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The clinical significance of drives in individuals with fibromyalgia. A concept mapping study

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Abstract

Introduction: Fibromyalgia's impact on a societal and individual level is considerable, with current treatment being moderately effective and, therefore, leaving room for improvement. This study examines the applicability of Gilbert's emotion regulation model by investigating personal drives in people with fibromyalgia, their perceived importance, and the possible relationship to somatic symptoms. We hypothesized that the resulting drives would be based on evolutionary social needs and focused on controlling fibromyalgia pain and coping with the condition. We expected drives related to the control of fibromyalgia pain to be correlated to higher levels of somatic symptoms.

Methods: a concept mapping design was used to gather qualitative data from participants on an international scale regarding personal drives; this resulted in an extensive overview of forty drives. 74 participants with a self-reported fibromyalgia diagnosis, with ages between 22 and 56, sorted and ranked these drives based on their perceived similarity and then on perceived importance; data regarding socioeconomic status was gathered and the PHQ-15 questionnaire to assess somatic symptoms.

Results: Hierarchical cluster analysis yielded four clusters named *interconnectedness, positive mindset, adjusted personal development,* and *healthy me-time*. Participants ranked cluster *positive mindset* as the most important. No correlations were found between the perceived importance of clusters and somatic symptoms, except for one item called *traveling*.

Conclusion: Gilbert's evolutionary social motivations were found amongst the clustered drive items, but no items were directly related to somatic symptoms. Other drives involved deficiency and growth needs; many drives were also related to psychotherapeutic goals of Acceptance and Commitment Therapy, Compassion-Focused Therapy, Cognitive Behavioral Therapy, and Positive Psychology. This study provides an extensive overview of forty drives that may aid future research in choosing relevant outcome measures; the drives obtained can also guide clinical practice to establish treatment objectives with patients with fibromyalgia collaboratively.

Keywords: acceptance and commitment therapy; compassion-focused therapy; drives; fibromyalgia; Maslow's pyramid; motivation; positive psychology.

Introduction

Fibromyalgia (FM) is a syndrome characterized by widespread chronic pain triggered by touch (Clauw, 2014). The diagnosis of FM follows a guideline composed of three clusters of symptoms that pertain to, respectively, pervasive pain, chronic fatigue, and cognitive disturbance named "fibro fog" (Aletaha et al., 2010; Clauw, 2014). The mean prevalence of FM in the worldwide population is estimated to be at 2.7% (Queiroz, 2013). FM has a substantial impact on the people who suffer from it by severely impairing their daily functioning and diminishing their quality of life, as well as applying a financial strain on a societal level (Bennet et al., 2005; Lacasse et al., 2016; Oliveira & Costa, 2013). The etiology of FM is still not completely clear; however, the most recent theories concern three emerging factors that may all partially play a role: genetic predisposition (Buskila et al., 2007), central nervous system sensitization (Woolf, 2011; Staud et al., 2001), and significant life events, such as injury, disease, or psychosocial stressors (Prince & Staud, 2005). Gilbert's model of affect regulation (Gilbert 2005; Gilbert, 2010) has been used to integrate the second and third factors (Pinto et al., 2021), the third one being the focus of this study.

The foundation of Gilbert's theory is the pursuit of the evolutionary goals of surviving and reproducing; to achieve those goals, a range of primal emotions and urges guide the basic needs of self-protection, acquisition of resources, and interpersonal connection (Buss, 2009). According to this model, the pursuit of these needs and resulting emotions is regulated by the combination of a *soother system*, a *threat system,* and a *drive system*. FM is considered to be influenced when chronic stressors throw the *threat* and the *drives systems* off balance, and when a person has an underdeveloped *soothers system* (Gilbert, 2010; Pinto et al., 2021).

The role of the *soother system* is to pacify and balance affect after activation and is related to positive feelings; for example, feeling safe after protecting oneself from something stressful or feeling calm and content after achieving a goal (Gilbert, 2014). The function of the *threat system* is to detect dangers of all types and take measures against them; for example, a person may feel anger, disgust, or anxiety in a social context, and they may take protective measures to resolve the situation (Gilbert, 2014). Hyperactivation of this system due to constant sources of stress and attempts at avoiding them may be involved in the onset and persistence of FM. This is because the neuroendocrine consequences of constant alertness to threats lead to a state of excessive wear and tear of the body, which in the long term may contribute to the onset of inflammatory developments associated with FM (McEwen, 1998; Pinto et al., 2021). Lastly, the *drives system* represents the urge to fulfill basic needs and feel enjoyment, the motivation to obtain resources, the wish to achieve different types of goals. The *drives system* is closely associated with the brain's reward system (Berridge & Kringelbach, 2008); indeed, according to Gilbert's model (2014), the drives are fueled by emotions such as enthusiasm and pleasure. Interestingly, it has been found that people with chronic pain experience modifications on a neurological level and a shift in motivation towards the relief of pain (Apkarian et al., 2011). Additionally, lower motivation levels have been associated with tiredness and depression in chronic pain patients (Navratilova et al., 2016).

However, what are drives? According to Gilbert's theory of emotion regulation, they consist of all our wishes, goals, objectives, and motivations in life (Gilbert, 2014), giving them a very prominent role. In addition to the primary motivations, such as obtaining food and reproducing, we have goals related to social interaction and relationships because our brain has evolved to facilitate social processing (Gilbert, 2014; Panksepp, 2010). Gilbert mentions four types of drives (2014); the first type is related to cooperating and sharing, given its evolutionary benefits for survival (Baumeister & Leary, 1995). The second type of goal involves obtaining skills that allow a person to compete for all kinds of relevant resources (Gilbert, 2014). The third relevant social drive is the basic need to care for and nurture others, grounded on the evolution of attachment in mammals and considered very important by people (Bowlby, 1969; Gilbert, 2014; Wang, 2005). Lastly, there is a social objective of seeking and responding to others' care (Gilbert, 2014); this is supported by the various developmental processes influenced by a parent's affection and care in childhood (Siegel, 2012; Slavich & Cole, 2013).

It is essential to consider that after several thwarted attempts at achieving specific drive-relevant objectives (Panksepp, 2004), an individual may consequently experience depression or anxiety, leading to a loss of drive (Gilbert, 2014; Taylor et al., 2011). Indeed, when specific social drives are not met, such as wishing to belong to a group or not achieving a favorable social position, we feel threatened, lonely, anxious, or depressed (Cacioppo & Patrick, 2009; Wesselmann et al., 2013). Additionally, it has been found in a qualitative study by Juuso et al. (2016) that the disability resulting from FM and the diminished capacity for work or loss of employment has markedly affected women with FM. They also found that women who suffer from FM find their work very important, and they would like to continue functioning normally in it. These studies begin to highlight the importance of drives in the general population and people with FM and the importance of more research on the subject. Nevertheless, are they being addressed by the current treatment guidelines of FM?

The recommended interventions that target the psychosocial aspect of FM are Cognitive-behavioral Therapy (CBT; Beck, 1997; Beck, 2020) and Acceptance and Commitment Therapy (ACT; Macfarlane et al., 2016; National Institute for Health and Care Excellence, 2021; Vowles & Thompson, 2011); another type of therapy showing promise is Compassion-Focused Therapy (CFT), based upon Gilbert's model of emotion regulation (2014).

How do these three different approaches relate to the *drives system*? In CFT, the main focus is to strengthen the *soother system* by fostering a sense of self-compassion; still, a significant therapeutic goal is also the pursuit of drives and valued activities, with particular focus on the ones that will create a sense of connection with others and oneself. The pursuit of drives is supported by basing interventions on how the patient responds to difficulties in achieving them (Gilbert, 2010). Being committed to one's value-related activities and taking value-congruent decisions is also a key component of ACT (Vowles et al., 2019); similarly, in CBT there is a focus on involving the client with activities that they enjoy or give them a sense of competence; yet, drive-related activities are not necessarily highlighted (Beck, 2020; Dimidjian et al., 2011).

The pursuit of drives and values is supported by a study by Hooker et al. (2019), where chronic pain patients experienced lower pain levels and more satisfaction after value-based behavioral activation. Additionally, initial research points towards improving chronic pain by focusing on brain pathways responsible for reward and motivation (Navratilova & Porreca, 2017). With regards to the usefulness of these psychotherapies for FM, CBT and ACT have shown moderate effectiveness in the treatment of FM so far (Macfarlane et al., 2016; National Institute for Health and Care Excellence, 2021), leaving significant room for improvement; with regards to CFT, meta-analyses have found initial evidence supporting it as a cost-effective intervention for people with chronic pain. However, more research is needed to support its effectiveness (Carvalho et al., 2021; Ferrari et al., 2019; Mistretta & Davis, 2021).

Given the potential role of drives in the psychosocial treatment of FM, it is pertinent to investigate what kind of motivations and drives FM patients have. Crombez et al. (2016) conducted a correlational study with individuals with chronic pain, including FM, researching these participants' type of goals. They found that people with chronic pain have similar goals to those with no chronic pain in the following domains: social, intrapersonal, health or body-related, occupational, financial, psychological welfare, recreational or enjoyment-related. Goal categories exclusive to the chronic pain patients were related to domestic tasks, physical exercise, validation of their pain, and the control of pain (Claes et al., 2018; Crombez et al., 2016). This last category is also supported by research in neuropsychology. It has been found that people with chronic pain have as a new goal the relief of pain, given that its alleviation is interpreted as rewarding by the brain; consequently, it could lead to less focus towards actually rewarding activities (Navratilova & Porreca, 2017). Still, Crombez et al. (2016) found that the pain control goals were only reported by 40% of the participants. This research begins to give insight into the type of drives people with FM have to have an encompassing overview that is specific for that population.

In summary, FM has a significant individual and societal impact, making it an important subject to be researched (Arnold et al., 2008; Lacasse et al., 2016). The current treatment of FM still has limited effectiveness, and the management of the psychosocial aspect of FM needs further exploration (Arnold & Clauw, 2017; Macfarlane et al., 2016; National Institute for Health and Care Excellence, 2021). Additionally, despite value-based interventions showing promise in treating FM, more insight into the *drives system* component and its relevance for people with FM is needed. This understanding would be valuable in designing better interventions that target the psychosocial factor of FM and improving their effectiveness in managing FM symptoms.

Therefore, four research questions will be investigated:

1. Which drives people with FM have?
2. How do people with FM group these drives together?
3. Which drives are considered more important by them?
4. Is the appraised importance of these drives associated with the level of their FM pain?

Part of this study is qualitative and exploratory; still, we had a two-part first hypothesis with regards to the first research question. We expected to find drives related to evolutionary goals as described by Gilbert (2014); these were cooperating and sharing with others, the acquisition of skills, taking care of others, and pursuing and accepting the care of others. For the second part of the first hypothesis, we expected drives that have to do with the management of FM pain and adapted living (Crombez et al., 2016). No hypotheses have been established regarding how they are grouped and their importance. Lastly, we hypothesized that the drives directly related to pain management would be associated with higher pain severity.

Methods

Procedure

Ethics

The research proposals for the two data collection moments, under numbers 19-219 and 19-274, have been approved in September and December 2019 by the Ethics Committee of the Faculty of Social and Behavioral at Utrecht University.

The participants to both parts of the study provided informed consent; they were only permitted to participate after reading an information letter and giving informed consent. They were also completely free to participate and end their participation at any point. The data of the participants were collected anonymously by not collecting names and other identificatory information. The collected data were treated confidentially.

Participants

In the first part of the study described in the *procedure* section, participants have been recruited through social media groups for people with chronic pain and/or fatigue and/or chronic inflammatory diseases such as fibromyalgia, rheumatoid arthritis, irritable bowel syndrome, and chronic fatigue syndrome. The social media groups and the participants were of several different languages: English, Dutch, Spanish, Greek, and Portuguese. The inclusion criteria were having to be above 18 years old and the presence of chronic pain, fatigue, or other physical symptoms for an extended amount of time. 616 participants completed the online questionnaire describing their personal threats, drives, and soothers.

Regarding the second part of the study, the participants were only Dutch-speaking and were recruited through national patient associations in The Netherlands meant for people with chronic pain, fatigue, or bodily symptoms. The sample observed for this thesis is composed of people who, in the self-reporting questionnaire, reported having a Fibromyalgia diagnosis done by a medical professional.

Data collection

This study used a concept mapping design (Herrera et al., 2021) to obtain and sort qualitative data collected through semi-structured interviews. The design involved three phases; the objective of the first phase was to gather qualitative data regarding individual threats, soothers, and drives from the participants. A questionnaire in English, Dutch, Spanish, Greek, Portuguese, and Brazilian Portuguese was created, then filled in by the participants.

The second phase involved having the research team select and organize the obtained statements regarding individual threats, soothers, and drives. The statements were selected based on the criteria used in previous research with a similar design (Klemm et al., 2018), which follows the concept mapping method (Trochim, 1989). The criteria consisted of the following: we adhered to what the participant expressed as much as possible, except if all members of the team (seven or eight) agreed that a particular statement is not a threat, soother or drive; in that case, the statement would be deleted. The statements needed to apply to the entire sample and were not specific to a subpopulation. Similar statements were combined into one, and when multiple different factors were in a single statement, they were divided into single ones. The statement could not be ambiguous, abstract, or too specific. The statement needed to remain as close as possible to the original statement but should be understandable for everyone. Lastly, statements with "no'' and "not" were avoided. The final statements were then used to create the card-sorting task for the third part of the study.

In the third part of the study, the participants received material composed of four elements. The first element was a sociodemographic questionnaire to obtain general information regarding the sample. The second element was the PHQ-15 questionnaire, which was used to assess the severity of the illness symptoms in the participants. The third element consisted of three sets of 40 cards (total of 120 cards) containing statements regarding drives, threats, and soothers; these statements needed to be sorted in piles, using as criteria their perceived similarity. The fourth element was a form in which the forty drives, threats, and soothers needed to be sorted based on their perceived importance on a scale of one to five, one being the least important and five being the most important. The cards should be evenly distributed across the five piles.

Instruments

The participants filled in the *Patient Health Questionnaire* (PHQ-15; Kroenke et al., 2002), a brief self-report questionnaire consisting of 15 items representing somatic symptoms. Each somatic symptom is scored from 0 (not bothered at all) to 2 (bothered a lot). The internal reliability of the PHQ-15 has been found to have a Cronbach's alpha of .80 in health care settings (Kroenke et al., 2002), showing good internal consistency.

Data analysis

All the analyses in this study were conducted using the IBM Statistical Software Package for the Social Sciences (SPSS), version 27 for Windows. Statistical significance was considered when the *p*-value was less than .05.

The sociodemographic information of the participants was explored by using Descriptive Statistics, by defining participants per gender, age, marital status, education level, professional that diagnosed FM, years since diagnosis, and comorbid diagnoses.

In order to check for clusters and obtain a dendrogram, Hierarchical Cluster Analysis with Ward's method was performed, using squared Euclidian distances. This procedure analyzed the individual statements sorted by the participants and grouped them based on how the participants perceived them to belong together. The resulting dendrogram, which can be found in *Appendix I*, is a graphic representation of the cluster solution found by SPSS.

Subsequently, the items that the participants clustered based on their perceived importance in max five piles were used to carry out reliability analyses. The purpose was to check the internal consistency of each cluster; the resulting Cronbach's alphas were used as a measure of how closely related were the items within the cluster.

The GLM Repeated Measures procedure was used to compare the clusters with each other and determine if they statistically significantly differed from one another in terms of the importance of drives. The variables representing each cluster were their respective computed means. GLM Repeated Measures analyzed the variance of the same measurement performed on all participants. Bonferroni posthoc analyses were also used to determine which cluster mean was most important.

Correlation analyses were performed to check for an association between the PHQ-15 scores mean with gender, age and education. Another correlation analysis was carried out to check for associations between the means of the four clusters. One last correlation analysis was performed on the fourth cluster to check for the presence of an association between an individual statement and the PHQ-15 scores mean.

Multiple Regression Analyses were done to observe the associations between the means of each cluster, entered as predictors, and the PHQ-15 mean scores entered as the dependent variable. The data met the assumption of homoscedasticity and normally distributed residuals; additionally, no multicollinearity was found as well as no significant outliers.

Subsequently, Multiple Regression Analyses were performed separately per cluster, always including one of them as the predictor and the PHQ-15 scores mean as a dependent variable.

Results

Demographics

111 individuals participated in the card-sorting task, of which 74 had a diagnosis of fibromyalgia. The majority of the participants before and after exclusion were women. An overview of demographic, medical, and health characteristics can be found in *Table 1*.

Table 1

Sociodemographic and health information of the participants

Variable	Quantity
Gender, *n* (%)	
Male	2 (2.7%)
Female	72 (97.3%)
Mean Age (min-max), *SD*	47.8 (22 –56), 1.3
Marital status	
Single	14
Married or in a partnership	52
Divorced	3
Other or missing status	5
Education	
High education	38
Middle or low education	36
Diagnosis by	
Specialist	104
Family physician	6
Health professional	1
Mean years since diagnosis (min-max)	9.3 (0-40)
Comorbid diagnosis	
Irritable Bowel Syndrome	41
Osteoarthritis	35
Chronic pain elsewhere in the body	24
Lung disease	15
Chronic Fatigue Syndrome - Myalgic Encephalomyelitis	14
Psychiatric illness	13
Migraine	11
Severe obesity	11
Heart disease	10
Job burnout	8
Chronic skin condition	8
Diabetes	6
Chronic headache, not migraine	5
Rheumatoid arthritis	3
Cancer	3
Sjögren's disease	3
Kidney disease	2
Eye disease	2
Other diseases	13

Card sorting task

The online survey yielded a list of 40 drives. The participants sorted these 40 drives in piles, which varied from four to seven, based on perceived similar content. Hierarchical cluster analysis was performed to derive clusters, which resulted in a dendrogram. The final number of clusters was based on two criteria. Firstly, each cluster needed to represent a discrete group of experiences based on the research team's consensus. Secondly, squared Euclidian distances between the items determined the clusters, meaning that items with shorter distances were grouped. Based on these two criteria and visual inspection of the dendrogram, the cutoff point on the Euclidian axis of the dendrogram, which ranged between 0 and 25, was determined to be 15. This yielded four main clusters.

A representation of the dendrogram can be found in *Figure* 1, but the complete dendrogram of the drives can be found in *Appendix I*. The four resulting clusters are *interconnectedness, positive mindset, adjusted personal development,* and *healthy me-time*. The items in the first cluster (*interconnectedness*) concern the importance of contact with significant others and meaningful relationships; the items in the second cluster (*positive mindset*) concern good self-esteem and healthy coping mechanisms, as well as a generally positive attitude. In the third cluster (*adjusted personal development*), the items refer to the different degrees of functioning and personal growth the participants may wish for themselves. Lastly, the items in the fourth cluster (*healthy me time*) refer to enjoying outdoor activities and pursuing a healthy lifestyle.

A reliability analysis on the items of a cluster reflecting the extent to which drives of a cluster are considered a personal drive, using Cronbach's alpha. In order to achieve a reasonable coefficient value, items were deleted if they demonstrated to have a negative correlation with the scores of other items in the cluster, or if by deleting them, the coefficient value would increase. The final Cronbach's alphas per cluster were as follows: for the first cluster $\alpha = .45$; for the second $\alpha = .44$; for the third $\alpha = .35$; for the fourth one $\alpha = .43$. It is crucial to consider that, for this study, the reliability coefficients cannot be high due to the forced sorting process applied during the card sorting task.

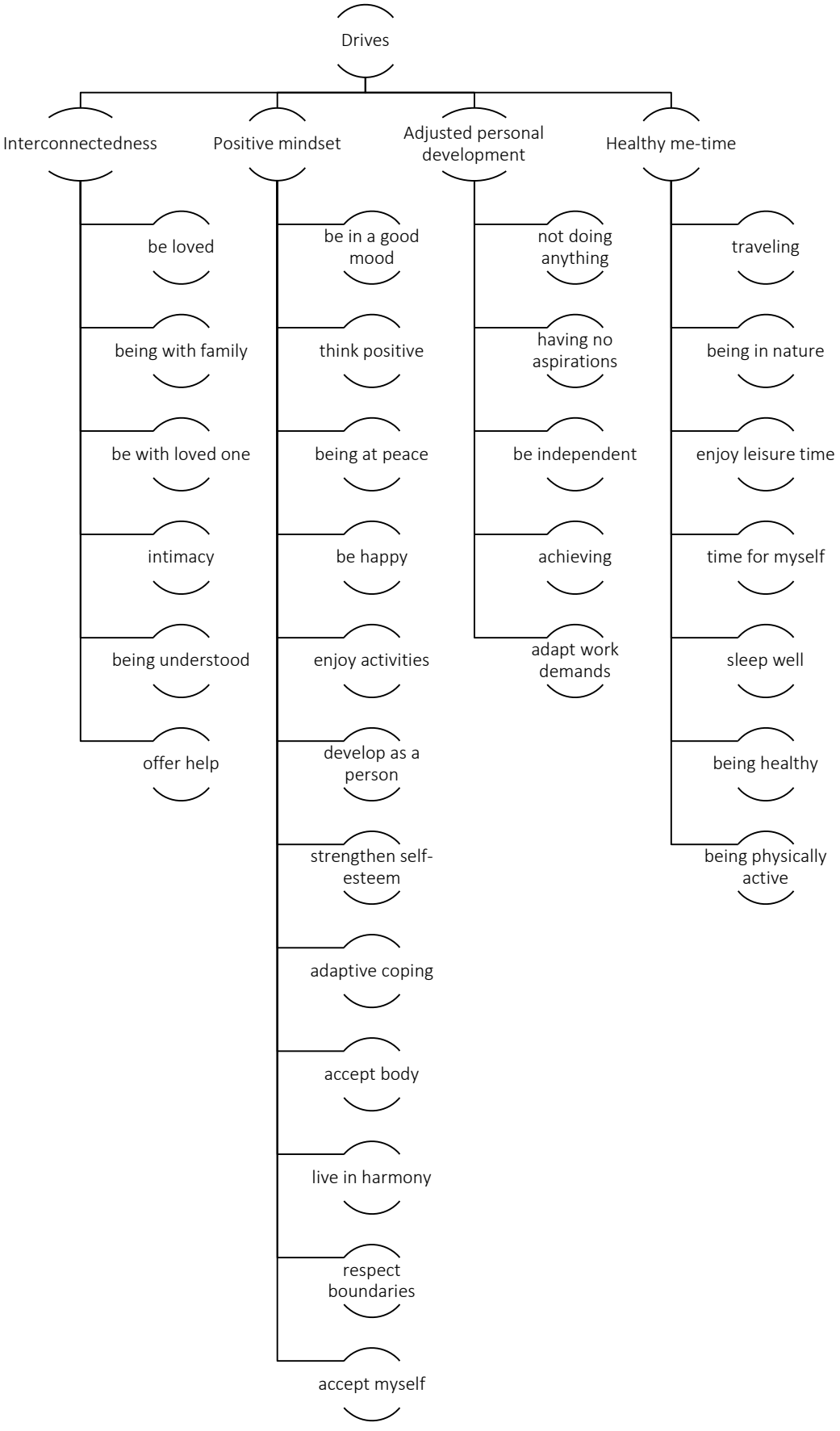

Fig. 1. Representation of the clusters in the hierarchical structure. The names of the items are abbreviated.

The perceived extent to which the clusters reflect personal drives

Repeated measures analysis of variance (GLM) showed that the clusters statistically significantly differed from one another F (2.92, 207.46) = 97.99, p <.001.

The assumption of sphericity was met (X^2(5) = 2.65, p = .75). Given that the above GLM was significant, we could examine the differences between the means of each cluster by performing a post hoc test using the Bonferroni method.

Post-hoc analyses showed the individual importance of drives: *positive mindset* was considered the most important (M = 3.49, SD = 0.45), the cluster *healthy me time* was in second place (M = 3.21, SD = 0.59), thirdly came *interconnectedness* (M = 3.16, SD = 0.63), and the least important cluster of drives was *adjusted personal development* (M = 1.85, SD = .60). There are substantial individual differences in the perceived importance of the four clusters, as can be noticed by the standard deviations. *Figure 2* shows a boxplot illustrating these individual differences per cluster. The mean of cluster *interconnectedness* mentioned above significantly differed from the mean of *positive mindset* (p = .006) and *adjusted personal development* (p < .001). The mean of the cluster *positive mindset* significantly differed from the *adjusted personal development* cluster (p < .001) and the cluster *healthy me time* (p = .04)*;* lastly, the mean of the cluster *adjusted personal development* showed a significant difference from cluster *healthy me time* (p < .001).

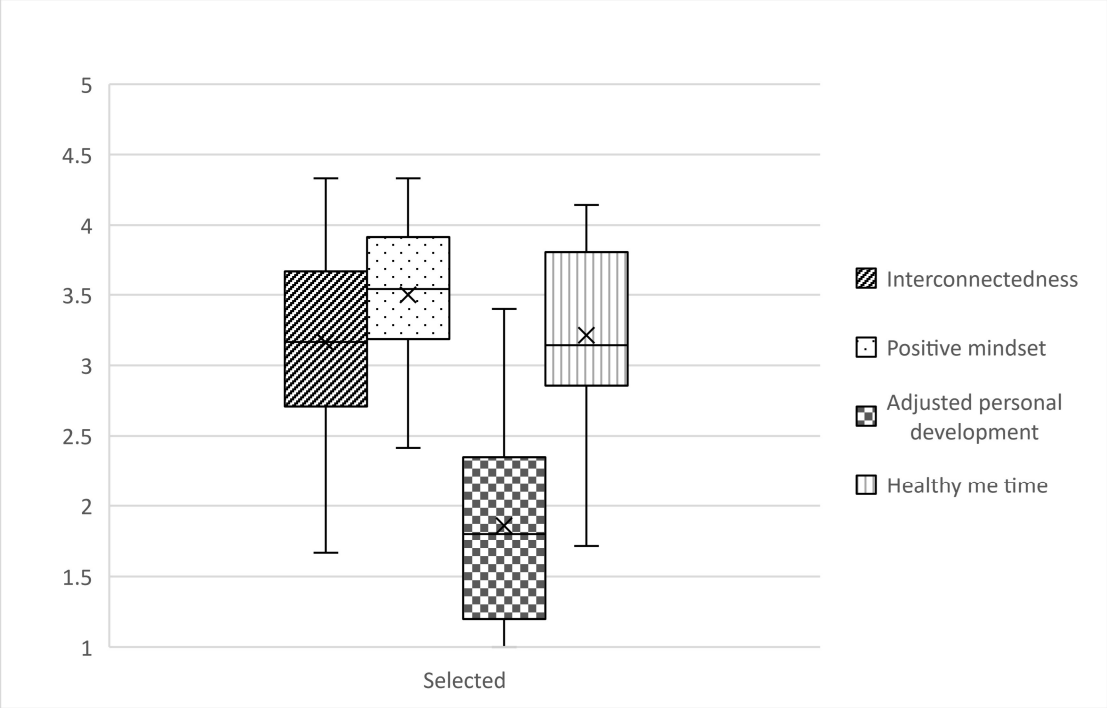

Fig. 2. The perceived importance of drives is described through their means and the range of the individual scores. The lowest score possible is 1 (least important), and the highest possible score is 5 (most important). The wider the range of each cluster, the less the amount of agreement is present with regards to its perceived importance.

Correlations between the clusters

To examine how each cluster of drives associated with the others, a correlation analysis was performed including all four clusters. The results found showed that *positive mindset* had a negative significant correlation with two clusters: *adjusted personal development* (r = -.36, n = 72, p = .002) and *healthy me time* (r = -.43, n = 72, p < .001).

There were no significant correlations between the other clusters: *positive mindset* and *interconnectedness* (r = -.16, n = 72, p = .16); *adjusted personal development* and *interconnectedness* (r = -.15, n = 72, p = .18); *healthy me time* and *interconnectedness* (r = -.15, n = 72, p = .20).

The severity of physical symptoms and the drives clusters

The association between the clusters representing the perceived similar content and the results of the questionnaires measuring the severity of physical symptoms, evaluated through the *PHQ-15* questionnaire, was examined; for that, a

multiple regression analysis was carried out. Additionally, we checked for a correlation between the *PHQ-15* scores and age, gender, and education, respectively. No significant correlations were found between any of these variables; therefore, no covariates were included in the regression analyses.

As can be seen in *Table 2*, no significant associations were found through the regression analyses between the *PHQ-15* scores and any of the drive clusters [F (4, 67) = .973, p = *.428*]. The possibility of an association between each specific cluster with *PHQ-15* was examined by running separate regression analyses. The results showed that three of the clusters were not associated with *PHQ-15* scores: *interconnectedness* (β = .03, t(70) = .309, p = .75); *positive mindset* (β = .00, t(70) = .07, p = .94); *adjusted personal development* (β = .07, t(70) = .65, p = .51); however, a trend for an association was found between the fourth cluster (*healthy me time*) and the *PHQ-15* scores (B = -.21, t(70) = -1.80, p = .07).

Correlation analysis for the individual items of the fourth cluster (*healthy me time*) was performed to check which item correlated with the scores of the *PHQ-15*. The results yielded no significant correlation within the fourth cluster, except for the item called *traveling*: it has a significant negative correlation with the severity of PHQ-15 scores (r =-.23, n = 72, p = .04).

Table 2

The association between physical symptom severity and the clusters of drives

The severity of somatic symptoms (PHQ-15)					
Model	*b*	*Standard Error*	*β*	*t*	*Sig.*
Interconnectedness	-0.043	0.842	-0.007	-0.051	0.959
Positive mindset	-0.750	1.401	-0.083	-0.535	0.594
Adjusted personal development	0.320	0.916	0.048	0.350	0.728
Healthy me time	-1.710	0.973	-0.248	-1.758	0.083

** $p < .05$.*

Discussion

This study aimed to provide more understanding of the drives of people with FM and investigate a possible relationship between drives and pain. This study resulted in an encompassing overview of 40 drives, which were sorted by participants based on their perceived similarity. They were divided into four clusters, named *positive mindset*, *interconnectedness*, *adjusted personal development,* and *healthy me-time*; the first one was considered the most important by the participants. There was no significant correlation between the severity of physical symptoms and the perceived importance of these drives.

In the first part of our first hypothesis, we expected the resulting drives to be similar to the four social goals described by Gilbert (2014); this was partially supported because all four social motivations were found to an extent in the resulting drives. The items in the *positive mindset* cluster were mainly related to a good overlook in life, self-esteem, and self-acceptance, but also coping skills; of these, items *living in harmony* overlapped with Gilbert's cooperating and sharing drive (2014). The cluster *interconnectedness* referred to meaningful connections and time spent with important people in the participants' lives. This cluster had the items *being understood*, *be loved,* and *offer help* that coincided with Gilbert's drives of caring and nurturing others, and seeking others' care. The other items in this cluster were not directly related to Gilbert's drives because they referred to positive social contact rather than caring for others or being cared for. The items in the *adjusted personal development* cluster were on a spectrum of personal and professional functioning: they ranged between inactivity and achievement. Items *achieving* and *being independent* overlapped with Gilbert's drive to obtain the skills necessary to compete for resources. Finally, the *healthy me-time* cluster had items related to healthy daily habits and participating in recreative activities; these did not overlap with Gilbert's social drives because they referred to individual activities rather than social ones. Overall, given the flexible nature of this mapping study, the drives obtained included but were not limited to Gilbert's social drives. This supports the applicability of Gilbert's theory for FM treatment. Nevertheless, it needs to be carefully integrated with the other types of drives that will be discussed ahead; these have been acknowledged by Gilbert's theory (2014). Nonetheless, Gilbert focuses on drives that support us in fulfilling objectives that are evolutionarily functional in interpersonal relationships (2014).

According to the second part of our first hypothesis, we expected drives directly related to the control of FM pain and adapted living found by Crombez et al. (2016). The latter type was supported because we found drives named *adapt work demands*, *be independent,* and *accept body* from clusters *adjusted personal development* and *positive mindset,* respectively. However, these types of drives were not many. These results may resemble Crombez's study, given that such items were only reported by 40% of their participants (2016). Yet, this finding goes against previous research by Claes et al. (2018); they found that people with chronic pain spend energy and efforts to avoid or hinder pain while not engaging in valued activities. These findings may be explained by how we investigated the drives: we asked participants to report urges and motivations that lead them to pursue activities in general rather than the ones focused on FM or coping with it. This may also explain why we did not find drives directly related to the control of FM pain, despite research showing that people with chronic pain show neurological changes that prioritize the relief of pain as the primary motivator (Apkarian, 2011). Another possible explanation is that controlling FM pain may not be considered a drive or something to strive for, but rather the deactivation of the *threat system.* According to Gilbert's model, FM pain could be considered a threat; a protective measure against it would be to attempt to control the pain to resolve the threatening situation (Gilbert, 2014).

Next to the abovementioned results regarding the first hypothesis, other types of reported drives are of note. Firstly, the individual needs that have been found in the drives overview are similar to the other goals by Crombez et al. (2016) that were not directly related to FM pain or adapted living. The overlap was apparent in all clusters, and it covered items that fit into Maslow's hierarchy of needs (1970). This model is another way to categorize people's motivations between *deficiency needs* and *growth needs*; the *deficiency needs* covered the majority of the drives in our study. Within this group, there are four subcategories of needs: *physiological*, *safety*, *belonging and love*, and *esteem*. The drives from our study that fit these subcategories were the ones that had to do with physical well-being, healthy lifestyle, positive social contact, feeling loved and respected, and psychological well-being. According to Maslow's model, only after fulfilling the *deficiency needs* will the person experience the drive to pursue the next step on the hierarchy and proceed in the *growth needs*. The subcategories under the *growth needs* of Maslow's model (1970) are *cognitive*, *aesthetic*, *self-actualization*, and *transcendence* needs. The drives from our study that fit these subcategories had to do with leisure time, enjoying nature, professional goals, and self-development. Maslow's design (1970) may help customize therapeutic interventions for FM patients by assessing whether the patient's drives comprise *deficiency needs* or *growth needs*.

Another type of drive was found in the *adjusted personal development* cluster. Most of the items in the cluster had to do with work ambitions. Yet, there were two items related to inactivity; these were *not doing anything* and *having*

no aspirations. These items may be explained by Gilbert's theory (2014), in which a loss of drive occurs after unsuccessful attempts at achieving specific drive-related goals (Taylor et al., 2011). Additionally, these items may suggest the presence of depressive symptoms or depression; indeed, according to Gilbert (2014), depression may arise after a lack of success in achieving goals. This may also occur in fibromyalgia as research shows that 35% of FM patients have a comorbid psychological disorder, with a higher chance of suffering from Major Depressive Disorder and Post-traumatic Stress Disorder (American Psychiatric Association, 2013; Queiroz, 2013). These items may also reflect a dysfunctional coping strategy to difficulties in achieving goals; indeed, Van Middendorp et al. (2008) have found that FM patients are more likely to use dysfunctional coping strategies and less likely to use helpful coping strategies (Gilbert, 2009). It may then be helpful to target depression or depressive symptoms in therapeutic interventions for patients with this type of drive.

Lastly, one more interesting result about the first hypothesis was found. This was how several drives in our clusters were related to the therapeutic goals of different types of psychotherapies. Items such as *adaptive coping, strengthen self-esteem*, *accept body* and *accept myself* from the *positive mindset* cluster are compatible with CFT values; that is because they are related the CFT objective of bolstering the *soother system* through self-compassion (Gilbert, 2014). Items *enjoy leisure time, enjoy activities, traveling*, *being in nature,* and *achieving* represent activities that may give patients joy or a sense of competence, which is a fundamental element of behavioral activation in CBT (Beck, 2020). A different combination of some of the items mentioned above, such as *accept body*, *accept myself*, *enjoy activities,* and *enjoy leisure time* also are compatible with ACT values. That is due to both self-acceptance and being committed to valued activities being critical therapeutic targets in ACT (Vowles et al., 2019). Lastly, several items are related to Positive Psychology interventions (Seligman & Csikszentmihalyi, 2000), those being *be in a good mood*, *think positive*, *being at peace*, *be happy* as well as *being with family*, *being with loved one*. The objectives of Positive Psychology interventions are to increment positive emotions, thoughts, and behaviors by stimulating optimism and meaningful social contact (Sin & Lyubomirsky, 2009). Currently, Positive Psychology does have initial evidence supporting its use to improve the psychosocial elements of chronic pain, including FM. Still, the evidence is not yet substantial on its improving effects on physical functioning (Braunwalder et al., 2021).

The customization of therapeutic approaches in FM treatment is suggested by both the large variability of categories in which the drives can be sorted and the different possible alignment to types of psychotherapy. This tailoring can be based on the results of this research regarding the perceived importance of the clusters of drives; for this research question, we had no specific hypothesis. The participants considered *positive mindset* the most important, with the smallest but still substantial range of individual differences regarding its perceived importance. *Healthy me-time* and *interconnectedness* followed closely in importance, with wider ranges of individual differences regarding their importance. *Adjusted personal development* was more often considered the least important one of them all. Currently, no studies are focusing on examining how people with FM rank drives based on importance. However, this ranking could guide future research on a mixed treatment plan for psychological interventions of FM treatment. Studies integrating value-based interventions with positive psychology (Affleck et al., 1998; Herrero et al., 2014) or CBT behavioral activation (Hooker et al., 2019) begin to support this approach, but further research is necessary.

According to our third hypothesis, we expected goals related to control of pain to be associated with the severity of physical symptoms; yet, no pain-related goals were found. Additionally, no significant associations were found between the perceived importance of any other clusters of drives and severity of physical symptoms. Lastly, no significant covariates were found. These results do not align with previous research suggesting that attempting to control FM pain is a maintaining or even worsening factor of pain in this condition (Eccleston & Crombez, 2007; Mccracken & Eccleston, 2003). However, a trend for an association was found between the *healthy me-time* cluster and PHQ-15 scores; within this cluster, the specific item *traveling* was the only item with a significant negative correlation with the severity of PHQ-15 scores. This result may indicate that people with high pain severity are not motivated to travel. This correlation makes a small addition to previous research. It was found that avoidance of pain might be chosen over other types of goals due to its short-term results when compared to engaging in activities that might yield results only in the long term (Claes et al., 2018; Crombez et al. 2012).

Overall, this study contributes mainly to the current research on value-based interventions for FM by providing an encompassing outline of the drives people who suffer from it; it also gives initial insight for future research into how FM psychological treatment may not be universal, but rather dependent on the type of psychosocial problems a person may experience, or their personal motivations. One of the strengths of this study lies in its mixed design, involving both qualitative and quantitative methods. Its exploratory nature provided much flexibility to obtain unfiltered data from the participants; additionally, it allowed an in-depth view of FM's scarcely researched but relevant psychosocial element. Another strength of the study lies in how the qualitative data was collected with an international population, making the overview generalizable to different nationalities.

Yet, some limitations should be of note. Firstly, a force-sorting task was used to collect data regarding the importance of the clusters. This may have affected the results: the participants may have found multiple drives of maximum importance or of lowest importance, but they were not able to report it due to the forced-sorting procedure. Also, given that women are the great majority of the participants may be considered a limitation. This may generalize the results only to this population, yet, most people with fibromyalgia are female.

Conclusion

This research has yielded a broad and detailed overview of drives accounting for considerable individual variation; this may help in future research with choosing therapeutic outcome measures and differentiating the subgroups of FM patients. This drives overview may also give insight for clinical research; it may shed light on the mechanisms that are of relevance behind psychotherapies for FM patients. This may boost the accuracy of the current recommended treatment for FM (Macfarlane et al., 2016; National Institute for Health and Care Excellence, 2021). Furthermore, this outline contributes to an increased understanding of the biopsychosocial conceptualization of FM according to Pinto et al. (2021). For clinical practice, this study begins to provide a foundation in screening patients and aid in the customization of treatment goals and results.

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Appendix I

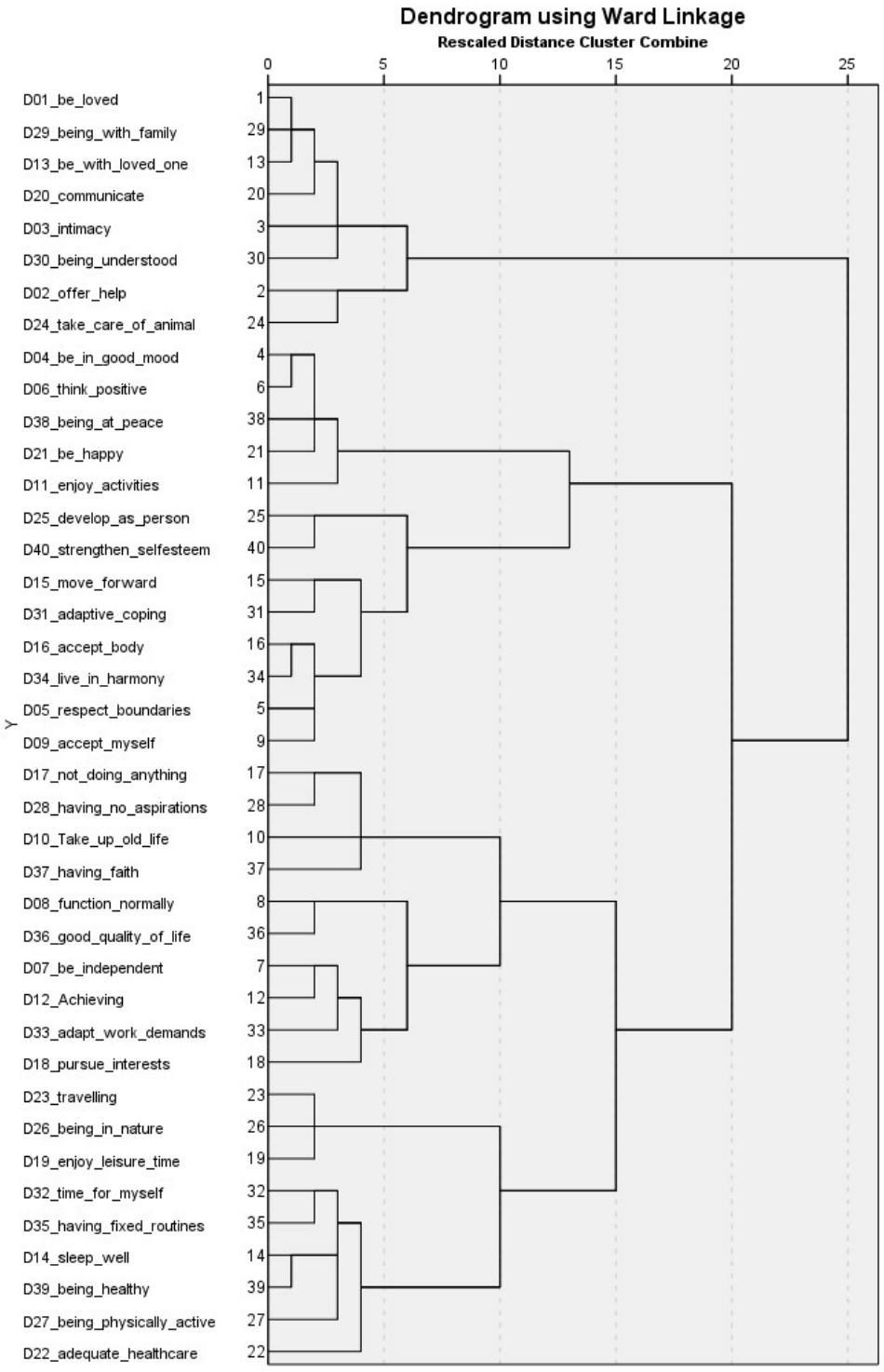

Fig. The complete dendrogram with drives items on the Y-axis. The number of clusters represented on the X-axis partially determined the final cluster solution.