.95
Education, n (%)				$\chi^2 = 0.04,$	0.84
Low	39 (27.3)	37 (26.2)	76 (26.8)		
High (academic/ professional)	104 (72.7)	104 (73.8)	208 (73.2)		
Daily activities, n (%)				$\chi^2 = 4.24,$	0.12
Paid employment	106 (74.1)	108 (76.6)	214 (75.4)		
Unemployed/unable to work	20 (14.0)	10 (7.1)	30 (10.6)		
Other (student, houseman/-wife, retired)	17 (11.9)	23 (16.3)	40 (14.1)		
Living situation (%)				$\chi^2 = 1.05$	0.59
With partner, with or without children	92 (64.3)	84 (59.6)	176 (62.0)		
Without partner, with or without children	45 (31.5)	48 (34.0)	93 (32.7)		
Other (student's house or parents)	6 (4.2)	9 (6.4)	15 (5.3)		
Major negative life event Yes (%)	80 (55.9)	73 (51.8)	153 (53.9)	$\chi^2 = 0.50,$	0.48

## Study design

The study is designed as a randomized trial with two parallel groups. The experimental group receives a two month access to an internet intervention called Psyfit. In contrast, before the control group gained access to Psyfit they were put on a waiting list for six months. Participants in both conditions had unrestricted access to professional help, if needed.

Internet websites, magazines and newspapers related to mental health and well-being were used to recruit participant by means of advertisers and banners. The advertisements showed the website address for the registration of Psyfit ([www.psyfit.nl](http://www.psyfit.nl)), which held complete information about the study and a demonstration video of the intervention. People could register on this site if they were interested in participating. After registration they received an email with additional information about the study and a link to the online informed consent form and online questionnaire. The email and Internet Protocol (IP) addresses were checked for multiple registrations. When people returned the informed consent form, completed the baseline questionnaire and met the inclusion criteria they

were randomly assigned to the experimental group (Psyfit) or to the control group (waiting list). Randomization was stratified by gender, education, and severity of symptoms based on CES-D scores (scores between 10-15 and 16-24) (see Bolier et. al, 2012). The study protocol, interventions, participant information, and informed consent procedure have been approved by the Dutch Medical Ethics Committee for Mental Health Care (METIGG), under registration number 9218 (Bolier et al. 2012).

### Inclusion and exclusion criteria

The participant group was defined as everyone willing to improve their “mental fitness.” Participants were included if they: (1) were 21 years or older; (2) presented with very mild to moderate depressive symptoms with a score between 10-24 on the Center for Epidemiological Studies Depression Scale (CES-D); (3) have moderate or low levels of well-being as measured with the Mental Health Continuum-Short Form (MHC-SF); (4) have access to a computer and the Internet; and (5) have sufficient knowledge of the Dutch language. To make sure that only people with mild to moderate depressive symptoms were included in the experiment Bolier et al. (2012) used the CES-D (Haringsma, Engels, Beekman & Spinhoven, 2004) and MHC-SF (Keyes , Shmotkin & Ryff, 2002; Westerhof & Keyes, 2008). The inclusion and exclusion scores for both tests were based on cut-off points. People with serious depressive symptoms (CES-D score  $\geq 25$ ) or active suicidal thoughts or plans, determined from the Web Screening Questionnaire (Donker, van Straten, Marks & Cuijpers, 2010) were excluded from her study and neither taken in to account in this study. Those who failed to meet these selection criteria were notified by email and were advised to contact their general practitioner if their depressive symptoms exceed the threshold limit. In cases of suicidal ideation, people were urgently referred to the national online suicide-prevention platform for help.

### Intervention group: Psyfit

Psyfit is an extensive online well-being program (see figure 1 for a screenshot). Participants within the intervention group gained access to this fully completely automated self help intervention without active support from a therapist and they were able to tailor their own intervention program to their personal needs. They could also monitor their progress by filling in several self-test during the course of the intervention. In addition, there was an opportunity to connect to other participants of the intervention via an online community so experiences could be exchanged and discussed.

The content of Psyfit is based on an extensive literature review (Walburg, 2008). The intervention has been shaped out of elements from positive psychology (Seligman, Steen, Park & Peterson, 2005; Sin & Lyubomirsky, 2009), mindfulness (Grossman, Niemann, Schmidt & Walach, 2004), cognitive behavioral therapy (Riper & Kramer, 2007) and problem-solving therapy (Cuijpers, 2005). For a description of the exact content of Psyfit see Bolier et al. (2012).

## Control group

Participants who were randomly assigned to the control group were placed on a waiting list for six months. After a 6 month follow-up assessment they were given a personal user name and password in order to gain access to Psyfit.

## Instruments

Well-being, depressive symptoms and critical life events were measured three times: before the intervention took place at baseline (pretest), two months after baseline (posttest) and again six months after baseline (follow-up).

### *Well-being*

As a secondary analysis to the data collected by Bolier and colleagues (2012) the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) was used to assess well-being. Stewart-Brown (2008) describes the WEMWBS as a 14 item scale of mental well-being covering subjective well-being and psychological functioning. All items are positively formulated and address aspects of positive mental health, such as feelings of optimism, satisfying interpersonal relationships and positive functioning (Tennant, Hiller, Fishwick, Platt, Joseph, Weich, Parkinson, Secker & Stewart-Brown, 2007). Because the WEMWBS covers a broad spectrum of positive mental health and resembles to the content of Psyfit, this questionnaire was chosen. The WEMWBS has shown to have a good internal consistency (0.91), correlates well with other mental health and well-being scales. In this study the reliability of the WEMWBS was good ( $\alpha > 0.82$ ). In addition, the social desirability bias was lower or similar to that of other comparable scales (Tennant et al. 2007).

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**Welkom Linda**  
zaterdag 9 juli 2011

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De cursus Psyfit bestaat uit 6 modules. Klik op de schijfpunt van de module waarmee je wilt starten. Naarmate je verder in de module bent, kleurt deze schijfpunt groen. Na afronding van de module is de schijfpunt volledig groen gekleurd.

Als je via de schijf een module start, begint de module altijd aan het begin. Als je al een deel van de les gedaan hebt, kan je in de taakbalk op 'Verder met de cursus' klikken om verder te gaan waar je gebleven was.

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<a href="#">Positieve gevoelens: Week 3...</a>	9-7-2011
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### TIP

*Doorbreek routine:  
kijk met een nieuwe,  
frisse blik*

[Toevoegen aan 'Mijn Psyfit'](#) | [Meer tips](#)

### POLL

**Vind jij dat je genoeg tijd en aandacht hebt voor de mensen om wie je geeft?**

Ja		44.0%
Nee		56.0%

### FORUM

De laatste onderwerpen uit het forum.

Onderwerp		
<a href="#">Bijna Klaar, Wat Nu ??</a>	5	29
<a href="#">Wie durft hier eens te reageren.</a>	3	33
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### REVIEW

Ervaringen van anderen.

Ik vond het een module waar ik echt iets aan had. Het werd n...

22-3-2011

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 Psyfit version 1.12 build 4162 (25-5-2011 11:28:48)

**mentalshare**

Figure 1. Screenshot of the Psyfit portal.

### *Depressive symptoms*

Depressive symptoms were measured by the Dutch version of the Center for Epidemiological Studies Depression Scale, the CES-D (Radloff, 1977). The CES-D is a 20-item self-rating scale with item scores ranging from 0 to 3 (higher scores indicating more depression), and a total score from 0 to 60. The CES-D has acceptable reliability and validity with a cut-off score of 16 for mild depressive symptoms (Haringsma, Engels, Beekman & Spinhoven, 2004) and a cut-off score of 25 for severe depressive symptoms (Beekman, Deeg, Van Limbeek, Braam, De Vries & Van Tilburg, 1997). When applied via the Internet, the CES-D appears to be a reliable and valid instrument (Donker, van Straten, Marks & Cuijpers, 2010). In this study the reliability was low ( $\alpha > 0.43$ ), indicating that the results should be interpreted with care.

### *Critical life events*

Participants were asked about negative critical life events. On the form they could indicate that they experienced such an event. The next question offered the possibility to specify the critical event or events lyrically by filling in the form.

### Statistical Analyses

Bolier et al. (in press) tested the experimental group and the control group on differences at baseline. They carried out an independent-samples T-test with the means of the following test variables: age, gender, education, daily activities, living situation, critical life events. The grouping variable was the condition to which the participants were assigned (experimental group or control group).

In preparation of answering the main questions of this study, the first step involved determining whether Psyfit could increase well-being and decrease depressive symptoms as Bolier et al. (in press) had proven. One way analyses of variance (ANOVAs) were executed to check for any differences at baseline. Concerning well-being the depended variable was the mean score on the WEMWBS at baseline. Concerning depression the depended variable was the mean score on the CES-D. The between subjects factor consisted of the condition (experimental group and control group). Then, a two factor repeated measures analysis of variance (ANOVA) was executed with the within-subject factor being the WEMWBS score at time of measurement (pretest, posttest and follow-up). The condition (experimental group and control group) was the between-subjects factor.

With the focus on psychological resilience, the next analyses included only participants from the experimental group. To test for differences at baseline a one way ANOVA was performed twice. One

with the mean score of the WEMWBS at baseline, the other with the mean score of the CES-D score. In both analyses the factor was critical life event (did or did not experience a critical life event).

To test whether Psyfit could promote psychological resilience a comparison was made in effectiveness of the intervention between participants who did and did not experience a critical life event. Repeated measures ANOVAs were carried out with well-being and with depressive symptoms as outcome measures. In case of well-being the within-subject factor consisted of the WEMWBS score at time of measurement with three levels (pretest, posttest follow-up). In case of depressive symptoms the within-subject factor was the test score on the CES-D at time of measurement (pretest, posttest follow-up). The between subjects factor always consisted of two levels: participants who did experience a critical life event and participants who did not experience a critical life event.

For the final research question, the goal was to investigate whether Psyfit differed in effectiveness according to the type of critical life events people had experienced. So, an open coding with a bottom-up approach with the qualitative data was done. The qualitative data consisted of participants' answers to the question: "which major negative life event(s) did you experience the last 12 months?" Based on the type of critical life event participants indicated on the form they were assigned to either one of the following groups: 1) close related death, 2) injury or illness, 3) work related problems 4) relational problems and 5) a combination of one or more categories. An example of the first category was: "my younger brother died of lung cancer". An example of a combination of critical life events was: "the imminent manic psychosis of my son, the unexpected death of a good friend and my husband broke his hip". Analyses were carried out with only those participants who experienced a critical event and underwent the intervention. A one way ANOVA was executed twice to assess the difference between groups at baseline. One with the mean score of the WEMWBS, the other with the mean score of the CES-D score. The factor in both analyses was 'type of critical life event' (group 1-5). Subsequently, repeated measures ANOVAs were carried out with outcome measures being well-being and depressive symptoms. The within-subject factor consisted respectively of the WEMWBS score and the CES-D score with three levels (pretest, posttest follow-up). The between subjects factor was type of critical life event (group 1-5).

Lastly and in addition to the final question, five repeated measures ANOVAs were carried out separately for each category to assess the improvement of well-being and decrease of depressive symptoms due to the intervention. The within-subjects factor for these analyses were respectively the scores on the WEMWBS and the scores on the CES-D at time of measurement (pretest, posttest follow-up). Every time the between subject factor consisted of another category of critical life event (group 1 - 5 separately).



## Results

Results on well-being will be presented first, since that is the primary outcome measure of this study. Next will be the results on depressive symptoms. In both paragraphs results are reported in the same order. Differences between the experimental group and control group are followed by differences between participants who did and did not experience a critical life event, concerning only participants who underwent the intervention. Lastly differences are described between the types of critical life events, concerning only participants who were from the experimental group and underwent the intervention. The reported effect sizes of each analysis were calculated within groups. That way the effectiveness of the intervention could be tracked from pretest to posttest and from pretest to follow-up.

### Well-being

#### *Experimental group versus control group*

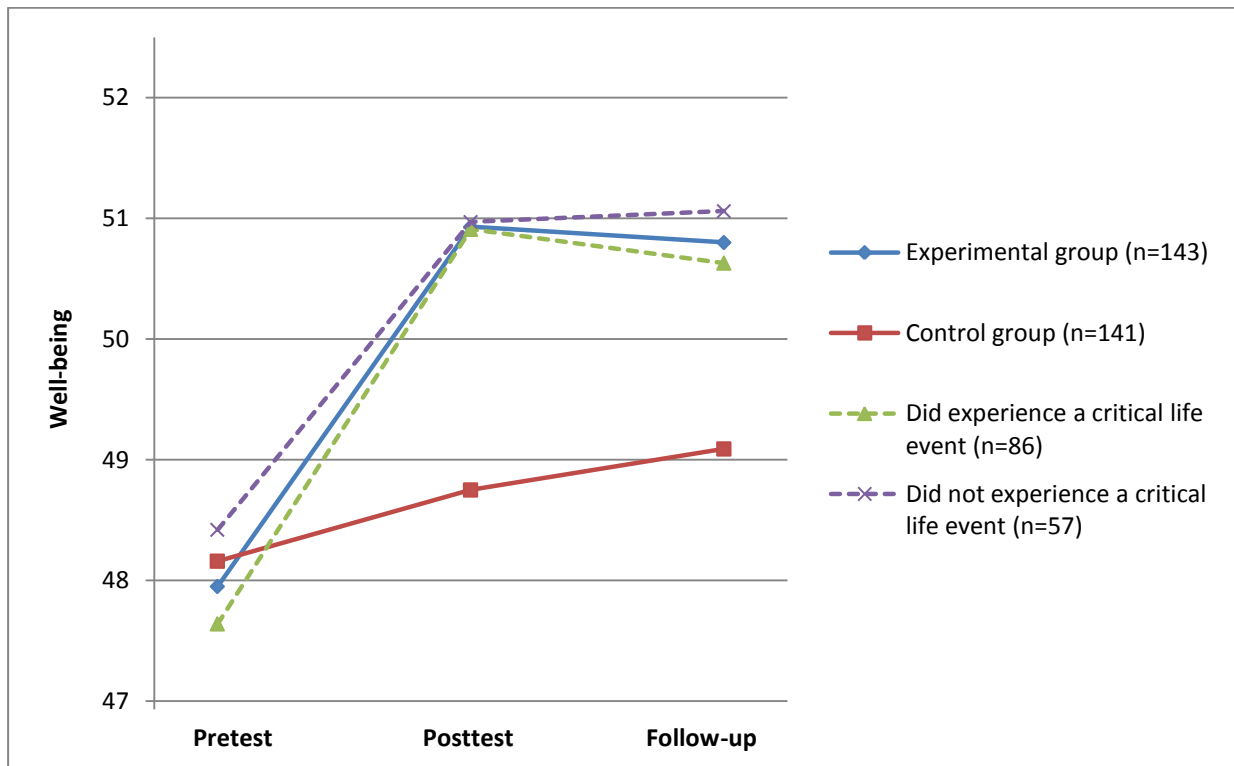
The first step of the study was to determine if the intervention was more effective than the waiting list when it comes to increasing well-being. At baseline no significant differences were found between the experimental group and the control group ( $F(284)=0.11, p=0.74$ ). From the pretest to the posttest at two months, a significant time effect was found on well-being ( $F(2, 284) = 25.38, p<0.001$ ). Again a significant time effect was found from pretest to the follow-up at six months ( $F(2, 284) = 26.02, p<0.001$ ). Within the experimental group the effect size was just below the medium boundary at the posttest ( $d=0.48$ ) and small at the follow-up ( $d=0.44$ ). However, the effect sizes of the control condition are negligible both at the posttest ( $d=0.01$ ) and follow-up ( $d=0.16$ ). Consistent with these differences in effect sizes a significant interaction effect was found from pretest to posttest ( $F(1,284)= 11.48, p<0.001$ ), indicating that the increase in well-being depends on whether participants are from the control group or experimental group. In other words participants from the experimental condition increased significantly in well-being while participants from the control condition did not, as can be viewed in Figure 2. From pretest to follow-up this interaction effect was again demonstrated ( $F(1,284)= 6.74, p=0.01$ ). So, the intervention has proven to be effective still after six months, also visible in Figure 2. Table 2. shows the means and standard deviations of the outcome measure well-being for both the experimental group and the control group during the pretest, posttest and follow-up. Furthermore it presents the effect sizes.

Table 2.

*Effects of Psyfit on well-being at the pretest, posttest and follow-up for the experimental group in comparison to the control group*

		Experimental group (n=143)			Control group (n=141)			Repeated measures ANOVA				
		Mean	Sd	$d^a$	Mean	Sd	$d^a$	Time		Time*group		
								F	P value	F	P value	
WEMWBS	Pretest	47.95	5.51		48.16	5.26						
	Posttest	50.93	6.80	0.48	48.75	7.01	0.01	25.38	<0.001	11.48	<0.001	
	Follow-up	50.80	7.28	0.44	49.09	6.41	0.16	26.02	<0.001	6.74	0.01	

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up



*Figure 2.* The improvement in well-being of the control group and the experimental group at pretest, post test and follow-up. It also shows the improvement of the subgroups within the experimental group (did experience a critical life event and did not experience a critical life event).

*Experimental group: critical life events*

The main goal of this study was to investigate if the effectiveness of the intervention depended on whether or not people experienced a critical life event. Results showed no differences at the pretest between participants who did experience a critical life event and participants who did not ( $F(1,142)=0.69, p=0.41$ ). A significant effect of time was found from both pretest to posttest ( $F(1,141)= 34.47, p<0.001$ ) and pretest to follow-up ( $F(1,141)=28.86, p<0.001$ ). The effect sizes within the group of people who did experience a critical life event were small at the posttest ( $d=0.44$ ) and follow-up ( $d=0.47$ ). Within the group of people who did not experience a critical life event the improvement in well-being was of comparable strength at the posttest ( $d=0.46$ ) and follow-up ( $d=0.24$ ). No interaction effect was found at either the posttest ( $F(1,141)=0.52, p=0.47$ ) or follow-up ( $F(1,141)=0.12, p=0.74$ ). The effect sizes in combination with the results on interaction suggest that the improvement of well-being does not depend on whether or not participants experienced a critical life event. Figure 2. displays a graphical image of these results.

Table 3.

*The difference in well-being between subgroups of people who did and did not experience a critical life event*

		Did experience a critical life event (n=86)			Did not experience a critical life event (n=57)			Repeated measures ANOVA			
		Mean	Sd	$d^a$	Mean	Sd	$d^a$	Time		Time*group	
								F	P value	F	P value
WEMWBS	Pretest	47.64	5.73		48.42	5.17					
	Posttest	50.91	8.73	0.44	50.97	6.22	0.46	34.47	<0.001	0.52	0.47
	Follow-up	50.63	6.79	0.47	51.06	8.01	0.24	28.86	<0.001	0.12	0.74

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up

*Type of critical life event*

The final research question aimed at investigating if the type of critical life event influenced the effectiveness of the intervention. So, only participants who experienced a critical life event and underwent the intervention were included in the following analysis. This group of participants (n=86) was divided into five subgroups based on the type of critical event they experienced. Table 4. shows the distribution of participant to each category. The category ‘combination of critical life events’ made up the largest (31%) followed by ‘injury or illness’ (26%), ‘relational problems’ (21%), ‘close related death’ (14%) and ‘work related problems’ (8%).

Table 4.

*Number of participants for each type of critical life event*

Type of critical life event	Experimental group (n=86)
Close related death, n (%)	12 (14.0)
Injury or illness, n (%)	22 (25.5)
Work related problems, n (%)	7 (8.1)
Relational problems, n (%)	18 (20.9)
Combination, n (%)	27(31.4)

At the pretest no differences in well-being were found between types of critical events concerning well-being ( $F(4,85)=0.21$  ,  $p=0.93$ ). When the different groups were taken together, results showed a significant time effect from the pretest to the posttest two months later ( $F(1,81)= 16.91$  ,  $p<0.001$ ,  $d=0.44$ ) and from pretest to follow-up, six months after the intervention ( $F(1,86)=23.71$ ,  $p<0.001$ ,  $d=0.47$ ). No interaction effect was found from pretest to posttest ( $F(4,81)= 0.62$ ,  $p= 0.65$ ) and from posttest to follow-up ( $F(1,86)= 0.85$ ,  $p= 0.50$ ). This indicates that the type of critical life events that people experienced does not have any influence on the improvement of well-being. The results are summarized in Table. 5 and displayed in Figure 3.

Table 5.

*Difference in effectiveness of Psyfit between different types of critical events (well-being)*

		All (n=86)			Close related death (n=12)			Injury or illness (n=22)			Work related problems (n=7)			Relational problems (n=18)			Combination (n=27)			Repeated measures ANOVA				
		Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Time		Time* categories		
																				F	P value	F	P value	
WEMWBS	Pretest	47.64	5.73		46.67	4.92		48.45	6.41		46.14	3.18		47.39	6.47		47.70	5.75						
	Posttest	50.91	7.20	0.44	51.73	6.30	0.90	51.87	7.90	0.48	47.95	5.27	0.42	49.87	9.80	0.30	51.21	5.49	0.62	16.91	<0.001	0.62	0.65	
	Follow-up	50.63	6.79	0.47	51.64	6.64	0.85	51.42	6.31	0.47	48.68	5.31	0.58	50.98	7.02	0.35	49.79	7.71	0.31	23.71	<0.001	0.85	0.50	

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up

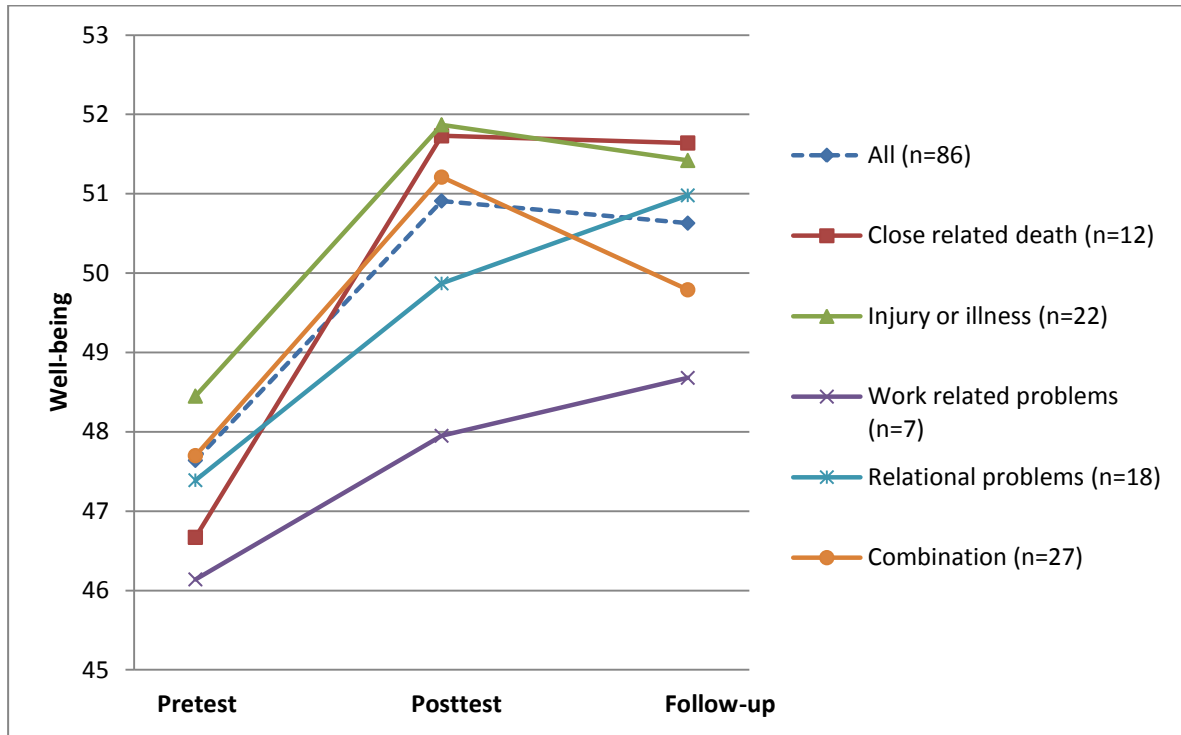


Figure 3. The improvement in well-being for each type of critical life event at pretest, posttest and follow-up

## Depressive symptoms

### Experimental group versus control group

First, the goal was to investigate if the intervention was more effective in comparison to the waiting list when it comes to decreasing depressive symptoms. At baseline, no differences between experimental group and the control group were found ( $F(284)=0.24, p=0.62$ ). However, the mean CES-D depression scores were slightly above the cut-off score of 16 for both groups, indicating a clinically relevant level of depressive symptoms (Radloff, 1977). From pretest to posttest a significant effect of time was found ( $F(1,282)=30.37, p<0.001$ ). Also from posttest to follow-up this effect of time was found ( $F(1,282)=40.45, p<0.001$ ). Effect sizes for the experimental condition were medium at both the posttest ( $d=-0.58$ ) and follow-up ( $d=-0.77$ ), while the effect sizes for the control condition were small at posttest ( $d=-0.21$ ) and at the follow-up ( $d=-0.28$ ). In addition, an interaction effect was found both from pretest to posttest ( $F(1,282)=5.71, p=0.02$ ) as from pretest to follow-up ( $F(1,282)=5.90, p=0.02$ ). So, participants from the experimental condition decreased significantly in depression while participants from the control condition did not, as can be viewed in Figure 4. Furthermore, the intervention proves to be effective after six months. Table 7. Summarizes the results. Figure 4. shows that the control group does not decrease in depressive symptoms, whereas the experimental condition does.

Table 7.

*Effects of Psyfit on depressive symptoms at the pretest, posttest and follow-up for the experimental group and the control group*

		Experimental group (n=143)			Control group (n=141)			Repeated measures ANOVA			
		Mean	Sd	$d^a$	Mean	Sd	$d^a$	Time		Time*group	
								F	P value	F	P value
CES-D	Pretest	16.91	4.16		16.67	4.12					
	Posttest	13.67	6.69	-0.58	15.39	7.64	-0.21	30.37	<0.00	5.71	0.02
	Follow-up	13.06	5.77	-0.77	14.95	7.48	-0.28	40.45	<0.00	5.90	0.02

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up

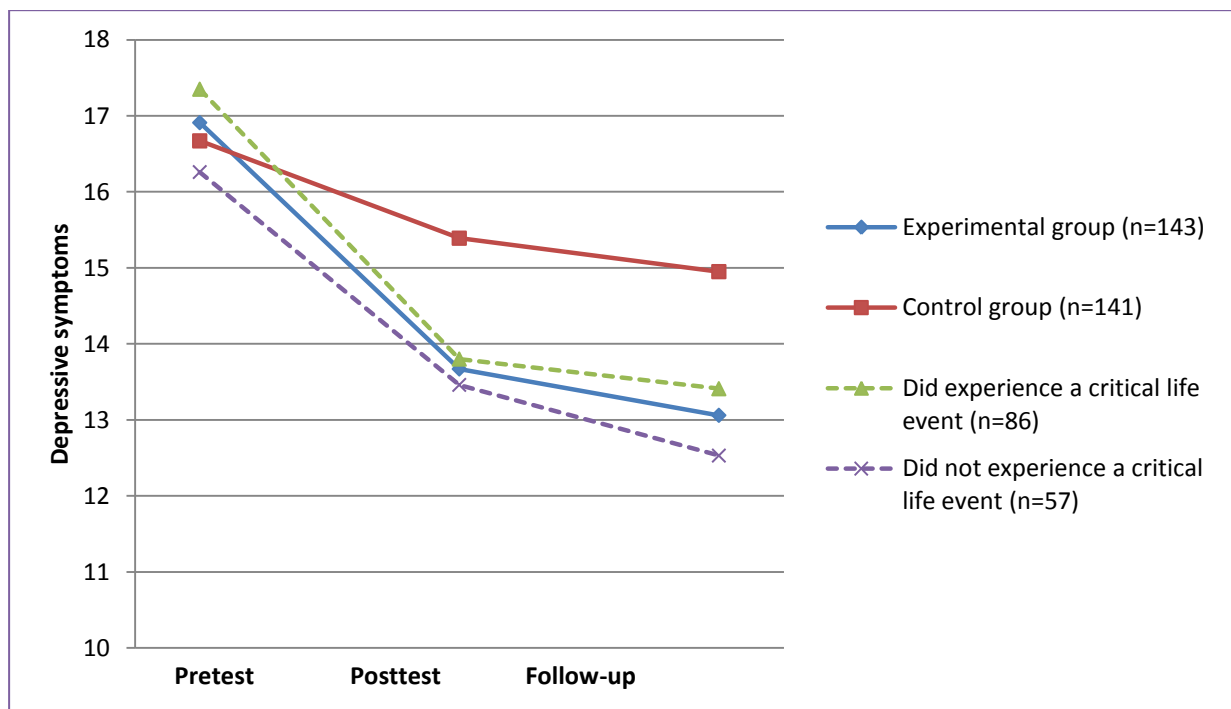


Figure 4 . The decrease in depressive symptoms of the experimental group and the control group at pretest, post test and follow-up. It also shows the decrease in depressive symptoms of the subgroups within the experimental group (did experience a critical life event and did not experience a critical life event)

#### *Experimental group: critical life events*

The main goal of this study was to determine if there was any difference in the effectiveness of the intervention between people who did and did not experience a critical life event. No differences were reported at the pretest ( $F(1,142)= 2.35, p=0.13$ ), so both groups were equal when it comes to depression. Results show a time effect both at the posttest ( $F(1,141)= 35.29, p<0.001$ ) and at the follow-up ( $F(1,141)=36.03, p<0.001$ ). The effect sizes fell within the medium range for the

participants who experienced a critical life event at the posttest ( $d=-0.58$ ) and at the follow-up ( $d=-0.66$ ). Concerning the people who did not experience a critical life event the effect sizes were also medium at the posttest ( $d=-0.56$ ) and at the follow-up ( $d=-0.59$ ). Furthermore, no interaction effect was observed either at the posttest ( $F(1,141)=0.49$ ,  $p=0.49$ ) or follow up ( $F(1,141)= 0.03$ ,  $p=0.87$ ). This means that the effectiveness of the intervention does not depend on whether participants experienced a critical life event or did not. Results are summarized in Table 8. Figure 4 shows the decrease in depressive symptoms for participants who did and did not experience a critical life event.

Table 8.

*The difference in depressive between subgroups of people who did and did not experience a critical life event*

		Did experience a critical life event (n=86)			Did not experienced a critical life event (n=57)			Repeated measures ANOVA			
		Mean	Sd	$d^a$	Mean	Sd	$d^a$	Time		Time*group	
								F	P value	F	P value
CSD	Pretest	17.35	4.12		16.26	4.18					
	Posttest	13.80	7.59	-0.58	13.46	5.94	-0.56	35.29	<0.001	0.49	0.49
	Follow-up	13.41	7.32	-0.66	12.53	7.92	-0.59	36.06	<0.001	0.03	0.87

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up

#### *Type of critical life event*

The last research question investigated if the type of critical life event influenced the effectiveness of the intervention, concerning depressive symptoms. Table 4. again shows the distribution of participant to each type of critical life event. This time with depressive symptoms as outcome measure. No differences were found between the five types of critical life events at baseline ( $F(4,81)= 2.11$ ,  $p=0.09$ ). When the groups were taken together a significant time effect was found, both at the posttest ( $F(1,81)=18.88$ ,  $p<0.001$ ) and follow-up ( $F(1,81)=28.44$ ,  $p<0.001$ ). The effect sizes fell within the medium range at the posttest ( $d=-0.58$ ) and at the follow-up ( $d=-0.66$ ). At the posttest it was not proven that the effectiveness of the intervention depended on the type of critical life event participants experienced. The interaction effect was not significant ( $F(1,81)= 0.89$ ,  $p=0.47$ ). However, the interaction effect was marginal at the follow-up ( $F(1,81)=2.46$ ,  $p=0.05$ ). In Figure 5. can be seen that the category 'combination' rises again to the cut off score for depression. This increase is probably responsible for the marginal significant interaction effect. Table 9 summarizes the results.



Table 9.

*Difference in effectiveness of Psyfit between different types of critical events (depression)*

		All (n=86)			Close related death (n=12)			Injury or illness (n=22)			Work related problems (n=7)			Relational problems (n=18)			Combination (n=27)			Repeated measures ANOVA				
		Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Mean	Sd	D <sup>a</sup>	Time		Time* categories		
																				F	P value	F	P value	
CES-D	Pretest	17.35	4.11		18.83	4.13		16.50	4.25		14.71	4.38		18.88	4.56		17.04	3.22						
	Posttest	13.80	7.59	-0.58	12.49	7.46	-1.05	12.58	7.04	-0.67	13.71	5.21	-0.21	15.79	11.04	-0.37	14.09	5.80	-0.63	18.88	<0.00	0.89	0.47	
	Follow-up	13.41	7.32	-0.66	11.32	4.42	-1.76	11.35	6.66	-0.92	11.85	5.20	-0.59	14.09	7.88	-0.74	16.00	8.41	-0.16	28.44	<0.00	2.46	0.05	

<sup>a</sup>. Effect sizes within groups from pretest to posttest and pretest to follow-up

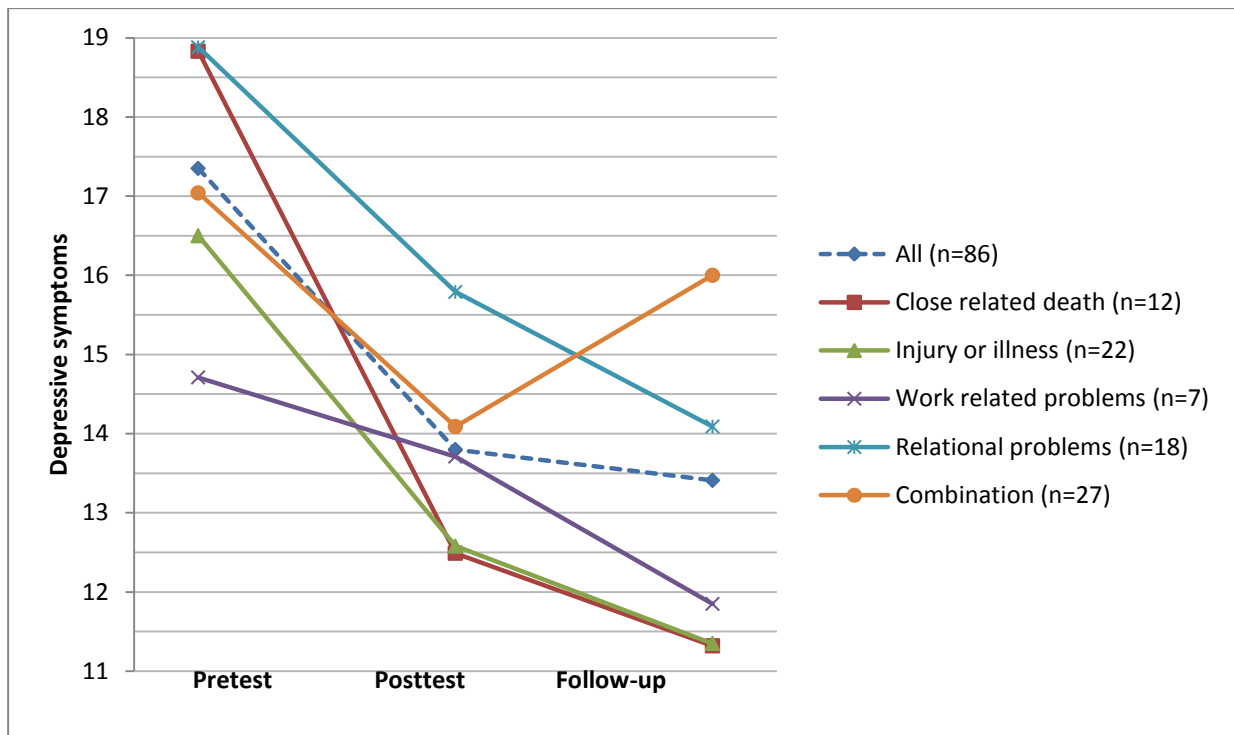


Figure 5. The decrease of depressive symptoms for each type of critical life event at pretest posttest and follow-up.

## Discussion

The first step of this study was to replicate the finding of Bolier et al. (in press), whether Psyfit can enhance well-being and decrease depressive symptoms. Results showed that participants who made use of Psyfit improved their well-being and decreased their depressive symptoms significantly more than the participants from the waiting list control group did. These effects were again showed after six months at follow-up. Regarding the posttest results, the same results on well-being were reported by Bolier et al. (in press). The effect sizes were comparable to the ones found in this study. However, Bolier et al. (in press) did not find a significant effect of well-being at the follow-up. The inconsistency may be caused by the different measurements being used. Whereas Bolier et al. (in press) used the MHC-SF and the WHO-5 to measure well-being, the current study used the WEMWBS. The various measurements might not cover exactly the same aspects of well-being. For instance, the WHO-5 is not only useful for measuring well-being but has a screening function for depression as well. Furthermore, the WHO-5 has fewer items than the WEMWBS. This might have caused the differences in results as well. The WEMWBS seem to have a broader view on measuring resilience whereas the focus of MHC-SF is more specific. The MHC-SF measures subjective, psychological and

social wellbeing. The WEMWBS measures subjective well-being and psychological functioning, a term which is much vaguer.

Nevertheless, both the current study and their study indicate that Psyfit can effectively enhance well-being and reduce depressive symptoms. Regarding prior studies, the effects of Psyfit on well-being are comparable with effects of other *offline* self-help intervention with a positive psychological approach. Concerning depressive symptoms the effects of Psyfit are larger on average (Bolier et al., in press). In comparison to the effects of other *online* positive self-help interventions, the effect sizes of the current study are about the same size (Seligman, Steen, Park, & Peterson, 2005; Shapira & Mongrain, 2010) and sometimes higher (Luthans, Avey & Patera, 2008; Mitchell, Stanimirovic, Klein & Vella-Brodrick, 2009; Schueller & Parks, 2012).

## Resilience

Psyfit can be considered as an effective positive psychology intervention to enhance well-being and decrease depressive symptoms in the short and long term. However, the main question was whether Psyfit promotes psychological resilience as well. In this study increased well-being and decreased depression despite adversity were viewed as indications of psychological resilience. So, the second and main step involved a comparison between people who did experience a critical life event and people who did not, within the experimental group. This way we could assess if Psyfit is likely to provoke a resilient reaction for those people who recently passed through a major negative life event. Results showed that people who experienced a critical life event improved their well-being and reduced their depressive symptoms in a comparable manner to those who did not. In addition, the effect sizes for the two groups were similar.

However, from these results cannot yet be concluded that Psyfit promotes a resilient reaction to adversity. Our hypothesis held that that people who experienced a critical life event started off the intervention with lower levels of well-being and higher levels of depression in comparison to those who did not experience a critical life event. Then, after the intervention we expected to see people who experienced a critical life event recovering to a state at least equal to those who did not experience a critical life event. This would have meant that the bouncing back effect actually occurred. Despite our expectations, the two groups did not differ in well-being and depression at the pretest and the bouncing back effect wasn't observed at the posttest and follow-up. In fact, Psyfit proved to be equally effective for people who experienced a critical life event as for those people who did not. Though, to conclude that Psyfit does not promote resilience might be too shallow as well. Despite the absence of the bouncing back effect, people who experienced a critical life event did improve their well-being and diminished their depressive symptoms significantly. This raises an

interesting question. That is whether a person should experience a critical life event in order to show a resilient reaction. Put differently, can recovering from low well-being and depression not be seen as full-blown resilience, regardless of the fact that an individual did or did not experience a critical life event? Literature on resilience all define this concept in relation to adversity (Affleck & Tennen, 1996; Park, Cohen, & Murch, 1996; Tugade, Frederickson, Barrett, 2004; Lightsey, 2006; Davydov et al. 2012; Rutter, 2012; Ryff, Friedman, Morozink & Tsenkova, 2012). However, results of the current study are put in to different perspective when viewing adversity as experiencing low well-being in combination with depressive symptoms, regardless of whether they experienced a critical life event. Both people who experienced a critical life event and people who did not started of at the same levels of well-being and depression and recovered equally from this. This leaves the cautious conclusion that if adversity is defined in a much broader sense, Psyfit has the potential to promote resilience. This could contribute to the preventive power of Psyfit. By promoting resilience, depressive symptoms can be stopped in a relatively early age and prevent the developing of a clinical disorder.

Next, to answer the question why Psyfit works we turn to the framework of the broaden-and-build theory (Frederickson, 1998). This theory states positive and negative emotions have distinct functions. Negative emotional experiences narrow the thought-action repertoire of an individual and positive emotional experiences broaden the thought–action repertoire. The range gets larger of positive cognitions and behaviors that come to mind. These broadened mindsets help build psychological resources and play a critical role in increasing psychological well-being, which in this study is viewed as an indication of resilience. A closer look at Psyfit reveals that its elements have the function to provoke positive emotional experiences. For instance, learning to live from a deeply felt mission and personal values, and working on positive thinking and positive affect (Bolier et al, in press). In addition, some elements have their roots in mindfulness, teaching people to live consciously and enjoying moment to moment. These elements are closely related to the positive emotional experiences that lead to resilience. Such as having a positive and energetic approach to life, being curious and open to new experiences (Klohn, 1996; Masten, 2001; Werner & Smith, 1992) being creative (Cohler, 1987) and relaxed (Anthony, 1987), and thinking optimistically (Masten & Reed, 2002). So by promoting these positive emotional experiences Psyfit tries to establish psychological resources that in turn lead to higher well-being, fewer depressive symptoms and thus psychological resilience.

The third research question had the goal to determine if the type of critical life event people experienced made a difference in effectiveness of the intervention. More precisely, we investigated if the type of critical life event that people experience. The hypothesis that Psyfit was not equally effective for all types of critical life events, is not lived up to. No evidence was found that the type of

critical life event that people experienced affects the extent to which Psyfit promotes resilience. In other words, the results point in the direction of the idea that Psyfit multi-applicable across a range of different critical life events. However, conclusions should be drawn with care. By dividing the subgroup of people that experienced a critical life event into six separate groups numbers were small. More conclusive evidence could be presented only if the numbers of participants were larger within these groups.

### Strengths and weaknesses

The most important strength of this study is the innovatory combination of positive psychology and resilience with the use of an online self-help intervention. This study presents an effective easily accessible program to which people can be addressed who experienced a critical life event. Although, there are numerous studies who investigate well-being and depressive symptoms, online interventions or resilience, but the combination of online positive psychology interventions and resilience is rather unique and can be considered pioneering.

A second strength of the current study is the inclusion of depression, following the two continua model of Keyes (2005). He stresses that an increase in well-being does not necessarily mean a decrease of depressive symptoms. By taking depression into the equation, results on the effectiveness of Psyfit are more thorough. It presented an image of how the intervention works at both the mental illness side and the mental health side.

Additional to the limitations of Bolier et al. (2013) a number of weaknesses must be taken into account concerning this extension as well. First, no comparison was made at baseline between participants who experienced a critical life event before the intervention and participants who experienced a critical life event during the intervention. It might be possible that the time at which adversity occurs determines the effect of the intervention. For instance, the intervention could simply be too soon after the negative life event. Second, each group representing a different type of critical life events consisted of a low number of participants. With a larger sample of participants in each group, perhaps different results had been found. This would consequently have led to a more conclusive implication when it comes to the effectiveness of Psyfit for different types of critical life events. Third, the allocation of participants to the types of critical life events yielded a disadvantage. No distinction in impact of the critical life events could be made. For instance, critical life events placed under the category 'close related death' varied from death of a spouse to death of a friend. For the last category, 'combination of critical events' the differences in seriousness were even bigger both in the number of experienced critical life events and the seriousness of the events. These

differences could influence the effectiveness of the intervention. Fourth, the internal consistency of the CES-D was low. This could explain why the effect sizes for depression were larger than those of well-being. In addition, results regarding depression should be interpreted with care. Fifth, the drop-out rate in the experimental condition was higher than in the control condition. Although this is not an uncommon phenomenon in online trials (Prochaska & DiClemente, 1992) the drop-out could have affected the result and should be considered with some caution. Lastly, some participants of the experimental group did not fill in the forms at posttest or follow-up, which asked them about the critical life events they experienced. Those participants were assigned to the group that did not experience a critical life event. This was done to keep both subgroups as level as possible.

### **Conclusion and recommendations for future research**

This study replicates the finding of Bolier et al. (in press) that an online well-being intervention called Psyfit can effectively enhance well-being and reduce depression symptoms. On the account of resilience, conclusions are less straightforward. If adversity is defined in a much broader sense, that is experiencing low levels of well-being and high levels of depression, Psyfit has the potential to promote resilience. In addition, the intervention is equally effective for people who experienced a critical life event and people who did not, although conclusion should be made carefully due to low numbers. Putting it with caution, it looks that the intervention is applicable to a variety of critical life events.

As regards to the implications for future research a scale to measure the impact of critical life events could be included. The social readjustment rating scale (SRRS) (Holmes & R. H. Rahe, 1967) for instance, assigns a score to a variety of critical life events. That way an objective score is obtained for each participant and can subsequently be taken in to account when examining the effects of Psyfit.

In addition, it would be interesting to take in account the differences in well-being and depressive symptoms between the people who experienced a critical life event before the intervention and the people who experienced a critical life event during the intervention. Both the pretest and posttest verified whether participants experienced a critical life event the past year. The recommendation is to ask participant at the posttest if they experienced a critical life event the past three months instead of the past 12 months. This way overlap in critical life events can be avoided and will consequently make a comparison more workable.

In order to make the *bouncing back* aspect of resilience more visible, it would be interesting to assess well-being and depressive symptoms before a critical life event has taken place. Of course this yields a difficulty since the occurrence of such an event is not predictable. However, it would provide

an answer to the question if people in fact reach their initial level of well-being and depressive symptoms after a critical life event with the use of Psyfit. Or even succeed the initial level as opposed by Affleck and colleagues (1996).

Furthermore, a scale could be included to assess psychological resilience directly. In this study psychological resilience was measured indirectly. Although an increase in well-being and a decrease in depressive symptoms can be considered as a resilient response to adversity, adding a psychological resilience scale could strengthen the found effects. In addition, a psychological resilience scale could give a more sophisticated understanding of how resilience is promoted.

Lastly, it is recommendable to take positive life events in the equation, since these life events occur as well and may have a profound effect on the level of well-being and depressive symptoms before, during and after the intervention. Therefore, it may influence the effectiveness of the intervention.

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