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Personality Change and Therapeutic Gain: Randomized Controlled Trial of a Positive Psychology Intervention

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ABSTRACT

This study examined the possibility that personality would change in the course of a positive psychology intervention, and would add to therapeutic gain. 89 participants were randomly assigned into the intervention group (*N*= 45) and the waiting-list group (*N*= 44). The intervention followed 6-week-online-protocol. Participants reported on the Steen Happiness Index (SHI), The Positive Psychotherapy Index (PPTI), and the Satisfaction with Life Scale (SLS) as well as on the temperament scales Harm Avoidance and Persistence, and the character trait Self-Directedness three times: at outset, post-intervention, and four weeks later at follow-up. Hypotheses were tested using growth curve analysis and regression analysis. The intervention group gained in all three happiness measures, in the personality traits Self-Directedness and Persistence and decreased in Harm Avoidance relative to the waiting-list group. Regression analyses revealed that the change in personality traits, and particularly in Self-Directedness mediated the therapeutic gains in the SHI as well as in the PPTI, but not in SLS. Although personality is basically very stable, successful interventions can bring about beneficial changes in personality which may in turn help to maintain therapeutic gains. The role of personality change in psychotherapy should be studied across therapeutic approaches, settings, and psychiatric diagnoses.
Key words: therapeutic gain, positive psychology, personality, TCI, self-directedness, growth curve analysis.

Novelty and Significance

What is already known about the topic?

- Some studies highlights the role of personality in therapeutic response and in the retention of therapeutic gains.
- Previous correlational studies have demonstrated that the resilient personality profile of high Self-Directedness, High Persistence and low Harm Avoidance is related to physical and mental health, to happiness and to the absence of depression.

What this paper adds?

- The study suggests that personality is the driving dynamic force behind therapeutic gain -and in particular the character trait of Self-Directedness, the linchpin of personality change and therapeutic gain.
- The change in personality, promises to secure the therapeutic gains and to help maintain them over time.

In his classical paper from 1957 Rogers describes what is needed so that a positive personality change may occur in psychotherapy. Paraphrased, Rogers' requirements can be condensed into the following: the therapist should have a mature personality, the therapist must view the client with empathy and positive regard, and the client must have at least a minimal awareness of this. In short, most successful therapeutic interventions should in fact result in a positive personality change for the patient.

Since the 1960s, this perspective has not been salient in personality or in psychotherapy research. Indeed, it seems that personality was considered that which is

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not altered by life-events or by psychotherapy. There is extensive work showing the impressive stability of the main personality measures and models. This is true of the temperament and character psychobiological model of personality, as measured by the Temperament and Character Inventory (TCI). The TCI (Cloninger, Przybeck, Svrakic, & Wetzel, 1994) showed remarkable rank order and mean level stability over 16 years from young adulthood into middle age in a large Finnish community sample (Josefsson *et alii*, 2013). The TCI measures seven traits, four of temperament, namely, Novelty Seeking, Reward Dependence, Harm Avoidance, and Persistence; and three of character: Self-Directedness, Cooperation, and Self-Transcendence. The temperament traits are mainly un- or pre-conscious tendencies, while the character traits are conscious and often ego-syntonic. The TCI was designed to measure the dynamic personality configuration of healthy people, as well as to predict psychopathology (Cloninger, 2004).

        In the context of psychotherapy research, the TCI traits usually measured are character traits, which tend to be more malleable than temperament traits. Character traits refer to one's own evaluation of the self and are responsible for efficient behavioral self-regulation; Self-Directedness relates to self-esteem and self-efficacy, the character trait of Cooperation refers to empathy, tolerance and compassion. Self-Transcendence refers to trans-personal identification, including spirituality and creativity (Cloninger, 2004). Individuals high in all three character traits function at their optimal level, and manage to use their temperamental composition to their advantage, defining personally meaningful goals, acting resourcefully and effectively to attain them, while working well with others and keeping in mind the greater good. However, temperament traits, as well as character, have a strong association with happiness and well-being. In particular, being low in Harm Avoidance, and high in Persistence, as well as being high in Self Directedness is associated with elevated positive affect, lower negative affect, better satisfaction with life, better subjective health, and more perceived social support (Cloninger & Zohar, 2011; Josefsson *et alii*, 2011).

        There are some published case studies of personality change associated with psychotherapy. Lingiardi, Shedler & Gazzillo (2006), described a five-year psychodynamic psychotherapy of a woman who presented with borderline features and serious drug use. They showed that over therapy substantial and positive personality change was achieved; personality was assessed by the clinician-rated personality scale, the SWAP-200. In another illustrative case study, a middle-aged man presenting with severe cocaine dependence, who was treated with a behavior activation approach targeting Conscientiousness rather than drug dependence, underwent significant positive personality change as well as being relieved of his cocaine use and its damaging implications (Magidson, Roberts, Collado Rodríguez, & Lejuez, 2014). This study relied on behavioral assessment to measure change in conscientiousness, rather than the use of a formal personality test.

        There have been some larger scale quantitative studies on personality traits as predictors of therapeutic outcomes and of personality change accompanying psychological interventions. Anderson et alii (Anderson, Joyc, Carter, McIntosh, & Bulik, 2002) found that a year after the completion of CBT group-treatment of Bulimia, the participants had gained in Self-Directedness and had declined in Harm Avoidance. A randomized controlled trial of Internet delivered CBT for depression (Johansson, Lyssarides, Anderson, & Rousseau, 2013) found similar changes in Self-Directedness and in Harm Avoidance; the differences were most pronounced in those patients whose depression had improved most, demonstrating a dose-response. Wagner *et alii* (2015) found that patients with initial lower levels of the character trait Self-Directedness as measured

by the TCI, were likelier to drop out of Email-delivered interventions to treat bulimia. Terock, Janowitz, Spitze, Mierts, Freyberger, and Grabe (2015) found that initial higher levels of Self-Directedness predicted better outcome in the treatment of a cohort of day-clinic psychiatric patients; they also showed that successful treatment outcome was associated with attaining higher levels of Self-Directedness. Crescentini, Matiz, & Fabbro (2015) found in a controlled study of alcohol dependent patients, that an 8 session mindfulness training intervention not only improved the patients' resistance to relapse, it also significantly affected all three character traits as measured by the TCI, i.e. Self-Directedness, Cooperativeness, and Self-Transcendence.

The aims of the current study were: (1) To test the effectiveness of the 6 session positive psychology intervention (2) To test whether there would be significant change in personality traits associated with the therapeutic intervention, and (3) To test for mediation of the therapeutic gain by the change in personality traits.

METHOD

Participants

Participants were recruited mainly via Facebook, including closed Facebook groups such as the Multiple Sclerosis Group. In total, 89 individuals consented initially to participate in the study, and completed an online self-report. Participants were mainly female (74.7%, $n=$ 71) and mainly single (61.1%, $n=$ 58). The mean age was 36.03 years ($SD=$ 10.52). Nearly a fifth, 19% of the participants, suffered from a chronic illness.

There were no exclusion criteria. Thus the participants were self-selected. After the anonymous online initial self-report was completed by 89 individuals, participants were required to send an email to MG with informed consent. They were allocated into intervention and waiting-list group by alternating emails, as the easiest and best proxy for randomness. The two groups did not differ significantly on any demographic variables, or on the baseline values of the psychological variables.

Thus two groups were formed: an Intervention Group (IG) of 45 participants, and a Waiting-list Group (WLG) of 44. After the six-week intervention, 25 participants (51%) of the IG, and 32 participants (71.1%) of the WLG self-reported. Four weeks later follow-up was responded to by 20 participants of the IG (80%), and by 29 of the WLG (90.6%), the latter were then invited to participate in the intervention. Thus the participants were initially and increasingly self-selected. The flow chart appears in Figure 1.

Procedure

Consenting participants were asked to self-report online on their current happiness, satisfaction with life and personality. The participants were randomly, alternately assigned to intervention and control groups. The intervention group received the Positive Psychology exercises, week-by-week, over a six week period. The study was approved by institutional IRB. Only participants who actively sought participation and signed an informed consent form were included. Participants who were originally randomly allocated to the waiting list group, were offered the intervention 10 weeks after the beginning of the intervention for intervention group.

Figure 1. Participation and dropout flowchart

Measures

Steen Happiness Index (SHI; Seligman, Steen, Park, & Peterson, 2005) consists of 24 items. Scores range from 24 to 120 with higher scores indicating higher levels of happiness. Each item requires a forced choice between five statements. The SHI was translated for use in this study, using translation, independent back-translation, comparison and revision. The SHI in this study had an internal reliability of $\alpha= .65$.

Positive Psychotherapy Inventory (PPTI; Rashid, 2005) was used for measurement of the specific active components that are addressed in positive psychology therapy, including positive emotion, meaning and engagement. The PPTI consists of 21 items that list behaviors, occupations, or domains, and asks the participant to rate each on a 4-point scale from 0 to 3. Items include frequency of laughing or smiling, using strengths in the service of others, spiritual or religious activities, and closeness to others. Scores range from 0 to 63 with higher scores indicating higher levels of happiness. In the current study, the PPTI showed an internal reliability of $\alpha= .67$.

Satisfaction with Life Scale (SLS; Diener, Emmons, Larsen, & Griffin, 1985) consists of 5 items. Scores range from 5 to 35 with higher scores indicating higher levels of satisfaction with life. The SLS showed good internal reliability, $\alpha= .70$.

The Temperament and Character Inventory (TCI-140; Zohar & Cloninger, 2011) includes 140 items and measures four dimensions of temperament: Harm Avoidance, Novelty Seeking, Reward Dependence, and Persistence. It also measures three dimensions of character: Self-Directedness, Cooperativeness, and Self-Transcendence. For the current study three traits were measured, the temperament traits of Harm Avoidance and Persistence and the character trait of Self-Directedness. The temperament trait of Harm Avoidance has 4 subscales: Anticipatory Anxiety (e.g. "I usually feel tense and worried when I have to do something new and unfamiliar"); Fear of Uncertainty (e.g. "I often feel tense and worried in unfamiliar situations, even when others feel there is nothing to worry about"); Shyness toward Strangers ("I often avoid meeting strangers because I feel insecure around people I don't know"); and Fatigability ("I have less energy, and I tire faster than other people"). The temperament trait of Persistence has 4 subscales; Eagerness to Work ("I am usually happy to start any task I undertake"); Work Hardened ("I prefer a challenging job to an easy one"); Ambitious ("I am a very ambitious person"); and Perfectionistic ("I tend to try harder than others because I want to attain the highest possible achievements"). The character trait of Self Directedness has 5 subscales: Purposefulness (e.g. "Every day I try to take another step toward my goals"), Responsibility (e.g. "I often feel that I am a victim of circumstances" rever-

sed), Resourcefulness (e.g. "I often can't deal with problems because I simply don't know what to do" reversed); Self-Acceptance ("I would like to be more intelligent than other people" reversed); and Enlightened Second Nature (e.g. "Many of my habits make it difficult for me to achieve worthy goals" reversed). In the current study internal consistency for Harm Avoidance was $\alpha = .81$, for Persistence $\alpha = .75$ and for Self Directedness $\alpha = .68$.

Positive Psychology Intervention

The positive psychology intervention drew (with permission) from the content of the 6-week PPT Protocol (Seligman, Rashid, & Parks, 2006) and the group psychotherapy protocol (Parks & Seligman, 2007), and were delivered to the participants via E-mail. All the exercises included in this protocol are also described in some detail by Schueller (2010). The intervention included the following exercises:

Core strengths: Participants rated themselves on their core strengths online and then identified their 5 highest strengths. On each day of the week, the participants were asked to find a new way to use one of their five personal core strengths.

Three good things: Participants were asked to keep a daily log in which they recorded 3 good things that had happened to them that day, and why these things had happened.

Gratitude visit: Participants identified a person to whom they felt gratitude and had not yet thanked properly. They wrote a letter thanking this person and then saw the person face-to-face and read the letter aloud to them.

Savoring: Taking at least two to three minutes to enjoy pleasurable experiences of everyday life thus prolonging the pleasure and positive affect as long as possible.

Actively support other people's good news: When hearing other people's good news, listening in a positive, supportive manner and refraining from criticism or modification. Asking questions and showing interest and enthusiasm.

Repeating the personal favorite of the 5 exercises described, and considering how to embed it into everyday life in the future. Detailed explanations of the exercises were sent to the participants. In addition, the participants could receive personal guidance from a graduate student of clinical psychology (MG), by phone or e-mail. In order to receive the personal guidance, the participants had to actively contact MG and request such guidance. During the entire intervention, 68 guidance phone calls and more than 400 guidance personal e-mails were sent to the participants. Besides answering the personal guidance requests that the participants actively sent, MG sent up to 3 personal e-mails to each participant during the intervention, in which the participants were asked how the intervention was going for them and if they needed any help. In order to increase the motivation and the persistence of the participants, each week, in addition to presenting the weekly exercise, the participants were asked to complete a short feedback form about the previous exercise. The participants were asked to rate the extent to which they enjoyed the exercise, the extent that they felt the exercise contributed to them, the extent to which they felt they had managed to persist in the exercise, and how much time they had invested in the exercise. At the end of the intervention (T1) and one month after the end of the intervention (T2), the members of both groups self-reported on the same measures they had reported on at at the beginning of the intervention (T0).

Data Analysis

To analyze changes over time in the study variables, we used growth curve analysis (Singer & Willet, 2003), which can compensate for missing data points without dropping participants for whom there is only partial data.

The growth curve analysis is based on a multilevel model, in which time measurements (baseline, post-test, and follow-up) comprise level-1, and individuals comprise level-2. In this model average baseline differences between experimental groups and treatment effects can be estimated, as well as inter-individual variability in baseline and rate of change. The growth trajectory estimates from the multilevel analysis, as well as a graphical depiction of the average change in both groups are shown in figures throughout.

Time measurements were coded in weeks (6 weeks between baseline and post-test, and 4 weeks between post-test and follow-up), hence average growth estimates are the rate of change per week across the study duration.

For each analysis, a figure is given, describing the multilevel results for differences between groups (experiment vs. control), between time-points (pre, post and follow- up) and for the interaction between group and time on each variable.

For the growth curve analysis we compared the intervention group with the waiting-list group, thus there were $N= 45$ vs $N= 44$ at T0, 25 vs 29 at T1 and 20 vs 32 at T2. The groups remained balanced for demographic variables throughout the 10 weeks and the declining numbers.

RESULTS

In order to assess if the Positive Psychology Intervention group gained happiness and well-being relative to the Waiting-List Group we calculated growth curves for the self-report measures of happiness and well-being: the Steen Happiness Index (Figure 2a); the Positive Psychotherapy Index (Figure 2b) and the Satisfaction with Life Scale (Figure 2c). All of them showed significant growth post-intervention and a month later.

There were no significant differences between the control group and the treatment group at T0 for the three measures. Over time however, the control group did not change in these measures while the treatment group showed significantly higher levels at T1 and at T2. (The estimates of the models are summarized in Table 1).

Post-hoc analyses of the Steen Happiness Index, the Positive Psychotherapy Inventory, and the Satisfaction with Life Scale are summarized in Table 2. There were significant differences between the change in the control group and the treatment group at post-treatment and at follow-up for all three measures.

In order to assess change in personality traits associated with the Positive Psychology Intervention we conducted Growth curve analyses were conducted (Singer & Willet, 2003) as in the previous section. Figures 3a, 3b, and 3c show the increase in Self Directedness and Persistence and the decrease in Harm Avoidance in the intervention group and the maintenance of the gain to follow-up. (Descriptive statistics and effect sizes are shown in Table 3).

No significant differences were found at baseline for the three measures. Post-hoc analyses of Self Directedness, Persistence and Harm Avoidance are summarized in Table 4. There were significant differences between the control group and the treatment group in the change they underwent between pre-treatment and post-treatment and between pre-treatment and follow-up.

------- Treatment
——— Control
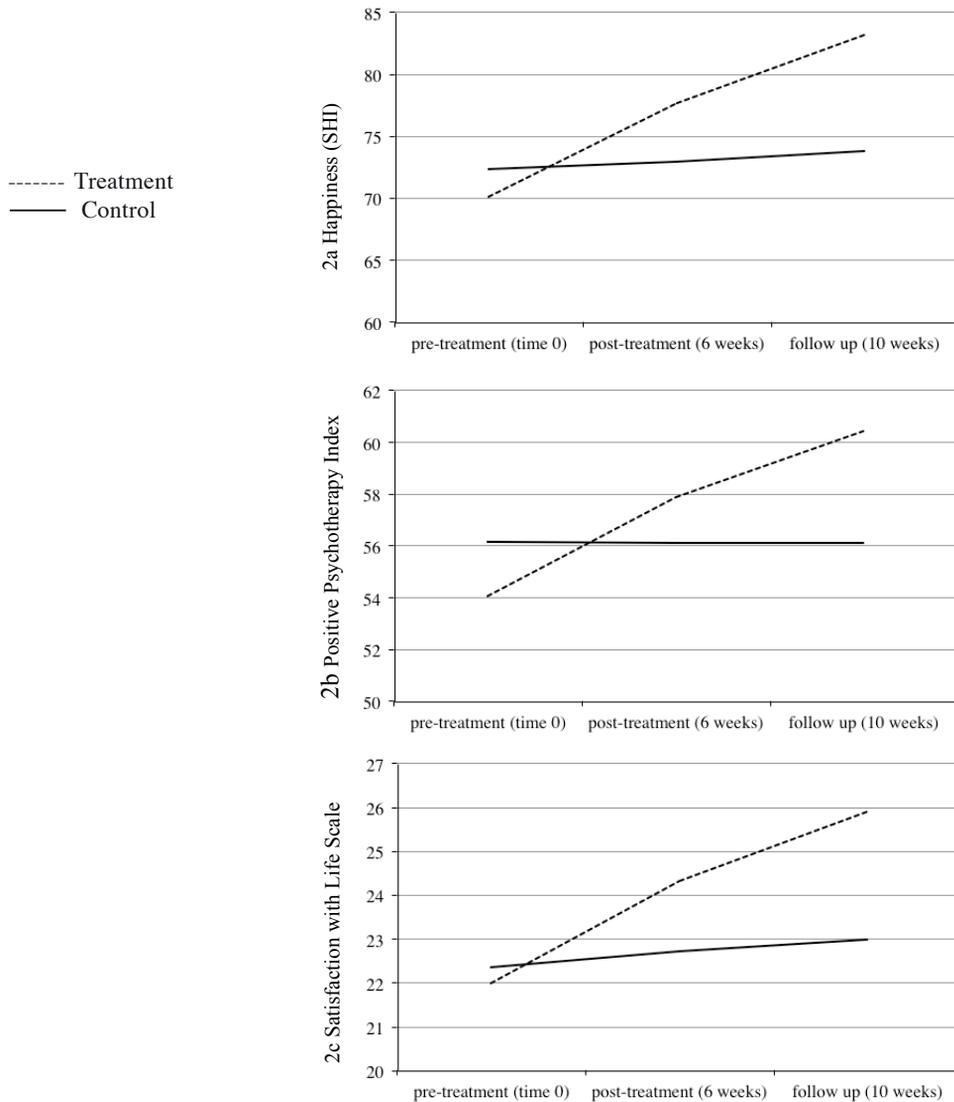
Figure 2. Growth curves for the self-report measures of happiness and well-being.

In order to better understand the differential influence of each of the personality traits on happiness, we conducted a hierarchical regression analysis in which the change in happiness due to treatment (between T1 and T0) was the dependent variable and the difference scores for Self Directedness, Persistence and Harm Avoidance between T1 and T0 were the independent variables. In step 1 only group (i.e. intervention vs. waiting list) was entered into the analysis. In step 2, changes in personality traits were also entered. Table 5 show the results of these regression analyses.

Table 1. Multilevel analysis for Steen Happiness Index, Positive Psychotherapy Inventory and Satisfaction with Life Scale comparing Intervention and Control groups.

		Estimate	SE	$t_{(df)}$
Steen Happiness Index	Intercept	72.28	2.74	$t_{(60.74)}= 26.37^{***}$
	Group	-2.20	4.21	$t_{(60.23)}= -0.52$
	Time	0.10	0.17	$t_{(51.04)}= 0.62$
	Interaction Group x Time	1.16	0.26	$t_{(51.98)}= 4.47^{***}$
Positive Psychotherapy Inventory	Intercept	56.14	1.92	$t_{(61.21)}= 29.25^{***}$
	Group	-2.07	2.95	$t_{(60.64)}= -0.70$
	Time	-0.01	0.11	$t_{(55.65)}= -0.05$
	Interaction Group x Time	0.64	0.18	$t_{(56.05)}= 3.65^{***}$
Satisfaction with Life Scale	Intercept	22.35	1.03	$t_{(60.94)}= 21.75^{***}$
	Group	-0.38	1.57	$t_{(59.76)}= -0.24$
	Time	0.06	0.07	$t_{(110.13)}= 0.95$
	Interaction Group x Time	0.33	0.10	$t_{(110.57)}= 3.13^{**}$

Notes: **= $p <.01$; ***= $p <.001$; *SE*= Standard Error.

Table 2. Post hoc analysis: Independent *t*-tests of the difference between Steen Happiness Index, Positive Psychotherapy Inventory and Satisfaction with Life Scale at different times in control and treatment groups.

		Difference T1-T0 ($n= 54$)				Difference T2-T0 ($n= 52$)			
		M	SD	$t_{(df)}$	d	M	SD	$t_{(df)}$	d
SHI	Controls	1.38	8.27	$t_{(51)}= -2.68^{**}$	-0.74	0.45	7.67	$t_{(49)}= -4.50^{***}$	-1.29
	Treatment	9.08	12.44			12	10.66		
PPI	Controls	0.17	5.20	$t_{(51)}= -2.57^{*}$	-0.70	-0.37	5.48	$t_{(51)}= -3.57^{***}$	-0.98
	Treatment	5.16	8.70			6.25	7.77		
SLS	Controls	0.32	3.73	$t_{(51)}= -3.19^{**}$	-0.87	0.70	3.77	$t_{(48)}= -2.36^{*}$	-0.70
	Treatment	3.92	4.47			3.08	2.99		

Notes: *d*= Cohen's *d*; *= $p <.05$; **= $p <.01$; ***= $p <.001$; PPI= Positive Psychotherapy Inventory; SHI= Steen Happiness Index; SLS= Satisfaction with Life Scale.

Table 3. Multilevel analysis results for Self-Directedness, Persistence and Harm Avoidance comparing intervention and control groups.

		Estimate	SE	$t_{(df)}$
Self-Directedness	Intercept	68.36	2.10	$t_{(60.68)}= 32.48^{***}$
	Group	-0.25	3.23	$t_{(60.08)}= -0.08$
	Time	0.21	0.13	$t_{(56.55)}= 1.60$
	Interaction Group x Time	0.51	0.21	$t_{(57.24)}= 2.47^{*}$
Persistence	Intercept	65.63	1.81	$t_{(62.50)}= 36.30^{***}$
	Group	-1.62	2.78	$t_{(61.94)}= -0.58$
	Time	-0.004	0.11	$t_{(52.04)}= -0.04$
	Interaction Group x Time	0.53	0.18	$t_{(53.04)}= -3.01^{**}$
Harm Avoidance	Intercept	54.42	2.06	$t_{(60.69)}= 26.48^{***}$
	Group	4.31	3.16	$t_{(60.15)}= 1.37$
	Time	-0.10	0.12	$t_{(51.38)}= -0.79$
	Interaction Group x Time	-0.62	0.19	$t_{(51.94)}= -3.30^{**}$

Notes: **= $p <.01$; ***= $p <.001$; *SE*= Standard Error.

Table 4. Post hoc analysis: Independent t-tests of the difference between Self Directedness, Persistence and Harm Avoidance at different times in control and treatment groups.

		Difference T1-T0 ($n= 54$)				Difference T2-T0 ($n= 52$)			
		M	SD	$t_{(df)}$	d	M	SD	$t_{(df)}$	d
SelfD	Controls	0.75	6.95	$t_{(51)}= -2.16^{**}$	-0.59	1.45	7.50	$t_{(49)}= -2.47^{***}$	-0.79
	Treatment	5.27	8.29			7.33	7.45		
P	Controls	0.22	5.67	$t_{(51)}= 1.96^{*}$	0.54	-0.28	4.71	$t_{(51)}= -2.92^{**}$	0.79
	Treatment	3.84	7.69			4.95	8.08		
HA	Controls	-1.32	6.07	$t_{(51)}= 1.49$	0.41	-0.66	6.49	$t_{(48)}= 3.37^{***}$	0.96
	Treatment	-4.32	8.49			-7.13	6.97		

Notes: *d*= Cohen's *d*; HA= Harm Avoidance; *= $p <.05$; **= $p <.01$; ***= $p <.001$; P= Persistence; SelfD= Self Directedness.
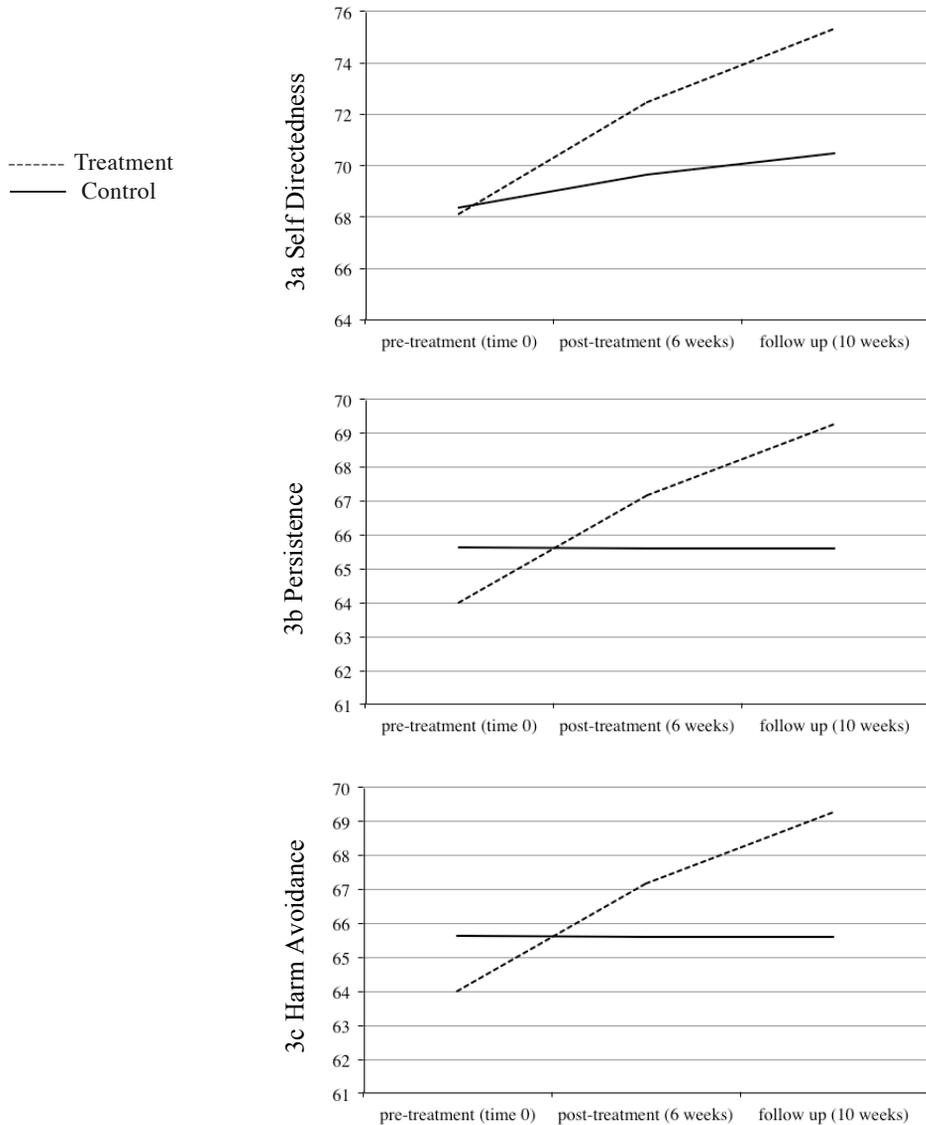
Figure 3. Self Directedness, Persistence, and Harm Avoidance in the Intervention Group.

As can be seen in Table 5, changes in personality traits contributed significantly over and beyond group allocation to gains in happiness for two of the three measures. Gain in the character trait of Self-Directedness was a strong mediator for the gain in happiness as measured by the Steen Happiness Index; gain in happiness as measured by the Positive Psychotherapy Inventory was strongly mediated by the gain in Self-Directedness as well as by the increase in Persistence. However, for the Satisfaction with Life Scale, personality traits did not mediate the gain; the allocation to the

intervention group remained significant in the presence of the changes in personality traits as additional independent predictors.

Table 5. Hierarchical Regression Analysis.

		$S\beta$	T	R^2	Adj. R^2	ΔR^2	$F_{(df)}$
	Step 1			.12	.11		$F_{(1,51)}=7.18^{**}$
	Group	.35	2.68**				
	Step 2			.59	.55	.46***	$F_{(4,48)}=16.89^{***}$
SHI	Group	.14	1.44				
	ΔSD	.39	2.92**				
	ΔPR	.18	1.44				
	ΔHA	-.24	-1.84				
	Step 1			.12	.10		$F_{(1,51)}=6.60^{*}$
	Group	.34	2.57**				
	Step 2			.49	.45	.37***	$F_{(4,48)}=11.43^{***}$
PPI	Group	.14	1.29				
	ΔSD	.49	3.27**				
	ΔPR	.33	2.33*				
	ΔHA	.14	0.98				
	Step 1			.17	.15		$F_{(1,51)}=10.19^{**}$
	Group	.41	3.19**				
	Step 2			.27	.21	.10	$F_{(4,48)}=4.41^{**}$
SLS	Group	.32	2.47*				
	ΔSD	.23	1.26				
	ΔPR	-.04	-0.23				
	ΔHA	-.17	-0.96				

Notes: HA= Harm Avoidance; *= $p <.05$; **= $p <.01$; ***= $p <.001$; PPI= Positive Psychotherapy Inventory; PR=Persistence; $S\beta$= Standardized β; SD=Self-Directedness; SHI= Steen Happiness Index; SLS= Satisfaction with Life Scale; Δ change between post-treatment and pre-treatments points.

DISCUSSION

The current study was a randomized controlled trial of a 6-week protocol-driven and email-delivered intervention of positive psychology (Seligman, Rashid, & Parks, 2006) in a self-selected sample of Israeli happiness seekers. The intervention was effective: The intervention group improved dramatically and significantly on the positive measures. This is consistent with what is now a considerable literature supporting the efficacy of positive psychology interventions. Hone, Jarden, and Schofield (2014), in their meta-analysis, concluded that there was strong proof for the reach, efficacy, adoption, implementation and maintenance of positive psychology interventions. This result is also consistent with a report of Shoshani and Steinmetz (2014), who conducted a randomized controlled trial of a two-year-longitudinal positive psychology intervention for students in junior high and in high school in Israel. The school-based program produced significant gains in self-efficacy, optimism, and life satisfaction, and a significant decrease in psychological distress. Thus positive psychology interventions can be effective in Israelis (Shoshani & Steinmetz, 2014) as they have been for individuals in other cultures (Hone, Jarden, & Schofield, 2014) and this modified 6-week-protocol is no exception.

The limitations of the current study included its self-selected sample, which does not allow generalization of the results to all potential participants of positive psychology interventions, and the limited follow-up period of 4 weeks post treatment. It is possible that the positive changes associated with this intervention might not persist over time; only a longer follow-up can provide this information. In addition this study targeted community volunteers and not patient groups; it is possible that relatively high-functioning

individuals profit more from this form of intervention, and undergo more personality change than other groups.

What works when positive psychology interventions are effective? Layous and Lyubomirsky (2012) suggest that encouraging participants to perform positive tasks increases their positive emotions, as well as their positive cognitions; these lead to enhanced well-being and satisfaction with life. This explanation has prima faci validity, but does not suggest that the gain in happiness will be maintained beyond the positive change in behavior. In the current study we explored the possibility that the positive psychology intervention might have an effect on personality. Several studies on the effectiveness of other psychotherapy methods have shown a sizable and positive change in personality. In our study we chose to measure personality through the prism of the temperament and character inventory (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). Individuals who are high in the character trait of Self-Directedness, low in the temperament trait of Harm Avoidance and high in the temperament trait of Persistence are happier, more satisfied with life, have better subjective health and experience a higher level of social support (Cloninger & Zohar, 2011). Thus these three traits were selected for scrutiny in the context of the positive psychology intervention trial. The current study found that in the intervention group and not in the waiting-list group there were substantial changes in the three traits: gains in Self Directedness and in Persistence which were enhanced further at follow-up and a decrease in Harm Avoidance which further declined from the end of the intervention to follow-up. Since these traits are usually very stable, it is possible that their new values will be maintained over time, and contribute to the enhanced happiness of the intervention group, beyond our last measurement, 10 weeks from outset.

If happiness is gained, and personality traits changed in the course of the positive psychology intervention and beyond, what is the relationship between these processes? We tested for the possibility that the change in personality traits mediated the effect of the intervention on happiness. We found support for this idea: the addition of the change in personality traits to the regression equation resulted in a significant additional explained variance in happiness measures. For two of the measures gain in Self-Directedness and for one of the positive measures an increase in Persistence explained additional variance in the therapeutic gains.

As in many other studies, the most important personality trait of the three measured was the character trait of Self-Directedness, which is the trait most often found to predict treatment response and to change as a response to treatment (e.g Terock *et alii*, 2013). Self-Directedness allows the individual to formulate personally meaningful goals, and to be purposeful and resourceful in trying to achieve them. Growth in Self-Directedness is beneficial for happiness and for self-fulfillment (Cloninger, 2004; Cloninger & Zohar, 2011).

Future research that replicates this finding and tests it in the context of other psychotherapeutic approaches would extend our understanding of how personality and successful psychotherapy interact to produce stable gains. Although personality is basically very stable, successful interventions can bring about beneficial changes in personality which may in turn help to maintain therapeutic gains. The role of personality change in psychotherapy should be studied across therapeutic approaches, settings, and psychiatric diagnoses.

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