



A new viewpoint to schema modes and mode domains through Polyvagal Theory: Could schema modes be just a way of coping?

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Accepted: 29 April 2022

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Abstract

The aim of this study is to investigate how the schema modes defined in Schema Theory group together and accordingly question the conceptualization of schema modes considering the theories combining evolutionary, neuroscientific, and psychological point of views in psychology literature. It was hypothesized that there would be differences in the categorization and conceptualization of schema modes conceptualized by Schema Theory based on Polyvagal Theory. The sample of the study consists of 2032 participants aged between 18 and 71 years old ($M = 36.00$, $SD = 14.312$) who applied to a psychotherapy center in Istanbul working with the approach of Schema Therapy. Short Schema Mode Inventory was applied to the participants. According to the results of the second-order factor analysis, compliant surrenderer, healthy adult, punitive parent, happy child, and detached protector modes were clustered in the first factor. Impulsive child, enraged child, condescending, and easily bored child modes were loaded under the second factor while demanding parent, detached self-soother, and status-seeking modes were loaded under the third factor. When the results were evaluated with respect to Polyvagal Theory, it was determined that the first factor represented the parasympathetic nervous system activation and consisted of schema modes that include surrender, freezing, and socialization responses while the second factor consisting of schema modes related to flight or fight responses represented the sympathetic nervous system activation. Moreover, the third factor consisted of the schema modes of the sympathetic nervous system, which included flight or fight responses with parasympathetic inhibition (vagal brake). The results were discussed in line with the literature.

Keywords Schema therapy · Schema modes · Polyvagal theory · Schema theory

Introduction

The origin of Schema Theory is based on the concept of “early maladaptive schemas”. The schemas are the rules rooting in unmet childhood needs, temperament, cultural factors, and selective internalization during childhood (Young, 1990). Since the rules of the early experiences are valid in

the conditions of the day in childhood, when they continue in adulthood, they create an unhealthy perspective, where they are not valid. According to Young (1999), a person tries to deal with schemas either by surrendering it and behaving towards the schema, by avoiding it to prevent activation of the schema related negative emotion, or by fighting it. However, these coping styles are unhealthy as they perpetuate the schema. In treatment processes, especially, if a client has many schemas besides many maladaptive coping styles, a treatment model is maintained through schema modes so that the concepts can be simply perceived by the client (Bamelis et al., 2012). Schema modes defined by Young et al. (2003) as the part of Schema Theory consist of responses to early maladaptive schemas and maladaptive coping styles in a specific time that is currently activated (Young et al., 2003). Schema modes are triggered related to the combination of early maladaptive schemas and maladaptive coping styles originated from maladaptive parenting and unmet childhood

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emotional needs. Young et al. (2003) describe four types of schema modes; namely, child modes, maladaptive coping modes, maladaptive parent modes, and healthy adult mode. Additionally, there are ten schema modes under these four schema mode categories. The first schema mode domain, child modes, include angry child, impulsive child, vulnerable child, and happy child modes (Young et al., 2003). Child modes are related to basic emotional needs that are not sufficiently met during childhood. During situations that evoke and trigger these unfulfilled emotional needs in adulthood, child modes become activated. Vulnerable child mode reflects the feeling of anxiety, fear, sadness, and vulnerability when the effects of the schemas emerge. Angry child mode reveals anger directly as the result of perceiving unfair behavior or since the basic needs are not satisfied. Impulsive child mode represents ignoring the limits and needs of others, just saturating one's own desires (Young et al., 2003). Furthermore, a person in happy child mode, feels love, belonging, and satisfaction. Happy child mode is the only adaptive child mode (Lobbestael et al., 2007). On the other hand, maladaptive schema modes, the second schema mode category, represent the extensive use of coping styles such as schema driven surrender (compliant surrenderer mode), overcompensation of unfulfilled needs (overcompensation modes), and avoidance not to trigger emotions related to the schemas (detached protector mode) (Young et al., 2003).

Compliant surrenderer mode reflects surrender coping and acts obediently, passive, approval seeking due to fear of conflict or rejection. Moreover, a compliant surrenderer endures abuse and does not express his/her own needs or wishes to others (Young, 2003). Detached protector mode includes disconnection, emotional withdrawal, social isolation, and behavioral avoidance (Young et al., 2003). As for the last maladaptive coping mode, overcompensation mode, compromise counterattack, and over controlling (Young et al., 2003). Moreover, demanding parent and punitive parent modes take part in the category of maladaptive parent modes (Lobbestael et al., 2007). The punitive parent mode makes the person to restrict, criticize, and punish himself/herself or others whereas demanding parent mode reflects high expectations from himself/herself and others causing pressure on him/her and others (Lobbestael et al., 2007). The last schema mode is the healthy adult mode which is an adaptive mode focusing on nurturing the needs of vulnerable child by replacing maladaptive coping modes with healthy behaviors and reducing the maladaptive parent modes (Young et al., 2003). According to the study of Lobbestael et al. (2007) there are 22 schema modes under four main schema mode domains. These 22 schema modes are indicated in Table 1. With the new studies, "schema modes" started to diversify differently than the ones suggested by Young et al. in 2003. This highlighted the need for further studies in the literature.

Table 1 22 Schema Modes under Four Basic Categories (Lobbestael et al., 2007)

a. Child modes	Vulnerability	Lonely Child Mode	
		Abandoned and Abused Child Mode	
		Humiliated/Inferior Child Mode	
		Dependent Child Mode	
	Anger	Angry Child Mode	
		Enraged Child Mode	
	Lack of discipline	Impulsive Child Mode	
		Undisciplined Child Mode	
	b. Maladaptive coping modes	Happiness	Happy Child Mode
		Surrender	Compliant Surrender Mode
Detached Protector Mode			
Avoidance		Detached Self-Soother Mode	
		Angry Protector Mode	
Overcompensation		Self-Aggrandiser Mode	
		Perfectionistic-Overcontroller Mode	
		Suspicious Overcontroller Mode	
		Bully and Attack Mode	
		Conning and Manipulative Mode	
	Predator Mode		
c. Maladaptive parent modes	Attention and Approval Seeker Mode		
	Punitive Parent Mode		
	Demanding/Critical Parent Mode		
d. Adult mode	Healthy Adult Mode		

In schema mode model (Young et al., 2003), especially, maladaptive coping modes focus on three basic reflexes of human beings as one of the neurobiological theories has emphasized before. On the other hand, according to the Polyvagal Theory, the autonomic nervous system organizes three basic physiological states namely, fighting, flighting, and freezing (Porges, 2011) as well as three maladaptive coping modes as avoidance, overcompensation, or surrender, which parallel the basic general adaptation responses to threat: flight, fight, or freeze described in Schema Theory (Young et al., 2003). The perceived level of safety determines which state has to be active (Van der Kolk, 2018). When human beings perceive a threat, first request help from the people around them and wait for comforting themselves (Van der Kolk, 2018). This reaction is a part of the social engagement system which includes the activation of the ventral branch of vagus nerve and also cranial nerves which control the muscles related with social skills; speaking, hearing, and mimicking (Porges, 2001). However, if nobody responds to the call for help or if feels an instant and violent danger, the organism chooses one of the more primitive ways to survive (Van der Kolk, 2018). These ways are fight and flight. The organism can fight the attacker or escape to a safe place (Van der Kolk, 2018). Nevertheless, if these reactions fail, the organism turns itself into a state of freezing, shutting down itself, disconnecting, and consuming very little energy (Van der Kolk, 2018). Fighting and flighting reflexes are related to the sympathetic nervous system while the parasympathetic nervous system (dorsal branch of vagus nerve) is associated with freezing reflexes (Van der Kolk, 2018). Apart from freezing and surrender reactions of the parasympathetic nervous system, it has positive self-protective effects such as slowing the heartbeat, digestion, healing of wounds, being able to focus on the good aspects of life, and socialization (Van der Kolk, 2018).

The fight situation described in the Polyvagal Theory is thought to be similar to overcompensation modes in the Schema Theory. Overcompensation modes include control, counterattack, and manipulative behaviors (Young et al., 2003). Antisocial personality disorder reflects counterattack coping behaviors and is related to activation of enraged child mode and bully and attack mode (Lobbestael et al., 2008). However, narcissistic personality disorder reflects compensation coping behaviors involving control, supremacy, hostility, and manipulation rather than direct counterattack behaviors (Young et al., 2003). Moreover, the most common modes in narcissistic personality disorder are lonely child mode, self-aggrandizer mode, and detached self-soother mode (Young et al., 2003). Thus, it can be said that the type of compensation coping behaviors may change according to the active schema modes. Counterattack behaviors of overcompensation mode reflect fight state and sympathetic nervous system response in Polyvagal Theory. However, it is

thought that control, supremacy, and manipulative behaviors of overcompensation mode are more calm behaviors than counterattack behaviors. This is thought to be related to the vagal brake in Polyvagal Theory. The vagal brake reflects reducing mobilization associated with fight or flight states with the activation of the ventral vagal parasympathetic system (Porges, 2001, 2007). In addition, vagal brake promotes calm behavioral states, social engagement behaviors, and self-soothing behaviors (Porges, 2001, 2007). Thus, it is thought that control, supremacy, and manipulative behaviors of overcompensation mode include vagal breaking and they represent an indirect state of fight, not directly involving fighting because of vagal braking. For this reason, it is thought that overcompensation modes can cluster in different groups within themselves, or that overcompensation modes may have similarities with other schema modes which include vagal brake such as detached self-soother mode. As a result, it is thought that examining the factor structures of sub-modes of the overcompensation mode together with other modes is a need for better identification of schema modes in the literature.

On the other hand, the flight situation described in the Polyvagal Theory is generally thought to correspond to the avoidance coping modes in the Schema Theory. However, avoidance coping style includes detached protector mode in Schema Theory (Lobbestael et al., 2007). It is thought that detached protector mode is actually associated with dissociation, emotional detachment, disconnection, or decreased awareness instead of avoidance. In Polyvagal Theory, “dissociation, emotional detachment, disconnection, decreased awareness” are associated with freezing (Van der Kolk, 2018). In freezing mode, “clients are disconnected from emotions-painful ones and “shuts down” and become “relatively compliant and nonresponsive” (Porges, 2011; Porges & Dana, 2018; Van der Kolk, 2018). According to Polyvagal Theory, people using freezing state may withdraw from social relationships, have dissociation and emotional unawareness (Van der Kolk, 2018). Different from Schema Theory, Porges (2011), in his theory depending on physiological measures like heart rate variability and respiratory sinus arrhythmia, emphasizes that dissociation, emotional detachment, withdrawal are the signs of freezing state. Based on the difference between two theories, research questions arise related to the categorization of coping modes in Schema Therapy. What if the detached protector mode is a surrendering mechanism instead of avoidance? In a study in which the relationship of dissociation and the schema modes were investigated, it is found that dissociation has the highest level of relationship with detached protector, vulnerable child, impulsive child, angry child, demanding parent, and punitive

parent modes (Barazandeh et al., 2018). In addition, it was found that detached protector mode predicted dissociation (Barazandeh et al., 2018). Accordingly, in two different studies in which the relationships of schema modes with each other were analyzed, it is emphasized that the detached protector mode has the highest level of relationship with vulnerable child mode (Aytaç et al., 2020; Riaz et al., 2013). Because of the high relationship between detached protector mode and vulnerable child mode which represents the passive position and feeling the pain, it is thought that the detached protector mode reflects surrender coping mode instead of avoidance coping mode. In a study that investigated schema modes factor structure it was found that detached protector mode groups together with vulnerable child, lonely child, punitive parent, detached self-shooter, compliant surrenderer, and demanding parent modes in the first factor. This factor was named the internalizing because it reflects feelings of internalized self-criticism, painful feelings, vulnerability, and loneliness (Keulen-de Vos et al., 2017). However, it was found that detached protector mode also grouped together with the bully and attack, impulsive child, angry child, self-aggrandizer and, over controller modes in the second factor. Second factor was named externalizing because it includes impulsivity, anger, and overcompensatory or self-aggrandizing behaviors that were reflected outside (Keulen-de Vos et al., 2017). According to the results of the study, it is seen that detached protector mode is more relevant to the first factor, namely modes that include surrender (Keulen-de Vos et al., 2017). In another study (Arıcı, 2019; Arıcı et al., 2021) conducted to measure the mediating role of emotion regulation on the relationship between schema domains and fibromyalgia (associated with freezing reflex in Polyvagal Theory), it was found that unawareness of emotions/numbness had a mediating role. Due to the relationship between freezing, numbness and fibromyalgia, it was thought that detached protector mode (related to unawareness of emotions/numbness) could also be related to freezing reflex.

Lobbestael et al. (2007) underlined the importance of investigating what the ultimate purpose of schema mode conceptualization should be. The schema mode concept has some limitations due to the lack of clarity in the theoretical, clinical, and scientific background (Lobbestael et al., 2007). Thus, Lobbestael et al. (2007) study aimed at clarifying schema modes theoretically and by therapeutic guidelines, and in their study, it was investigated which schema modes characterized different personality disorders. In another study that investigated schema mode structure in personality disorders, it was found that borderline personality disorder had high scores on internalizing modes however antisocial personality disorder had high scores on externalizing modes (Keulen-de Vos et al., 2017). Moreover, in studies examining the grouping

of modes in terms of personality disorders, schizoid, and schizotypal personality disorders have not yet been clearly defined (Bamelis et al., 2011). Therefore, it can be said that there are limitations in the categorization of the modes according to personality disorder. However, Arntz and Jacob (2011) stated that identifying common schema modes in personality disorders may not adequately identify each case due to the presence of co-diagnosis and complex patterns in personality disorders. Due to the limitations stated by Arntz and Jacob (2011), it was thought that the research of how the schema modes group together according to general parameters and defenses of human psychology instead of personality disorders was considered as an important need for the literature. Moreover, Bamelis et al. (2011) claim that the schema mode model is brand new and more modes are likely to be defined. It was suggested that the validity of the schema mode model must be retested to combine and examine all formulated modes in one comprehensive mode model (Bamelis et al., 2011).

On the other hand, the importance of modes in treatment of psychological problems are emphasized from different approaches. According to the findings obtained from cognitive neuroscience, individuals are composed of parts, selves or voices that are in more than one interaction (Hermans, 1996). Cognitive therapy defines these structures as different components of personality with the expression "mode" (Beck, 1996). Human beings experience different parts representing different states related to expressing or suppressing, anger, unanswered questions, incomplete relationships, and farewells. At this point, it is required to talk to the parts of ourselves. Chair studies that are used as experiential techniques in Schema Therapy are psychological interventions that make these therapeutic dialogues with our sides possible (Pugh, 2017). With therapeutic dialogue interventions, it is decided which modes will be the focus of the intervention, and then it is worked with these modes directly by placing them on separate chairs (Pugh, 2019). Perls (1973) stated that chair study is an important method that provides awareness of our psychological conflicts in the present. It is noteworthy clinically that in important therapies such as psychodrama, cognitive therapy, gestalt therapy, and schema therapy, the subject of "modes" is addressed and studies are conducted with modes within the scope of therapeutic dialogue or chair studies (Beck, 1996; Moreno, 2014; Perls, 1973; Young, 1984/1990).

Depending on all this literature and the questions of which schema modes are corresponding to Polyvagal Theory's states and other approaches recognizing working with modes in psychotherapy settings, in this current study, it was aimed to investigate how the schema modes are grouping together. Moreover, according to the current study's results of the schema modes factor structure, it was also aimed to discuss how perspective on schema modes in schema therapy should be different. Accordingly, it was hypothesized that there would be

differences in conceptualization and categorization of schema modes determined by Schema Theory (Young et al., 2003).

Method

Participants

The sample of the study consists of 2032 participants (1404 females and 628 males) aged between 18 and 71 years old ($M = 36.00$, $SD = 14.312$) who applied to a psychotherapy center working with the schema therapy approach in Istanbul. After their first interview at the therapy center conducted by the psychiatrist working in this center, the clients were evaluated in terms of psychotic and paranoid symptoms according to DSM-V. The clients with these symptoms were not included in the study. The remaining logged into an online database and filled SMI and SCL 90-R on the basis of volunteerism after reading informed consent of the study. From this group (2353 participants), the clients whose measures had missing items were also eliminated. Due to confidentiality issues, only age and gender information was obtained from the participants. While creating the sample, a heterogeneous group having schemas and schema modes and in need of psychotherapy was chosen and focusing on any specific pathology group as the sample was not preferred in order to consider generalizability. Psychological symptoms of the participants (SCL 90-R) in the clinical group were presented in Table 2 while descriptive statistics of SCL-90-R scores were presented in Table 3. These results revealed that depression symptom was one of the most common psychological disorders, whereas phobic anxiety was reported as the lowest symptom (See Table 2).

Table 2 Distribution of psychological symptoms in clinical group

Symptoms	Symptom level		
	Normal	High	Very High
	%	%	%
Somatization	77.2	18.4	4.4
Obsessive–compulsive	44.1	41.5	14.4
Interpersonal sensitivity	52	33	15
Depression	35.8	38.6	25.6
Anxiety	66.5	24.1	9.4
Anger- hostility	74.3	17.8	7.9
Phobic anxiety	86.6	9.7	3.7
Paranoid ideation	63.3	27.9	8.8
Psychoticism	75.7	19.4	4.9
Additional scales	63.1	30.4	6.5
SCL 90 total	63.8	26.8	9.4

Table 3 Descriptive statistics of SCL-90-R score

	Minimum	Maximum	Mean	Std. Deviation
Somatization	12,00	57,00	24,557	9,453
Obsessive–compulsive	10,00	48,00	26,892	7,828
Interpersonal sensitivity	9,00	45,00	22,646	7,691
Depression	13,00	65,00	37,002	11,466
Anxiety	10,00	50,00	22,674	8,585
Anger- hostility	6,00	30,00	12,853	5,270
Phobic anxiety	7,00	33,00	11,872	5,112
Paranoid ideation	6,00	30,00	14,174	5,112
Psychoticism	10,00	50,00	19,283	6,783
Additional scales	7,00	33,00	16,112	5,184
SCL 90 total	90,00	419,00	208,064	60,498

Measures

Short Schema Mode Inventory

The Schema Mode Inventory (SMI) was developed by an international group (SMI, Young et al., 2007) to determine the schema modes. Since SMI has a large number of items ($N = 207$), no research has been conducted related to the psychometric properties of the long-form (Lobbestael et al., 2010). Thus, Lobbestael et al. (2010) developed a short version of the SMI. The study was conducted in a sample of 863 participants. Initially, the scale had 124 items. Due to factor loadings, 6 items were removed from the scale and 14 factor structure with 118 item-scale provided better data model fit as the result. In addition, the results demonstrated adequate and acceptable internal consistencies of the 14 subdimensions (ranged between 0.79 and 0.96) and test–retest reliability (ranged between 0.65 and 0.92). The items were measured via a 6 Likert-type scale ranging from 1 (never) to 6 (always).

The Turkish adaptation of Short Schema Mode Inventory was done by Aytaç et al. (2020). The study was conducted in a sample of 1,287 clinical and nonclinical participants. According to results of the factor analysis, a 14-factor structure produced a good level of adaptive value with 113 items ($CFI = 0.96$, $NNFI = 0.95$, $SRMR = 0.068$, and $RMSEA = 0.056$). Besides, the results indicated acceptable internal consistencies of the 14 subdimensions (between 0.66 and 0.92) and test–retest reliability (between 0.65 and 0.88). It was found that clinical participants' schema mode scores were higher than nonclinical participants' scores. Moreover, nonclinical group had higher scores of healthy schema modes than the clinical group.

Data Analysis

In the analysis of the data, Principal Component Analysis (PCA) was used to examine the factor structure of the scale and Kaiser–Meyer–Olkin was conducted as the extraction method to enable the comparison with the published studies. In order to test the fitness of the data, Kaiser–Meyer–Olkin (KMO) and Barlett's tests were utilized. Equamax rotation was selected as a more interpretable solution emerged compared to the other methods of rotation. Items with a factor loading of 0.30 and above were considered indication of the goodness of fit in terms of the distribution of scale items under the factors (Çokluk et al., 2012). Analyses of the data were conducted via SPSS 25 and LISREL 8.88 programs with a 0.05 significance level.

Results

In order to examine the both first and second order factor structure, PCA was applied to all items of the Short Schema Mode Inventory to measure how the items group together. Before performing the PCA, Kaiser–Meyer–Olkin (KMO) and Barlett's tests were conducted as the measure to test multivariate normality and sample size. Barlett's value was found to be statistically significant ($\chi^2 = 55,717.76$ $sd = 21$, $p < 0.000$), and Kaiser–Meyer–Olkin's value was found to be 0.93. These findings showed that the normality assumption was provided and the multivariate correlation matrix was suitable for factor analysis.

Considering the results of PCA, items with a factor loading of 0.30 and below were excluded from the scale (114, 62, 106, 60, 95, 4, 36, 32, 7, 50, 53, 77, 30, 93, 99, 45, 35, 92, 16, 59, 122, 104, 70, 33, 83, 42, 61, 17, 113, 76). In addition, that the principles that if items have a high loading value in one factor and a low loading value in another factor, the difference between these two loadings should be at least 0.10 (Büyüköztürk, 2012: 124–125; Çeçen, 2006: 105) was regarded. Therefore, the items of 105, 110, 74, 79, 20, 87, 68, 71, 34, 73, 49, 51, 6, 120, 67, 12, 85, 39, 26, 99, 9, 56, 22, 11, 111, and 119 were removed because of the cross-loading. Factors with an eigenvalue above one were analyzed to determine the number of factors. The results of factor analyses indicated that the 124-item structure of the scale was distributed under 13 factors. The results of the analyses indicated that it explained 58% of the total variance of the scale. The results of PCA were presented in Table 4.

As a result of PCA, due to the novel combination of some items, it was found that there were 3 mode domains different from the content of the 22 schema modes in the study of Lobbstaël et al. (2007). In this direction, new names for these three modes were defined by considering the meaning and content of the items. For these new schema mode names,

Table 4 Results of the factor structure of the scale

Schema Modes	EFA λ
Enraged Child Mode	
y46	,74
y98	,73
y14	,72
y25	,68
y103	,65
y54	,62
y101	,61
y123	,55
y5	,39
Impulsive Child Mode	
y78	,77
y40	,73
y69	,69
y15	,57
y97	,52
y44	,44
y66	,43
Compliant Surrenderer Mode	
y55	,68
y100	,67
y38	,67
y8	,63
y37	,59
y18	,58
y117	,47
Happy Child Mode	
y19	,74
y48	,69
y2	,67
y96	,63
y64	,58
Punitive Parent Mode	
y72	,70
y84	,70
y118	,66
y94	,64
y3	,56
y58	,48
Detached Protector Mode	
y43	,80
y28	,79
y75	,62
y88	,59
Status Seeking Mode	
y27	,82
y31	,81
y89	,71
y10	,56

Table 4 (continued)

Schema Modes	EFA λ
Angry Child Mode	
y63	,74
y109	,69
y47	,61
Condescending Mode	
y102	,74
y112	,71
y81	,65
y91	,46
Detached Self-Soother Mode	
y57	,85
Y52	,83
Y86	,67
y41	,66
Demanding Parent Mode	
y115	,71
y116	,67
y82	,61
y90	,56
y23	,52
Healthy Adult Mode	
y29	,60
y13	,54
y124	,52
y80	,46
Easily Bored Child Mode	
y65	,74
y21	,71
y107	,55
y121	,54

Easily Bored Child Mode (feeling distressed or boredom of the procedural or obligatory tasks to be done to reach long term goals and reacts rules and regulations by not doing boring tasks), Condescending Mode (bullying people by humiliating them), and Status Seeking Mode (seeking status with grandiosity) were deemed appropriate (See Table 4).

After examining the factor structure of the scale, schema mode domains were determined by using the second-order (higher-order) factor analysis, and it was found that the 3-dimensional structure was the most appropriate model, which explained %50 of the total variance. The results were indicated in Table 5.

As a result, in the first dimension, Compliant Surrenderer Mode, Healthy Adult Mode, Punitive Parent Mode, Happy Child Mode, and Detached Protector Mode took part in. Impulsive Child Mode, Enraged Child Mode, Condescending Mode, and Easily Bored Child Mode were loaded under second factor, Demanding Parent Mode, Detached

Table 5 Result of second-order Exploratory Factor Analysis (EFA)

Modes	Factor 1	Factor 2	Factor 3
Compliant Surrenderer Mode	,76		
Healthy Adult Mode	-,71	,32	
Self Punitive Mode	,70		
Happy Child Mode	-,70		
Detached Protector Mode	,68		
Impulsive Child Mode		,78	
Enraged Child Mode		,69	
Condescending Mode		,66	
Easily Bored Child Mode	,40	,55	,35
Demanding Parent Mode			,81
Detached Self-Soother Mode			,64
Status Seeking Mode		,42	,60

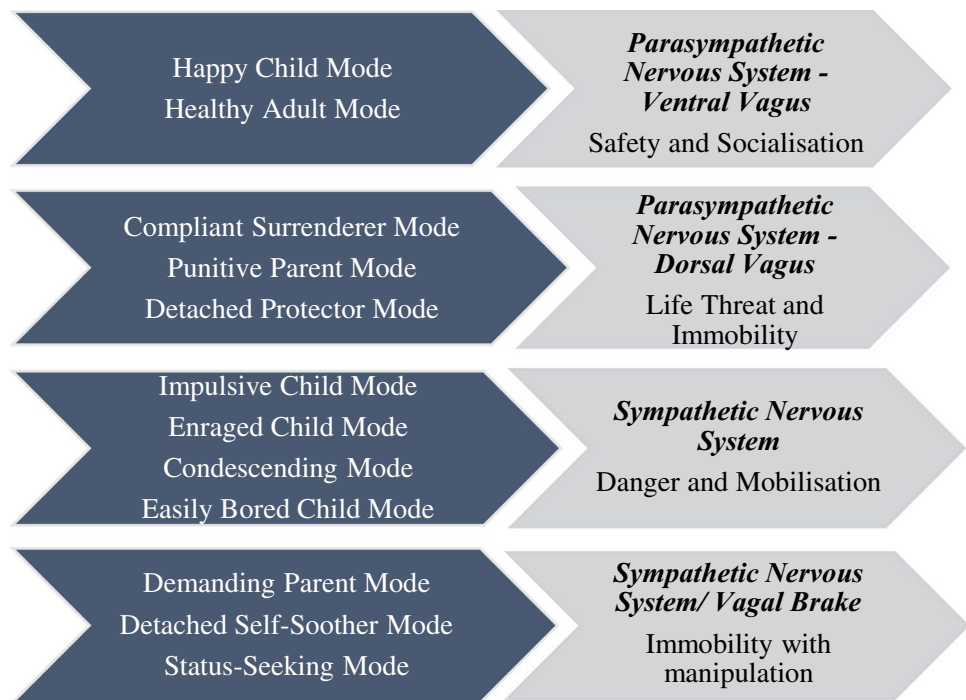
Self-Soother Mode, and Status Seeking Mode factors were loaded under the third dimension (See Table 5).

Discussion

According to the results of the higher-order factor analysis of the schema modes, three higher-factors were detected. Compliant surrenderer, healthy adult, punitive parent, happy child, and detached protector modes were clustered in the first higher-order factor. Impulsive child, enraged child, condescending, and easily-bored modes were loaded under the second higher-order factor while demanding parent, detached self-soother, and status seeking modes took part in the third higher-order factor. Accordingly, the names of many modes indicated similarity with the original model (Young et al., 2003) and the study of Lobbestael et al. (2007) while condescending, easily-bored, and status seeking modes needed to be given different names because of the items clustered under them.

Evaluating these results in the light of Polyvagal Theory (1995, 2001, 2007) it arises that the first factor is related to the parasympathetic nervous system (See Fig. 1). In Polyvagal Theory, it is claimed that both *freezing* including collapsing and immobility and *social engagement* involving calmness, connectedness, and safety are both related to the parasympathetic nervous system. However, 'freezing responses' are associated with the dorsal vagal complex whereas 'social engagement' is related to the ventral vagal complex of the parasympathetic system (2001, 2007). Accordingly, the results of the first higher-order factor can be explained as the happy child and the healthy adult modes are associated with the function of the parasympathetic nervous system, which is related to social interaction involving trust and the tendency to focus on the beautiful aspects of life. Therefore, these two modes are loaded with negative

Fig. 1 Distribution of schema modes towards basic psychological states in Polyvagal Theory



factor loadings under the first higher-order factor. However, compliant surrenderer, detached protector, and punitive parent modes are loaded into the first higher-order factor positively and reflect the function of the parasympathetic system of inactivity, surrender, freeze or collapse in the face of danger. In this direction, it is assumed that focusing on the beautiful aspects of life confidently and peacefully is the opposite of surrendering and freezing reflexes. The result reveals that while happy child and healthy adult modes are related to ventral vagal activation in the parasympathetic system, modes of compliant surrenderer, detached protector, and punitive parent are associated with dorsal vagal activation in the parasympathetic nervous system as parallel with Polyvagal Theory (2001, 2007).

Based on these results, it can be said that the happy child and the healthy adult modes overlap with the social engagement concept of Polyvagal Theory. Apart from this, one remarkable result related to the first higher-order factor is that detached protector mode which was defined as avoidance coping mode in Schema Theory (2003) is found related to surrenderer mode/freezing response. Thus, one of the research questions of the current study comes to conclusion. Accordingly, the results of this study demonstrate that the detached protector mode reflecting the inactivity, surrender, freezing or collapse function of the parasympathetic system in the face of danger is among the surrender/freezing responses within the parasympathetic nervous system, but not in the avoidance or fighting response part of the sympathetic nervous system. On the other hand, in the study in which 22 schema modes were classified, the detached

protector mode was classified under the heading of avoidance (Lobbestael et al., 2007). In the same study, it was found that the detached self-soother mode and the detached protector mode are found in the same group (Lobbestael et al., 2007). However, according to the results of the current study, detached self-soother mode was assigned to a different group than the detached protector mode. It was loaded into the third factor which is assumed to belong to the sympathetic nervous system activation with the vagal brake which produces sedative behaviors. Accordingly, the findings of this study differ from the schema mode classification of Lobbestael et al. (2007) and Young et al. (2003) (See Fig. 1). On the other hand, Roediger et al. (2018) also defined the detached protector mode as related to passiveness, reflex of shutting down, dissociation, and pain disorders similar to the current study.

Furthermore, one other remarkable result related to the first higher-order factor is that the punitive parent mode took part in the freezing responses. According to Schema Theory (Young et al., 2003), punitive parent mode is defined as maladaptive and dysfunctional and other coping modes (compliant surrenderer and detached protector) trigger in order to prevent negative emotion produced by this mode on vulnerable child mode (Roediger et al., 2018). Therefore, based on this explanation, it can be supposed that punitive parent mode is a part of freezing reaction in order to survive against a life-threatening danger by focusing on and exaggerating one self's erroneous behaviors or features to be able to stay still and not provoke the aggressor. Accordingly, the individuals can stay in compliant surrender and/

or detached protector mode as long as it is needed without being aware of their legitimate needs and wishes. On the other hand, one other explanation related to punitive parent's being in the first factor could be explained with the items related to self-criticism. It can be assumed that self-criticism fosters the freezing response because it is difficult for an individual to escape from the critical inner voice and the negative emotion caused by this voice. In their book, Roediger et al. (2018) also differentiate the inner critic voice/punitive parent as self-directed and other directed. Moreover, they claim that the self-criticism and the tendency to surrender or freeze response positively correlated. Porges and Dana (2018) also argue that people who experience trauma also have strong self-critical inner voices similar to punitive parent mode. Evaluating this assumption with Schema Theory (2003), it can be supposed that punitive parent mode activates the compliant surrenderer and detached protector modes to reduce the possibility of getting in conflict with the attacker/threat and protects the vulnerable child from a greater danger.

The second higher-order factor is assumed that it represents the sympathetic nervous system activation as the modes (i.e., impulsive child, enraged child, condescending, easily-bored modes) clustered under this factor demonstrate a mobility in the face of danger (Porges, 1995; Porges, 2001, 2007) (See Fig. 1). The common feature of all modes loaded into this dimension is that the vagal brake is weak. The vagal brake reflects reducing mobilization associated with fight or flight states (Porges, 2001, 2007). In addition, vagal brake promotes calm behavioral states and behaviors related to social engagement (Porges, 2001, 2007). Considering items under these modes, *enraged child mode* related to throwing objects, attacking threatening, and harming, *impulsive child mode* including running for desire without accepting any limitation, breaking the rules, behaving without thinking opposite of punitive parent mode, *condescending mode* consisting items related to making fun of others, being critical, and belittling are associated with the fighting function of the sympathetic nervous system. On the other hand, *easily bored child mode* is associated with fighting functions due to its items related to laziness, feeling distress or boredom of the procedural or obligatory tasks to be done to reach long term goals (Porges, 2001, 2007). Apart from explanations of Polyvagal Theory, there is a concept in the literature called 'impulsive anger' (Blair, 2016; Critchfield et al., 2005) which can clarify why these modes group under the second higher-order factor together. If the threat is too close it causes freezing, and if it is approaching it causes fighting; but when it is too close and impossible to escape then it can cause impulsive aggression (Blanchard & Blanchard, 1977). Many studies explain the positive link between impulsivity and anger in terms of the lack of inner locus

of control, lack of decision making, and provocation different from goal directed instrumental aggression (Blair, 2010; Deming & Lochman, 2015). Additionally, impulsivity and anger demonstrate an action in the face of threat compared to freezing/immobilization states. Like the function of anger to get rid of the threat, impulsivity can be assumed as a reflexive activity to quench hunger quickly before an opponent takes the food or any other need. For this reason, it is understandable that impulsivity, attack, and anger-oriented modes are loaded under the same factor. Furthermore, this point of view supports our assumption related to grouping the modes as fight or flight.

The third factor is also interpreted as related to the sympathetic nervous system like the second factor (See Fig. 1) but with a stronger vagal brake scope of the parasympathetic nervous system. According to Polyvagal Theory (2001, 2007) vagal brake promotes calm, socially engaged, and self-soothing behaviors (Porges, 2001, 2007) compared to the antisocial and violent behaviors of the sympathetic nervous system activation. We assumed that the third higher-order factor modes are used by individuals who can feel threatened easily like the individuals who use the modes with sympathetic nervous activation, but at the same time have the ability to socially engage with others. These individuals can use their social engagement abilities in a political or manipulative way to fight or flight. So, we conceptualized the third higher-order factor as sympathetic fight/flight reactions with social engagement component (vagal brake) thus individuals can act with a covert anger, rage or impulsivity, keeping the social relationships intact to reach long term goals. This manipulative or political ability is not present within the modes with the pure sympathetic activation. As more sophisticated fight mechanisms, demanding parent and status seeking modes which include items related to constantly seeking success, reaching high standards and being extraordinary may be ways to intimidate and indirectly beat the threat. We assume that these modes are evolutionary developed especially against the threats to the social status of the individuals which can decrease the level of comfort and feeling of safety. So instead of directly fighting with the threat, having high social status with the help of status seeking mode and high standards with the demanding parent mode, individuals can be out of reach of the threats where the common people have to face more often. On the other hand, detached self-soother mode based on doing excessive activities (i.e., sports, watching TV, working) to divert attention to avoid bothering thoughts or feelings is assumed to be flight response based on its content. In this factor, there is a social brake within the scope of the vagal brake. The detached self-soother mode in this factor tries to calm him/herself with more socially accepted ways compared to easily bored child mode in the second factor. Demanding parent and status seeking modes are not

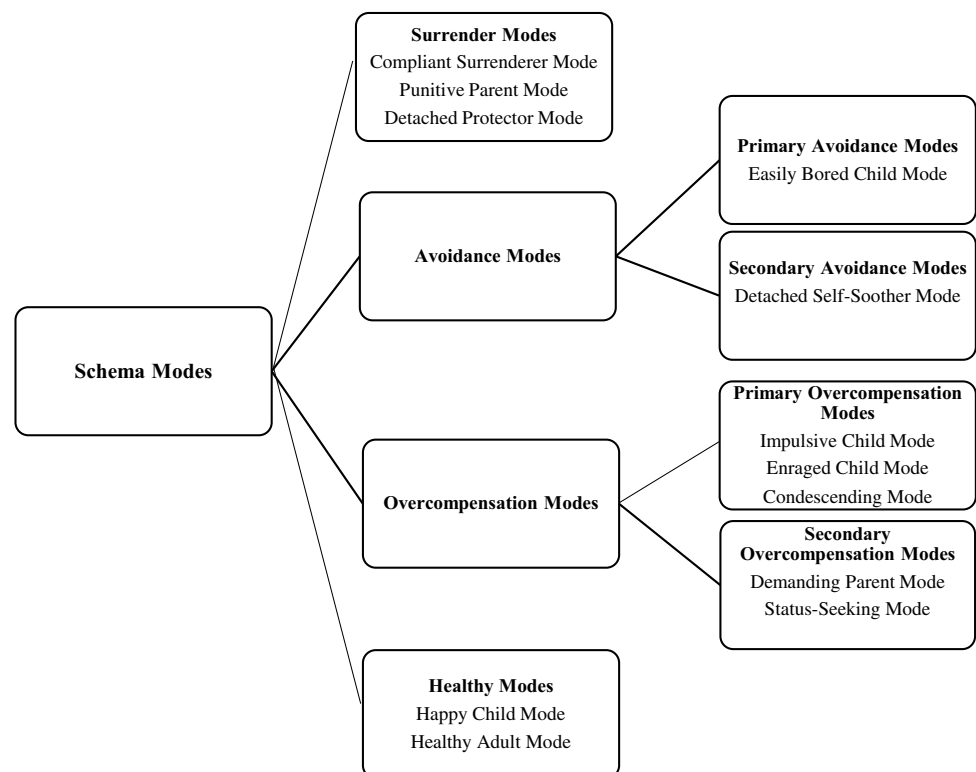
as damaging and aggressive in interpersonal relationships as the enraged child, impulsive child and condescending modes loaded in the second factor.

Findings of higher-order factor analysis of this study indicate that schema modes are not factored under 4 main headings as child modes, maladaptive parent modes, maladaptive coping modes, and adult modes, as stated in Lobbestael et al. (2007) study. Moreover, it is noteworthy that the first higher-order factor of this study is reflecting the dorsal parasympathetic system, similar to the internalization dimension which occurred in the study of Keulen-de Vos et al. (2017). In addition, it is thought that the second higher-order factor of this study which is reflecting the sympathetic system is similar to the externalization dimension in the study of Keulen-de Vos et al. (2017). Considering that all these studies that are related to the classification of schema modes and higher-order factor analysis findings in the literature is limited, the following question arises according to the findings of this study: Does the higher-order factor structure of SMI show parallel features with Polyvagal Theory? Due to the results of this study, the first factor represents the parasympathetic nervous system and consists of schema modes that include the surrender, freezing, and socialization responses of the parasympathetic nervous system. The second factor represents the sympathetic nervous system and consists of schema modes that include flight or fight responses in which the vagal brake is absent or weak. The third factor consists of the schema modes of the sympathetic nervous system, which

includes flight or fight responses with a strong vagal brake. The findings of this study are consistent with the features of the Polyvagal Theory (See Fig. 2).

According to the results of this study (See Fig. 2), it is thought that the three groups in which schema modes are clustered, associated with three coping styles (avoidance, overcompensation, and surrender in schema theory; flight, fight and, freeze in Polyvagal Theory) and, this study reveals that the schema modes are coping mechanism produced to deal with the perceived threat. In addition, with this study, schema modes appear as coping through the way of perceiving the threat in life, whether it is the parent or the child mode. Furthermore, schema coping modes are also defined as maladaptive regulatory strategies in another study (Salgo et al., 2021). Despite reducing the impact of emotional response to unmet needs in the short term, it causes dysfunctional emotion regulation in the long term as they do not provide satisfaction of basic needs like safety, soothing, and socialization (Salgo et al., 2021). Accordingly, Polyvagal Theory (Porges & Dana, 2018, p. 50–69) emphasizes that a healthy emotional regulation is associated with parasympathetic nervous system-ventral vagus activation depending on feeling safety and socialization and this is related to happy child and healthy adult modes in Schema Theory. In the original schema model, dysfunctional parent voices (facilitating surrender under the effect of threat/causing feeling negative), vulnerable child (affected/knowing what the individual needs), coping modes and impulsive/undisciplined

Fig. 2 Proposed mode distribution after reviewing schema modes through Polyvagal Theory



child and other coping modes also create an unhealthy coping while trying to prevent the child from being affected by the inner parental thoughts/voices. Furthermore, many studies emphasize the mediating role of emotion regulation between schemas/schema modes and psychopathology (Akhun, 2012; Çelik, 2021; Gross, 2001; Salgo et al., 2021; Sapmaz, 2014). According to these studies, schemas and schema modes can cause dysregulated emotions and dysregulation strategies through creating problems in emotional awareness, emotional clarity, impulse control, emotional expression, developing goal-oriented cognition and behavior under stress, and developing strategies to feel positive (Arıcı et al., 2021; Bitmiş, 2019; Sajadi et al., 2015). Schema Mode Model helps to reduce dysfunctional modes while promoting functional modes (Dadomo et al., 2018). Thus, it can be claimed that dysregulated emotions and dysregulation strategies have been studied in schema therapy scope of maladaptive coping modes and functional modes (happy child mode and healthy adult mode). In this study, the items belonging to the vulnerable child mode did not have the appropriate factor loadings and they are excluded. Considering the modes are just related to coping, it is understandable why the vulnerable child mode items were extracted from the remaining schema mode scale items. Nevertheless, in schema therapy treatment plan, since the vulnerable child is accepted as the side that knows what a person feels and needs (Young et al., 2003), this hidden side among these coping strategies can also be accepted as the feeling part created by the threat. Therefore, with the viewpoint of the evolutionary approach of Polyvagal Theory (2001), it can be assumed that in order to progress in treatment, it is important to reach the vulnerable child to help the individual to feel and react more adaptive or functional.

Since the studies on the classification of schema modes are limited, it is thought that this study will contribute to the literature with a new viewpoint and be an important study in terms of filling the gap in Schema Therapy literature in terms of conceptualization. In addition to this, the findings of this study show that schema modes can be classified according to the coping mechanisms specified in Polyvagal Theory and it is assumed that it brings a new and remarkable perspective to the subject of schema modes. Thus, clinicians working with schema therapy can present more explanatory information by making use of Polyvagal Theory while introducing schema modes to their clients within the scope of psycho-education. In addition, the findings of this study may enable better learning in schema therapy training within how schema modes are classified according to the logic of Polyvagal Theory depending on neurobiological approach. Thus, establishing partnerships with different disciplines in the scientific sense related to schema modes and a deeper understanding of the operation of schema modes can be provided via the current study. Parallel to the chair works described

in the literature, the existence of many therapy schools that involve working with modes (Moreno, 2014; Perls, 1973; Young et al., 2003), suggest that working with modes is effective in the clinical settings. Perls (1973) stated that chair work is an important method of providing awareness of our psychological conflicts in the present. For this reason, this study, which allows us to understand the physiological scientific origin of schema modes (used in chair works) within the scope of Polyvagal Theory, can be considered to be a strong study. Understanding which mode corresponds to which function of the nervous system can provide a new and creative perspective in vocalizing schema modes in the psychotherapy practice. In addition, it is thought that reliable findings were obtained with a large number of clinical participants in this study, and accordingly, conducting this study with a large sample can be assessable as another strength of this research. Finally, one another remarkable contribution of this study is that detached protector mode is found a freezing response since this reconceptualization of this concept would be a new point to the schema therapists working with somatization, trauma, and dissociation. While working with this group via this novel viewpoint, the clinicians will perceive the detached protector mode as unintentionally suppressed emotion/freezing in emotion and they will need to make the patients aware of their emotions via observing and following their unspoken body sensations, pains, and way of relating with the therapist. The most important treatment philosophy will be for the schema therapist working in this way to reveal and trigger the client's emotions by reading his/her indirect messages and provide a safe therapy environment in order to open inner experiences. Parallel with the suggestion of the current study, many studies in the literature have emphasized that somatization and disassociation are associated with apathetic freezing reflexes and it is an accepted approach that the main part of the treatment in somatization and dissociation is to reach the emotion (Payne et al., 2015; Porges, 2001, 2007; Porges & Dana, 2018; Van der Kolk, 2018; Van der Kolk & Fisler, 1995).

In summary, given the results of this research, it would be helpful for a practitioner working with schema modes to consider the following. Firstly, since happy child and healthy adult modes are related to social engagement and safety, aiming to increase these modes of clients as the treatment goal and fighting with the maladaptive modes blocking the activation of these modes would be effective. Secondly, as working with one of the compliant surrenderer modes (i.e., compliant surrenderer, punitive parent, and detached protector), considering that the client's thoughts and feelings may not be reached by cognitive questioning since the client suppresses the emotions and has difficulty to cope the negative emotion would be important to develop treatment strategy. For this reason, working with such a client, focusing on experiential techniques to trigger the client's frozen/

suppressed emotions, using techniques related to therapy relationship and drawing attention to psychosomatic complaints and unspoken indirect signals emerging in therapy processes to make the client aware of his/her emotions and needs, instead of asking questions and using cognitive techniques could be more effective. Making the client become aware his/her emotion and accept it would be the main goal, with a corresponding focus on the need of spontaneity and play and freedom of expression of own wants and needs. In addition, it would be particularly important with such clients that the therapist establish a caring, reassuring, and accepting therapeutic relationship to make the client express his/her feeling spontaneously. Secondly, working with avoidance coping modes, it would be important to take into account that the client having easily-bored mode avoids from boredom directly whereas the client with detached self-soother mode has the tendency to avoid feeling negative emotions via concentrating on activities indirectly. Therefore, trying to develop self-discipline and tolerance to boredom would be beneficial when working with easily-bored mode while concentrating to trace the avoided emotion, making the client become aware, accept, express emotions, and develop healthy strategies instead of avoiding would be more effective to deal with detached self-soother mode. Thirdly, while working with a client who has modes of impulsive child, enraged child, and condescending, it would be helpful to find out what a client compensates/fights for and directly try to meet the needs in an unhealthy way via impulsivity, feeling anger, criticizing, and belittling others. On the other hand, it would be more beneficial to discover what a client tries to compensate indirectly by using demanding parent and status seeking modes, by taking excessive responsibility, trying to be perfect and to have status in the eyes of others. Accordingly, it would be beneficial to make client develop healthy strategies to reach their basic needs instead of compensating.

This study has some limitations. First, many items of the SMI scale were excluded from the scale due to the fact that the factor loadings were not at the expected level according to the findings of factor analysis considering cross-loading. Therefore, some of the schema modes were not included in this study, since fewer items were analyzed in the higher-order factor analysis. The second limitation is that due to the confidentiality of the participants in the clinical group, demographic information other than age and gender could not be obtained. In future studies, it is thought that it will be useful to obtain more demographic information and the diagnosis of all participants by other evaluation methods, repeat this study in clinical samples, and compare clinical and non-clinical samples. In addition, it is suggested that causality relationships can be examined within the scope of schema modes and Polyvagal Theory, and the further studies including regression analysis will also contribute to the literature. Moreover, in order to benefit from Polyvagal Theory

to understand physiological origins of schema modes, experimental studies including physiological measures like heart rate variability and respiratory sinus arrhythmia can make remarkable contributions in the future. On the other hand, in this study, the first factor included both compliant surrenderer (being obedient) and detached protector (being dissociated) together. However, being obedient and being dissociated and stuck in an emotion could be different spectrums of freezing response. Therefore, conducting further studies investigating how being obedient differs from detaching from the emotions as the freezing reflex will also make an important contribution to the literature. Finally, although easily-bored mode is associated with the sympathetic nervous system in the current study, there are different studies (Dahlen et al., 2004; Moynihan et al., 2017) emphasizing the relationship among boredom, anger, and impulsivity. Therefore, further studies searching the relationship between different varieties and levels of boredom and parasympathetic nervous system will be contributing to the literature.

Data Availability The datasets generated during and/or analysed during the current study are not publicly available due to confidentiality issue of clinical participants.

Declarations

Ethical Statement *Ethics Approval* was obtained from the ethics committee of Bingöl University.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors did not receive support from any organization for the submitted work. The authors have no relevant financial or non-financial interests to disclose. The authors declare no conflict of interest in this study.

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