

RESEARCH ARTICLE

Multidimensional Healthy Adult Scale: Development and validation of a measurement tool to understand how the Healthy Adult works in a Turkish population

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Abstract

Healthy Adult (HA), a key schema therapy construct, represents the individual's 'healthy' state, characterized by balancing personal and others' needs within a realistic perspective. We developed the Multidimensional Healthy Adult Scale to explore how various dimensions of the HA contribute to different aspects of well-being and tested its factor structure and psychometric properties. Data were collected from 472 participants (24.1% male, 75.5% female) between the ages of 18 and 60. The items of the scale were generated based on a qualitative study conducted in Türkiye. Data were analyzed using Confirmatory Factor Analysis and Structural Equation Modeling in Lavaan, which demonstrated a strong fit for the measurement and predictive models. The Bond, Balance, and Battle factors, along with the overarching HA, showed good fit. Low Balance scores were associated with higher psychopathology and negative affect, while high Battle scores were associated with greater life satisfaction and positive affect. Although Bond correlated positively with Balance and Battle, high Bond scores, when controlling for the others, were linked to increased psychopathology and negative affect. These results provide evidence for a multidimensional structure of the HA. Further validation of the scale and clarification of Bond's role is needed for clinical insights.

Introduction

Schema therapy has been developed as treatment of chronic and persistent psychopathological states [1,2] and it is proven effective for a variety of problems [3–5] including personality disorders [6–8]. Young [1] postulated that when universal childhood needs (viz., secure attachment, autonomy, expressing needs and emotions freely, spontaneity and play, and realistic limit setting) are not met adequately, early maladaptive schemas (EMSs) develop. EMSs are pervasive patterns of making

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sense of the outer world that consist of cognitions, memories, and emotions [1,9]. Accordingly, limited reparenting is mostly built upon ‘correcting’ early maladaptive experiences that led to the development of EMSs. The ultimate goal of schema therapy is to reshape the internal world of the patient, enabling them to take care of their own unmet needs in their ongoing relationships with others [1]. This process begins with the therapist attuning to the needs of the patient by taking on the role of a parent within the borders of the therapeutic relationship. During therapy, patients gradually learn to take care of their own needs, helped by the modeling by the therapist. This mechanism is known as self-reparenting and considered as an important treatment goal in schema therapy, as it helps individuals to nurture and care for themselves [1,2].

According to the schema therapy perspective, when an EMS is activated in adulthood, people experience “the drama from their childhood, usually with a parent” [2] (p.10). The ‘drama’ is displayed by a group of so-called schema modes, defined as emotional states that stem from early maladaptive schemas, and the way the person copes with the schema. For example, the Vulnerable Child mode (VC) is an intense emotional state characterized by fear, abandonment and sadness that disrupts the individual’s functioning when it is triggered [1]. One mechanism of change in schema therapy is getting people out of dysfunctional schema modes by the activation of another state, the Healthy Adult mode (HA) [10]. This mode refers to the ‘healthy’ state of the person, which involves creating a balance between personal needs and the needs of others within a realistic perspective and taking responsibility for maintaining this balance. In this way, the HA plays a central role in the process of self-reparenting. The HA is defined within schema therapy through three key aspects: The HA (1) takes care of the needs of the VC by providing secure attachment and nurturance, (2) limits sudden outbursts of anger or other impulsive behavior that disturbs healthy functioning, (3) is to become responsible for fighting against the critical and demanding voices that stem from early maladaptive experiences [2].

The central techniques in schema therapy, such as empathic confrontation, chair work, imagery rescripting, and limited reparenting, stimulate the development of a sufficiently functioning HA [11,12]. The central role of the HA in the change process of schema theory is emphasized both theoretically [2,9,13] and empirically [10,14]. However, what mechanisms underlie the actions of the HA in achieving mental health is not yet fully understood. To enhance the understanding of the HA as a multidimensional construct, a recent qualitative study conceptualized its three fundamental functions, as originally described in schema therapy [2] into the domains of Bond, Balance, and Battle [15]. Accordingly, each of the functions are also defined in a top-down (i.e., showing compassion, setting boundaries, and self-empowerment) as well as a bottom up (i.e., emotional attunement, self-reflection and hope and faith) levels to conceptualize how the HA functions and contributes to different assets of well-being. In addition to assessing Balance, which reflects self-reflection and the ability to set limits, Bond and Battle were designed to measure the HA’s capacity for interpersonal connection and caregiving, as well as its ability to remain activated and hopeful in the face of adversity. These factors are closely linked to empathy, compassion

for others, and resilience, all of which are widely recognized in both theory and practice. However, they are not directly captured by existing measures of the HA and have therefore not been empirically tested. Given the complex nature of the self-reparenting, it is essential that this complexity is reflected in the HA and that it can be measured with precision.

In addition to the Schema Mode inventory [16], positive schemas (i.e., YPSQ [17]) and positive parenting (i.e., PPSI, [18]) can be used to measure the presence of the HA in an indirect way. The aim of this paper is not to create yet another scale for assessing the HA but to develop an instrument that captures its various dimensions, emphasizing its multidimensional conceptualization and the functions of Bond, Balance and Battle. This will hopefully enable us to understand whether these dimensions differ and contribute to changes in healthy functioning, particularly in terms of acquiring different elements of mental well-being. Thus, this paper is built upon the hypothesis that the HA is multidimensional and different dimensions operates at different levels of well-being.

Testing schema therapy constructs and measures is identified as a research priority by Pilkington et al. [19] Although measuring instruments in schema therapy have been translated and validated in several cultures, they have been developed mainly based on data from populations in the West, characterized as WEIRD (Western, Educated, Industrialized, Rich, and Democratic) [20]. In Western cultures, the conceptualization of healthy functioning places more emphasis on autonomy than on connectedness [21]. Therefore, it is crucial to ensure the applicability and presence of the HA and/or possible new dimensions that can be related to the HA in different cultures. Therefore, we aim to create an assessment tool based on qualitative data collected from a non-WEIRD population. In this way we also aim to provide an insight into how the HA functions at a multidimensional level and test the factor structure of hypothetical subdimensions of the HA. Accordingly, we hypothesized 1) Bond, Balance and Battle will be positively correlated but separate dimensions measuring the Healthy Adult mode. 2) Bond, Balance and Battle will be negatively associated with psychopathological symptoms and negative affect, and positively associated with positive affect and life satisfaction.

Materials and methods

Sample

Data were collected in a non-clinical community sample of 493 adult Turkish participants. The inclusion criteria comprised individuals residing in Turkey, aged between 16 and 75 years, who possessed the ability to read, write, speak, and comprehend Turkish. No additional exclusion criteria were applied beyond those implicit in the inclusion criteria. The sample consisted of 114 (24.1%) males and 358 (75.5%) females between the ages of 18 and 60 ($M=34.16$, $SD=11.30$).

Materials

Multidimensional Healthy Adult Scale (MHAS, [15]) was developed to measure a multidimensional construct of the HA in a Turkish population. The items were created based on a prior qualitative study, which involved a thematic analysis of the HA, grounded in its original definition by Young et al. [2]. Detailed information about the qualitative analyses and factor structure can be found in our previous publication [15].

The initial item pool consisted of 80 items generated based on qualitative study [15] consistent with recommendations to start with two to three times as many items as intended for the final scale [22]. After discussion within the analysis team, 60 items were selected, with the aim of developing a questionnaire of 20–30 items. Due to time constraints, data collection had to be initiated before the thematic analysis was finalized. Therefore, a larger set of items was included in data collection to allow evaluation of which items are supported by the qualitative findings and are suitable for quantitative testing.

During the analysis of the qualitative study, thematic patterns reflecting bottom-up and top-down processing led us to retain two subscales per dimension instead of our initial expected of three. To maintain construct validity, certain items were conceptually excluded based on insights from the qualitative work conducted prior to the quantitative analyses (i.e.,

Items related to social support and protection/encouragement of others in Bond (11 items) and Self-Distraction in Balance (6 items), and Self-Empowerment in Battle (6 items), leaving 37 items for analysis).

Based on the qualitative analysis, a hypothesized factor structure was proposed and tested using confirmatory factor analysis. Iterative processes were employed in the SEM model by which cross loadings and poorly fitting items were deleted based on modification indices [23]. Modification indices were not used as a sole basis for model modification. We evaluated items with large modification indices in the light of theoretical relevance, content validity and redundancy using a theoretical justification. Finally, for each of three overarching constructs, Bond, Balance and Battle, six items were selected. In each scale, half of the questions represent a top-down approach while the other half represents the bottom-up approach (a comprehensive description of the top-down and bottom-up approach to the HA can be found in [15]). The final scale contained 18 items distributed across the scales Bond, Balance and Battle.

The Brief Symptom Inventory (BSI, [24]) is a self-report questionnaire that assesses psychopathological symptoms experienced in the last seven days. It consists of 53 items rated on a five-point Likert scale (0 = not at all, 4 = extremely). We utilized the Turkish adaptation [25] which includes five dimensions (i.e., depression, anxiety, somatization, hostility, and negative self-concept) and demonstrated acceptable reliability and validity. In the current study, the internal consistency (Cronbach alpha) of the subscales ranged between $\alpha = .79$ and $\alpha = .90$.

Positive and Negative Schedule (PANAS, [26]) is a self-report questionnaire that assesses affect. It consists of 20 items rated on 5-point Likert scales (1 = very slightly or not at all, 5 = extremely). The Turkish translation of the PANAS has demonstrated acceptable reliability and validity [27]. In the current study, the internal consistency of the subscales for both positive and negative affect was $\alpha = .87$.

The Satisfaction with Life Scale (SWLS; [28]) self-report instrument assessing the level of life satisfaction using 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). The Turkish translation of the scale has acceptable reliability and validity [29]. In the present study, the internal consistency of the scale was found to be $\alpha = 0.86$.

The Short Schema Mode Inventory (SMI-SF) is a self-report questionnaire adapted from Lobbestael et al. [16] which is a shortened version of the original SMI [30]. It consists of 118 items rated on a 6-point Likert scale. We utilized the Turkish adaptation of the SMI-SF [31] and only employed the HA and the VC subscales. The internal consistency of the HA subscale was $\alpha = .76$ and of the VC subscale $\alpha = .92$.

Procedure

We used an online survey site (Qualtrics, Provo, UT) to upload the questionnaires and created a link to the participant to fill in the questionnaires. We employed snowball sampling to recruit participants who volunteered for the study without compensation. Data were collected between September 2018, and December 2018. Participants were able to complete the questionnaires only after providing written informed consent by selecting 'I agree' on the first page of the Qualtrics survey. They are additionally encouraged to disseminate the study link to other potential participants in order to enhance response rates. This approach, however, should be employed with caution, as such recruitment may introduce systematic error, including volunteer self-selection bias and deviation from random sampling procedures. Upon survey completion, participants were thanked for their participation. Approval for the study and methodology was granted by the Applied Ethics Research Center of Arel University on September 18, 2018.

Data analysis plan

Data were analyzed using R [32] and SPSS. Lavaan (vo. 06–19; [33]) was used to do a confirmatory factor analysis (CFA) and structural equation model (SEM), in order to check the proposed factor structure as well as its content validity. Although there was very little missing data, Little's MCAR test was used to confirm that the data was missing at random, which was confirmed. Since latent indicators were ordinal with fewer than seven response categories, they were handled

as ordered variables and a DWLS estimator with robust standard errors was used. Robust test statistics are reported whenever possible [34,35].

Outliers were checked using boxplots as well as Mahalanobis distances for multivariate normality, using the `influence_stat` function of the `Semfindr` package (vo. 0.1.8 [36]) and based on the CFA model. Prior to the analyses, a Kaiser Mayer Olkin test, as well as a Bartlett test of Sphericity were done to confirm the data is fit for factor analysis. Univariate and multivariate normality were checked using skewness and kurtosis and the Henze-Zirkler test respectively. Considering the size of the sample, non-normality would not be an immediate concern due to the central limit theorem. Multicollinearity was checked between indicators as well as Maximum Likelihood estimated factor scores of the CFA, correlations above .80 would be considered concerning, VIF was also checked based on a linear model with the factor score estimates as predictors. The gender of two participants who had indicated not wanting to disclose their gender was set as missing, and binary coding was used for women (0) and men (1).

A CFA with “orthogonal” option in `Lavaan` was used to constrain all covariances of the latent variables, and items were classified as ordinal, and an overarching (second order) factor was estimated, consisting of the three scales. A predictive model was added, where the latent factors were used as predictors of clinical outcomes, namely psychopathological symptoms (BSI), positive affect (PANAS-P), negative affect (PANAS-N) and life satisfaction (LSI). In this model gender and age were added as control variables. Adjustments to the model (e.g., added covariances between indicators) were made depending on the modification indices. A model is considered to have sufficient fit if at least two of the following criteria are met: CFI > .90, TLI > .90, RSMEA < .08, SRMR < .08. Pearson correlations were calculated for the saved factor scores, the outcome measures and the SMI scales.

Results

Outliers and assumptions

Influential outliers, based on the influence test ($N=24$) were removed from the data, leaving a sample of 450 participants. After removal of the influential outliers, there were still univariate outliers for most variables in the data, however, these were not removed due to being seen as natural variance in the data. Due to the DWLS and robust estimates, the analyses should be robust to these outliers. Both the KMO (MSA = .93) and Bartlett’s test of sphericity ($p < .001$), indicated the data was appropriate for factor analysis. We found univariate, normality, with skewness and kurtosis within range for all variables in the model, but multivariate normality was not achieved, this should not be an issue given the sample size and method of estimation. There was no multicollinearity in the data, descriptive statistics can be found in [Table 1](#) and correlations can be found in [Table 2](#).

Confirmatory factor analysis

Confirmatory factor analysis indicated an excellent fit for the measurement model (CFI = 1, TLI = .999, RSMEA = .012, SRMR = .037), with covariances between two sets of items (one in the Bond scale, and one in the Battle scale) allowed after inspection of the modification indices. Factor loadings, both unstandardized and standardized, can be found in [Table 3](#). Standardized covariance between the two Bond items was .336, and between the two Battle items was .285. The internal consistency was acceptable to good for Bond ($\alpha = .82$), Balance ($\alpha = .78$) and Battle ($\alpha = .84$).

Validity and reliability of the model was tested with various measures. Average Variance Extracted (AVE) was calculated based on the final measurement model, including the higher order Healthy Adult factor and the item covariances specified previously. AVE was calculated for Bond (AVE = .491), Balance (AVE = .431), and Battle (AVE = .516). These AVE values are on the lower side, especially for Bond and Balance, and are likely related to some factor loadings being relatively low. We calculated the Composite Reliability (CR) as an additional metric of internal consistency; this showed at least acceptable consistency of Bond (CR = .829), Balance (CR = .777) and Battle (CR = .854). Heterotrait-Monotrait

Table 1. Descriptive statistics for the observed variables and the saved factor scores.

Variable	N	M	(SD)	min	max
Bond	450	0.00	(1.48)	-4.23	3.74
Balance	450	0.00	(2.42)	-6.93	6.79
Battle	450	0.00	(2.65)	-8.25	6.95
Healthy Adult	450	0.00	(1.00)	-2.70	3.99
Brief Symptom Inventory	445	88.22	(26.55)	53.00	193.00
Negative Affect	447	18.69	(6.72)	10.00	42.00
Positive Affect	447	32.31	(7.43)	11.00	49.00
Life Satisfaction Inventory	444	23.38	(6.75)	5.00	35.00
SMI Heathy Adult	450	47.13	(6.18)	20.00	60.00
SMI Happy Child	450	43.32	(8.10)	18.00	60.00
SMI Vulnerable Child	450	19.74	(8.43)	10.00	48.00
SMI Angry Child	450	22.85	(7.81)	9.00	48.00
SMI Punitive Parent	450	16.21	(5.63)	10.00	42.00
SMI Demanding Parent	450	34.80	(7.94)	15.00	58.00

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Table 2. Spearman correlations for the dependent and independent variables.

Variable	2	3	4	5	6	7	8	9	10	11	12	13
1 Bond	.55	.55	-.10 ^b	-.12 ^b	.30	.21	.43	.47	-.17	-.09 ^{ab}	-.11 ^b	.16
2 Balance		.67	-.35	-.39	.42	.30	.61	.55	-.41	-.33	-.34	.01 ^{ab}
3 Battle	450		-.25	-.29	.49	.31	.56	.55	-.33	-.17	-.17	.20
4 Brief Symptom Inventory	445	445		.66	-.31	-.40	-.32	-.51	.72	.65	.55	.31
5 Negative Affect	447	447	442		-.31	-.37	-.27	-.45	.58	.60	.47	.31
6 Positive Affect	447	447	442	447		.37	.43	.53	-.37	-.17	-.21	.05 ^{ab}
7 Life Satisfaction Inventory	444	444	439	441	441		.28	.52	-.46	-.31	-.31	-.05 ^{ab}
8 SMI Heathy Adult	450	450	445	447	447	444		.55	-.34	-.17	-.27	.20
9 SMI Happy Child	450	450	445	447	447	444	450		-.65	-.45	-.44	-.07 ^{ab}
10 SMI Vulnerable Child	450	450	445	447	447	444	450	450		.61	.63	.31
11 SMI Angry Child	450	450	445	447	447	444	450	450	450		.56	.41
12 SMI Punitive Parent	450	450	445	447	447	444	450	450	450	450		.43
13 SMI Demanding Parent	450	450	445	447	447	444	450	450	450	450	450	

Note. N for each correlation is shown below the diagonal.

^acorrelations were **not** significant before correction for multiple testing.

^bcorrelations were **not** significant after correcting for multiple testing. Bond, Balance and Battle correlations are based on the factor score estimates, not sum scores.

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(HTMT) values were calculated as a measure of discriminant validity based on the Lavaan correlation table, and indicated sufficient distinctiveness between Bond and Balance (HTMT = .665), Bond and Battle (HTMT = .669) and Balance and Battle (HTMT = .836).

Measurement invariance was checked across gender. To facilitate this, two individuals that did not indicate a binary gender were removed from the dataset (N = 448). Furthermore, given the ordinal data specification, the analysis required data to be present for each ordinal category (1–6), however, eight variables had missing data for men in one of the categories, in 7 cases this was for the lowest indicator (1) in one case it was for the second lowest. For all these variables, there were relatively low instances of participants selecting 1, therefore it was decided to recategorize 1–2 for these

Table 3. Factor loadings for the CFA measurement model.

Scales and items	Est.	SE	z	p	Std. Est
Bond					
1. I enjoy nurturing other people.	0.411	0.030	13.566	<.001	.609
2. I have a warm interest in other people.	0.560	0.031	17.913	<.001	.829
3. My loved ones tell me that I encourage them to achieve their goals in life.	0.474	0.029	16.121	<.001	.702
4. Other people say that I am a good listener.	0.449	0.031	14.323	<.001	.664
5. <i>I attune to other people's emotions.</i>	0.496	0.029	17.160	<.001	.734
6. <i>I feel for other people.</i>	0.436	0.031	14.162	<.001	.645
Balance					
7. I usually have a good sense of how I am feeling.	0.321	0.04	8.025	<.001	.775
8. I pay attention to my emotions and accept them as they are.	0.285	0.036	7.923	<.001	.690
9. I know I am not able to control everything and I am at peace with that.	0.255	0.033	7.607	<.001	.615
10. I am able to stop myself when I feel that I might get hurt.	0.267	0.032	8.278	<.001	.644
11. I am good at controlling my ambitions.	0.270	0.033	8.153	<.001	.652
12. I don't lose my temper even if I get really angry.	0.222	0.029	7.627	<.001	.536
Battle					
13. I always try to have a positive attitude.	0.286	0.045	6.338	<.001	.756
14. No matter how big the problem is, there is always hope.	0.323	0.050	6.488	<.001	.855
15. I often have the idea that everything is going to be all right in the end.	0.282	0.043	6.602	<.001	.745
16. <i>Challenges enhance your ability to solve problems.</i>	0.225	0.037	6.119	<.001	.596
17. <i>The challenges I have faced in life, made me realize that I actually do better than I thought.</i>	0.243	0.038	6.361	<.001	.642
18. <i>If one way does not work, I strive hard to find another even if other people give up.</i>	0.259	0.039	6.571	<.001	.685
Healthy Adult					
Bond	1.091	0.097	11.241	<.001	.737
Balance	2.201	0.318	6.919	<.001	.910
Battle	2.449	0.435	5.630	<.001	.926

Note. Sets of items within each scale in italics were allowed to covary in the tested models. Est = Estimate, Std. = standardized.

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variables. Results should be interpreted with caution, given the data tested here is not completely consistent with that of the rest of the analysis. In terms of change, a $\Delta CFI \leq -.01$ and $\Delta RMSEA \leq .015$, and $\Delta SRMR \leq .03$ for metric and $\leq .01$ for scalar and strict invariance would be considered acceptable [37]. CFI, RSMEA and SRMR information and model comparison can be found in Table 4. Although usually only CFI and RSMEA are included, SRMR was included as this may be more reliable for ordinal data [38]. Model fit indices remain good across measurement invariance testing. The change metrics meet some but not all, of the ideal cut-off values: i.e., metric invariance across gender was not supported. Additional metrics are reported in Table 4. These results may also have been affected by unequal sample size, meaning they should be interpreted with care.

Predictive model

Regression results for simple SEM models (with one of the scales predicting each outcome variable, plus gender and age as control variables) can be found in Table 5. The simple models found each scale to significantly predict each of the outcomes in the expected directions. The full structural equation model used 436 observations and included Bond, Balance and Battle as predictors of BSI, Positive and Negative Affect and LSI (with gender and age as control variables). The model showed excellent fit (CFI = .990, TLI = .990, RSMEA = .041, SRMR = .039) and regression results are shown in Table 5, a visual overview of the model can be found in Fig 1. For both BSI and Negative Affect, Balance was a significant

Table 4. Measurement invariance across gender.

Type	CFI	RSMEA	SRMR	ΔCFI	ΔRSMEA	ΔSRMR
Configural	1.000	.000	.046			
Metric	.997	.027	.051	-.003	.027	.006
Scalar	.999	.017	.047	.002	-.011	-.005
Strict	.999	.017	.047	.000	.000	.000

Note. Δ indicates change in the metric compared to the previous level of invariance. Adjustments made to facilitate this check can be found in the text.

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Table 5. Regression coefficients for univariate regressions with each scale.

		b	SE	z	p	β
Bond	Brief Symptom Inventory	-4.172	0.764	-5.461	<.001	-.307
	Positive Affect	1.921	0.243	7.9	<.001	.508
	Negative Affect	-1.031	0.194	-5.311	<.001	-.300
	Life Satisfaction Inventory	1.319	0.203	6.481	<.001	.390
Balance	Brief Symptom Inventory	-4.022	0.653	-6.159	<.001	-.328
	Positive Affect	1.785	0.232	7.689	<.001	.523
	Negative Affect	-1.006	0.162	-6.199	<.001	-.325
	Life Satisfaction Inventory	1.24	0.195	6.36	<.001	.407
Battle	Brief Symptom Inventory	-2.911	0.656	-4.437	<.001	-.313
	Positive Affect	1.328	0.256	5.193	<.001	.513
	Negative Affect	-0.724	0.166	-4.366	<.001	-.308
	Life Satisfaction Inventory	0.915	0.193	4.752	<.001	.396

Note. Gender and age were controlled for, all models were based on 436 observations.

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negative predictor as expected, however, Bond was a significant positive predictor. For both Positive Affect and LSI, Battle was a significant positive predictor, in line with expectations. Given the results we checked a moderation model using double mean centering in Lavaan, with Bond as an independent variable and Balance as a moderator (and gender and age as control variables). None of the interaction effects were significant, for BSI ($p = .233$), Negative Affect ($p = .839$), Positive Affect ($p = .984$) or LSI ($p = .180$).

Discussion

This study aimed to test the factor structure and validation of Multidimensional Healthy Adult Scale, an assessment tool that measures the HA as a multidimensional construct based on the definition of the HA [2]. We created separate subscales with empathy and providing compassion to others (Bond), Self-reflection and emotion regulation (Balance), and the individuals capacity to fight back against hardship (Battle). The items of the scale were developed based on a qualitative study conducted with people who have relatively high HA mode [15]. The hypothesized subdimensions of the HA is tested and the measurement model including Bond, Balance and Battle factors, as well as an overarching HA, demonstrated an excellent fit to the data, supporting a three-factor model. The predictive model further indicated distinct relationships between the three sub-scales and the relevant outcomes. More specifically, those who scored low on Balance are more likely to experience psychopathological symptoms and negative affect, while those who scored high on Battle, were more likely to be more satisfied with life and experience positive affect. These results aligned with expectations, further highlighting the distinct impact of the two subscales on positive and negative affective states, as well as their broader implications.

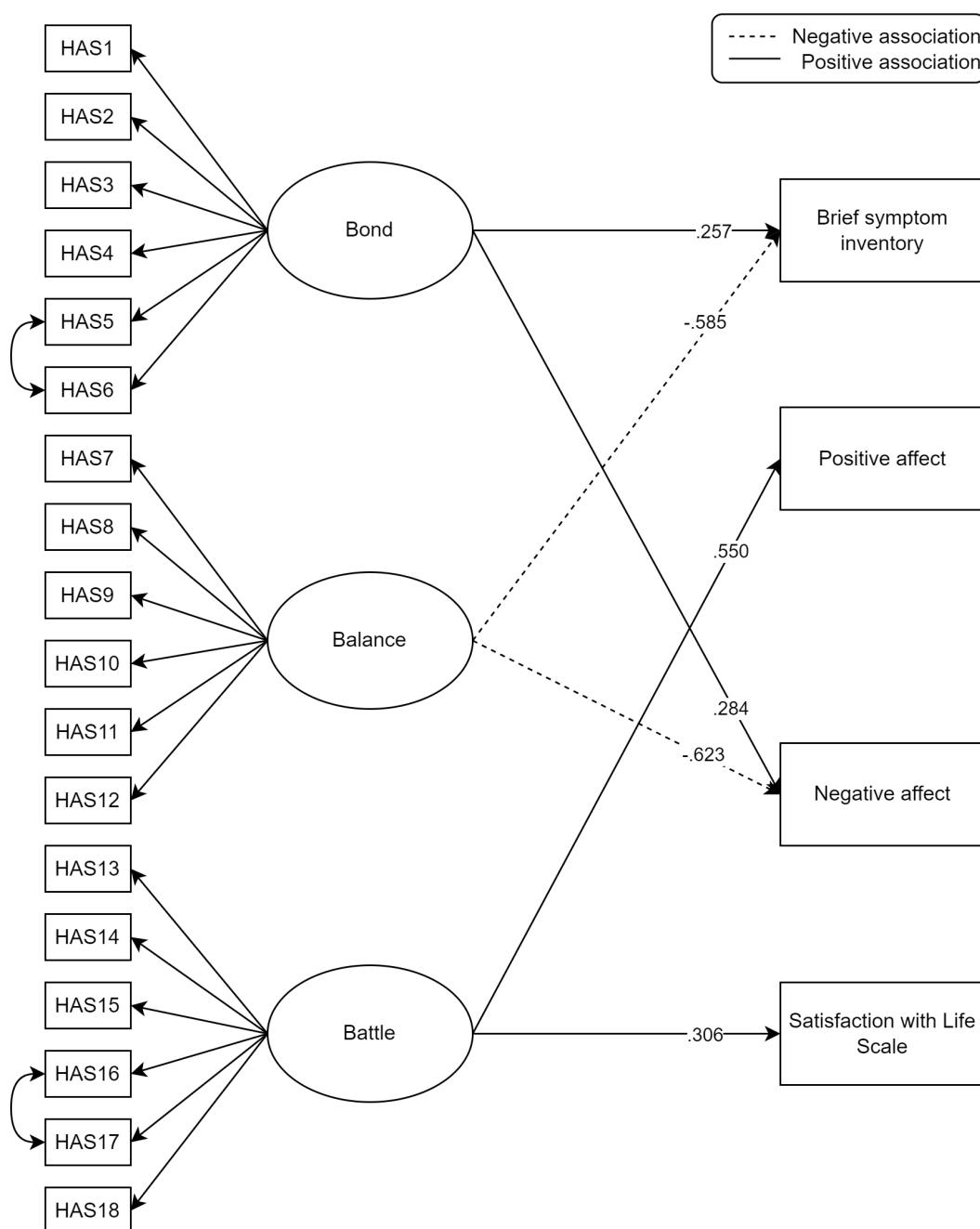


Fig 1. SEM model with standardized regression coefficients for outcome variable. Only significant associations are displayed, represented by arrows.

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Although the measurement model showed an excellent fit, not all factor loadings were very high. This may have contributed to the relatively lower AVE values (especially for Balance), despite both fit and internal consistency being adequate to good. Moreover, although measurement invariance testing showed some tendency towards invariance between men and women, the skewed sample distribution makes these findings relatively unreliable. Revision of the measurement

model might be in order, and further results should be interpreted with care. Discriminant validity between the factors was confirmed.

An unexpected finding was that, when controlled for Balance and Battle, Bond was a positive predictor for both psychopathological symptoms and negative affect, meaning that individuals who are more empathic and compassionate towards others are more likely to experience psychopathological symptoms and negative affect. However, the uncontrolled association between Bond and psychopathological symptoms and negative affect was negative, as expected. Thus, the sign of the associations reversed only after Balance and Battle were included into the model. This is a manifestation of Simpson's paradox, where the relationship reverses direction when other variables are included in an equation; this phenomenon has been reported to occur more often than is typically acknowledged in psychological research [39]. It is important to consider the context of Bond and Balance as separate but related constructs, however, it is essential to discuss the specific relation between Bond and Balance to understand this reversal, as Battle was not found to be a predictor of negative effect or psychopathological symptoms in the univariate regression.

Bond reflects the side of the HA which is mainly associated with taking care of the needs of the VC which is related to compassion, empathy and emotional attunement [15]. Empathy and compassion are known to be linked to both positive [40,41] and negative [42–44] mental health outcomes, the latter often referred to as 'compassion stress injury' or 'empathy fatigue' [45,46]. More specifically, studies show that increased other-directed compassion [42] and affective empathy (emotional state-matching) were linked to adverse mental health outcomes, while cognitive empathy (perspective-taking) and self-compassion were not [45]. However, de Waal [47] criticizes psychologist to often neglect affective empathy: "... Without emotional engagement induced by state-matching, perspective-taking would be a cold phenomenon that could just as easily lead to torture as to helping" (p.287). Similarly, emotional attunement to the VC is a very important part for especially bottom-up approach of the HA. Thus, our conceptualization of the Bond as a dimension of the HA underlines the dual dimensions of empathy (affective vs. cognitive) and compassion (i.e., self and other oriented) because both are needed for good (re)parenting, while highlighting a potential mental health burden that may accompany heightened emotional attunement and compassion toward others. Interestingly, this burden is only visible when Balance is in the equation. It could be argued that Balance, as the most influential subscale in our study, likely accounts for variance in Bond that relates to cognitive empathy and compassion towards self. Consequently, the additional variance that Bond explains, beyond what Balance accounts for, may primarily reflect affective empathy and compassion towards others that might be associated with negative affect and psychological symptoms.

Balance involves setting limits, self-reflection and accepting of emotions. It can be more related to factors such as compassion towards the self via limit setting, accepting emotions and cognitive emotion regulation. Research consistently shows a strong negative correlation between emotion regulation and psychopathological symptoms [48], supporting our findings. We found that Balance had the highest correlation with the original HA Subscale of the Schema Mode Inventory which was found to be a central mechanism of change [10]. Studies highlight the significant role of emotion regulation in shaping the link between empathy and psychopathological symptoms. Cho and Lee [45] found that individuals with higher emotion regulation capacities experienced less compassion fatigue. Similarly, Tully et al. [49] found that reacting to others' struggles with moderate levels of both affective and cognitive empathy, when combined with good emotion regulation was the most adaptive in terms of depressive symptoms. In the current study, the interaction term between Bond and Balance was not significant. Nonetheless, understanding how Bond and Balance interact remains an important question for future research, as the present study may lack sufficient statistical power to detect smaller or more nuanced effects.

Another finding is that both Balance and Battle contribute uniquely to healthy functioning. Battle was the only factor relating to positive affect and life satisfaction. This factor encompasses hope and self-empowerment, embracing challenges which promotes resilience. Positive emotions are demonstrated as stronger predictors of building resilience and increasing life satisfaction and these advantages can persist even when people experienced negative emotions [50]. Therefore, our finding overlaps with the recent efforts in schema therapy to argue that for a full functioning HA, the

absence of symptoms is not enough, but the presence of strengths promoting life satisfaction, positive emotions and self-efficacy, are also important [17,51]. Overall, while the Balance factor emerged as the most influential predictor, Battle appears to have a stronger impact when specifically predicting positive emotions and life satisfaction.

Our findings underline the need for a better understanding of the multidimensional structure of the HA. MHAS was developed and tested in Türkiye and the items were developed based on the qualitative study rather than solely on a theory-driven method. MHAS is the first of its kind in schema therapy, being based on data from a non-Western culture and emphasizing the importance of connectedness to others and resilience. Therefore, it is still important to test the factor structure in culturally diverse and clinical populations. Empirical testing of the complex relationship between Bond and Balance is also important in a cultural context. Affective empathy is found to be moderately correlated to clinical anxiety in the data derived from Middle East and East Asia in contrast to data derived from North America and Europe where the correlation was small [43]. Thus, culture might influence the display of the HA. In addition, we only tested linear relationships between the subscales of the HA and the related outcome variables. There is empirical evidence that the relation between empathy and depression is quadratic [49]. Thus, it is also important to test for non-linear relations between variables.

Still, this study has several limitations to consider. First, because our sample is non-clinical, we cannot generalize the findings to clinical populations. Second, the cross-sectional data restricts our understanding of the relationship between HA dimensions and prevents causal conclusions. Third, while data were collected in Türkiye, the sample was obtained via snowball sampling in Istanbul, which culturally aligns more closely to individualistic cultures and lack diversity, which limits generalizability. It should also be noted that the sample is characterized by a predominance of female participants and individuals with higher levels of education, which limits its representativeness of the general population in Türkiye. Similarly, conclusions regarding structural stability across genders should be interpreted with caution. In addition, the use of snowball sampling may have introduced self-selection bias, further limiting the representativeness of the sample. Furthermore, although the literature over the gender differences in empathy and compassion is robust [41,46] our sample predominantly consists of female participants. Due to time constraints, only a limited amount of questionnaires were included in the current study, limiting what can be said about construct validity to those constructs measured.

Despite these limitations, we do believe that these early results show that there is merit in measuring the HA as a multidimensional rather than unidimensional construct. We recognize that revision of the questionnaire (either in the wording of the specific questions or the questions used) might be needed. We would also recommend future studies use more instruments that can also indicate proper discriminant validity of the subscales, including instruments measuring resilience and self-compassion. Replication of these findings in clinical populations, diverse cultural contexts, and through the application of time series models might deliver more reliable results for the use of the MHAS.

Conclusions

To conclude, we developed a new scale to measure the HA based on a qualitative study with utilizing a bottom-up approach, tested its factor structure and association with various indices of mental well-being. The measurement model including Balance, Bond and Battle factors demonstrated an excellent fit to the data, supporting a three-factor model. The Balance dimension was associated with psychopathological symptoms and negative affect negatively, while Battle is the only factor relating to positive affect and life satisfaction. Although Bond demonstrates a positive relationship wellbeing, and with Balance and Battle, a high score on Bond, when Balance and Battle are taken into consideration, may in fact be associated with an increase in negative affect and psychopathological symptoms, which may be an example of Simpson's paradox.

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