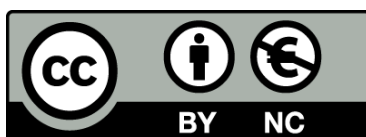




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Impact of Childhood Trauma on Levels of Depressive Symptoms, Pain, Functionality, and Cognitive Conflicts in Fibromyalgia

Anita Julieta Ribeiro



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Doctoral Dissertation

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UNIVERSITAT_{DE}
BARCELONA

Faculty of Psychology at the Universitat de Barcelona

Doctoral Program Brain, Cognition, and Behavior

Doctoral Dissertation

**Impact of Childhood Trauma on Levels of Depressive Symptoms, Pain, Functionality, and
Cognitive Conflicts in Fibromyalgia**

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Barcelona, 2023

In the loving memory of my godmother, Julia Petrucci Damiani (Zuzu)

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Table of Contents

<i>Abstract</i>	23
<i>Resumen</i>	27
<i>1 Introduction</i>	33
1.1. Childhood Adversity, Child Maltreatment, and Childhood Trauma	35
1.2. Fibromyalgia	76
1.3. Childhood Trauma and Fibromyalgia	105
1.4. Theory of Personal Constructs	107
1.5. The Repertory Grid Technique	114
1.6. Psychological Treatments for Fibromyalgia	128
<i>2. Objectives and Hypotheses</i>	137
2.1. General Objective	137
2.2. Specific Objectives and Hypotheses	138
<i>3. Method</i>	147
3.1. Design	147
3.2. Description of the Parent Randomized Clinical Trial	148
3.3. Instruments	155
3.4. Procedure	176
3.5. Data Analyses	181

3.6. Ethical Considerations	189
4. Results.....	193
4.1. General Observations	193
4.2. Study 1 Results	195
4.3. Study 2 Results.....	219
5. Discussion.....	239
5.1. Key Findings	239
5.2. Limitations and Implications for Future Research	257
6. Conclusion.....	267
References.....	277
Annexes	375
Annex 1 Hospital Anxiety and Depression Scale (HADS).....	377
Annex 2 Visual Analog Scale (EVA)	379
Annex 3 Fibromyalgia Impact Questionnaire (FIQ) Versión en Español	381
Annex 4 Repertory Grid Technique (RGT)	383
Annex 5 Childhood Trauma Questionnaire Short Form (CTQ-SF)	385

LIST OF TABLES

Table 1. Risk Factors for Child Maltreatment.....	39
Table 2. Reported Incidence of Maltreatment by Victims' Age in Spain Year 2018.....	41
Table 3. Reported Incidence of Maltreatment by Victims' Sex in Spain Year 2018.....	42
Table 4. Reported Incidence of Maltreatment Types in Spain Year 2018.....	42
Table 5. Reported Incidence of Maltreatment Types in Spain Year 2017.....	43
Table 6. Reported Incidence of Maltreatment Types and Severity by Victims' Sex in Spain Year 2018.....	44
Table 7. Number of Victims by Counties with the Highest Occurrence Year 2018.....	45
Table 8. Total Population and Percentage of Victims in Spain Year 2018.....	46
Table 9. Reported Incidence of Maltreatment by Victims' Sex in Spain Years 2017 to 2021....	49
Table 10. American College of Rheumatology Mechanisms of Fibromyalgia in 1990.....	81
Table 11. Summary of CBT and DFI Intervention Protocols.....	153
Table 12. Outline of Research Instruments.....	155
Table 13 Reliability Coefficients for CTQ-SF Subscales.....	167

Table 14. CTQ-SF Items for Each Subscale of Maltreatment and of Minimization/Denial.....	170
Table 15. Cutoff Scores by Bernstein and Fink (1998) for the CTQ-SF Subscales.....	170
Table 16. Distinct Classifications of the CTQ-SF Subscales.....	171
Table 17. Study One Hypotheses and Statistical Analyses.....	185
Table 18. Study Two Hypotheses and Statistical Analyses.....	188
Table 19. Studies Used for Comparison of Prevalence of Childhood Trauma.....	194
Table 20. Prevalence of Childhood Trauma in the Research Sample Using Cutoff Values by Bernstein and Fink (1998).....	196
Table 21. Prevalence of Childhood Trauma in the Research Sample Using Cutoff Values by Walker et al. (1999).....	196
Table 22. Prevalence Comparison Between Different Childhood Trauma Cutoff Values.....	197
Table 23. Prevalence Comparison Between Research Sample's Childhood Trauma and Witt et al.'s (2017) Sample Cutoff Values by Bernstein and Fink (1998).....	198
Table 24. Prevalence Comparison Between Research Sample's Childhood Trauma and Iffland et al.'s (2013) Sample Using Cutoff Values by Walker et al. (1999).....	200
Table 25. Childhood Trauma Percentage in Female Samples Using Cutoff Values by Walker et al. (1999).....	201

Table 26. Mean and Standard Deviation for Single Childhood Trauma in the Research Sample ($N = 104$).....	202
Table 27. Comparison of Mean and Standard Deviation of Single Childhood Trauma in the Research Sample ($N = 104$) and Hernandez et al.'s (2012) ($N = 185$).....	203
Table 28. Independent T-test for Childhood Trauma in the Research Sample ($N = 104$) and Hernandez et al.'s (2012) ($N = 185$).....	204
Table 29. Comparison Between the Research Sample's and Walker et al.'s (1999) Cumulative Childhood Trauma Using Two. Cutoffs.....	206
Table 30. Single Childhood Trauma and HADS-D Baseline Scores ($N = 104$).....	208
Table 31. Cumulative Childhood Trauma and HADS Baseline Scores ($N = 104$).....	209
Table 32. Single Childhood Trauma and VAS Baseline Scores ($N = 104$).....	210
Table 33. Cumulative Childhood Trauma and VAS Baseline Scores ($N = 104$).....	211
Table 34. Single Childhood Trauma and FIQ Baseline Scores ($N = 103$).....	212
Table 35. Cumulative Childhood Trauma and FIQ Baseline Scores ($N = 103$).....	212
Table 36. Single Childhood Trauma and Baseline Indexes of Self-construction ($N = 102$).....	214
Table 37. Cumulative Childhood Trauma and Baseline Indexes of Self-construction ($N = 102$).....	215

Table 38. Single Childhood Trauma and Baseline Number of IDs ($N = 102$).....	216
Table 39. Cumulative Childhood Trauma and Baseline Number of IDs ($N = 102$).....	217
Table 40. Single Childhood Trauma and Baseline Index of Polarization ($N = 102$).....	218
Table 41. Cumulative Childhood Trauma and Baseline Index of Polarization ($N = 102$).....	219
Table 42. Single Childhood Trauma and Posttreatment Change Index of Depressive Symptoms ($N = 74$).....	221
Table 43. Cumulative Childhood Trauma and Posttreatment Change Index of Depressive Symptoms ($N = 74$).....	221
Table 44. Single Childhood Trauma and Posttreatment Change Index of Pain Levels ($N =$ 73).....	223
Table 45. Cumulative Childhood Trauma and Posttreatment Change Index of Pain Levels ($N =$ 73).....	224
Table 46. Single Childhood Trauma and Posttreatment Change Index of Functionality Levels ($N =$ 71).....	225
Table 47. Cumulative Childhood Trauma and Posttreatment Change Index of Functionality Levels ($N = 71$).....	226
Table 48. Single Childhood Trauma and Posttreatment Change Indexes of Self-construction ($N =$ 71).....	227

Table 49. Cumulative Childhood Trauma and Posttreatment Change Indexes of Self-construction (<i>N</i> = 71).....	228
Table 50. Single Childhood Trauma and Posttreatment Change Index of Number of IDs (<i>N</i> = 71).....	230
Table 51. Cumulative Childhood Trauma and Posttreatment Change Index of Number of IDs (<i>N</i> = 71).....	231
Table 52. Single Childhood Trauma and Posttreatment Change Index of Polarization (<i>N</i> = 71).....	231
Table 53. Cumulative Types of Childhood Trauma and Posttreatment Change Index of Polarization (<i>N</i> = 71).....	232
Table 54. Cross Tabulation of Number of Dropouts (<i>N</i> = 89).....	233
Table 55. Chi-Square Tests of Childhood Trauma and Dropouts Relationship (<i>N</i> = 89).....	234
Table 56. Cross Tabulation of Cumulative Types of Childhood Trauma and Dropouts (<i>N</i> = 89).....	235
Table 57. Chi-square Tests of Cumulative Types of Childhood Trauma and Dropouts Relationship (<i>N</i> = 89).....	236

LIST OF FIGURES

Figure 1. Developmental Impact of Childhood Maltreatment.....	61
Figure 2. A Top-down Model of Fibromyalgia.....	97
Figure 3. Assessments in the Parent-Randomized Controlled Trial.....	149
Figure 4. Flow Chart of the Randomized Controlled Trial.....	151

ABBREVIATIONS

CM	Childhood Maltreatment
ACE	Adverse Childhood Experience
FM	Fibromyalgia
CM	Child Maltreatment
CT	Childhood trauma
CBT	Cognitive Behavioral Therapy
ID	Implicative Dilemma
CTQ	Childhood Trauma Questionnaire
PTSD	Posttraumatic stress disorder
CPTSD	Complex posttraumatic stress disorder
RUMI	Registro Unificado de Maltrato Infantil
BEMPI	Boletín Estadístico sobre Medidas de Protección Infantil
CC.AA	Comunidades y Ciudades Autónomas
HPA	Hypothalamus-Pituitary-Adrenocortical
fMRI	Functional magnetic resonance imaging
PFC	Prefrontal cortex
ADHD	Attention deficit hyperactivity disorder

ANAR	Ayuda a niños y adolescentes en riesgo
CSDT	Constructivist self-development theory
ICD-10	International Classification of Diseases 10 th version
ICD-11	International Classification of Diseases 11 th version
EPIFFAC	Impacto familiar, sociolaboral y económico de la fibromialgia
IASP	International Association for the Study of Pain
CNS	Central nervous system
CSS	Central sensitivity syndromes
GABA	Gamma aminobutyric acid
NMDA	N-methyl-D-aspartate
RSN	Resting state network
DMN	Default mode network
DAN	Dorsal attention network
FPCN	Frontoparietal control network
CON	Cingulo-opercular network
pgACC	Pregenual anterior cingulate cortex
TAS-20	Toronto Alexithymia Scale (20 items)
MDD	Major depressive disorder
PCT	Personal Construct Therapy

ToM	Theory of mind
RGT	Repertory Grid Technique
HADS	Hospital Anxiety and Depression Scale
VAS	Visual Analogue Scale
FIQ	Fibromyalgia Impact Questionnaire
CTQ-SF	Childhood Trauma Questionnaire Short Form
HADS-D	Depression items of the Hospital Anxiety and Depression Scale
SCID-I	Structured Clinical Interview for DSM-IV Axis I Disorders
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders (4 th version)
FIQ-R	Fibromyalgia Impact Questionnaire revised
USUMA	Unabhängiger Service für Umfragen, Methoden und Analysen

Abstract

In recent years, much scientific evidence has shown the role of child maltreatment in human development, which impacts all aspects of growth, physical, behavioral, emotional, and cognitive. Depending on the extent of the maltreatment, it may lead to childhood trauma and generate a vulnerability to mental and physical health. The extent of the maltreatment encompasses its frequency and duration, the age in which it occurred, and the type of maltreatment, whether one isolated type or several types of maltreatment. When more than one type of maltreatment is present, it produces a cumulative effect that can be potentially more damaging than a single type of maltreatment.

Although little is known to date, many studies focus on uncovering the role and influence of childhood trauma in chronic pain. Moreover, even less is known about the role of specific types of maltreatment experienced in childhood or the cumulative effect of multiple maltreatment types on the treatment outcome of patients with chronic pain.

This research investigated the impact of single types of childhood trauma and the cumulative effect of more than one type of maltreatment on reported levels of depressive symptoms, pain, functionality, and indexes of cognitive conflict before and after psychological treatment for participants with Fibromyalgia (FM) and depressive symptoms. The research was divided into two studies, Study 1 was a cross-sectional analysis, and Study 2 included pre and posttreatment data analysis. For these two studies, 104 women with FM and depressive symptoms responded to the childhood trauma questionnaire at baseline assessment.

In Study 1, our sample was assessed for single and cumulative types of maltreatment using a cutoff indicative of traumatic levels and compared with similar samples from other studies. In addition, childhood trauma scores were compared with scores of depressive symptoms, pain,

functionality, and cognitive conflicts at pretreatment (baseline). Results revealed that our sample had considerably higher percentages of participants with childhood trauma in at least four maltreatment dimensions than community samples of other studies. Regarding the hypotheses predicting possible correlations between depressive symptoms, pain, functionality, and cognitive conflicts with rates of childhood trauma, for both single and cumulative maltreatment types, there was only one small-sized correlation indicating a tendency of those women with FM to display low levels of functionality in the presence of a history of childhood emotional abuse.

In Study 2, participants were treated with either cognitive-behavioral therapy (CBT) or personal construct therapy (PCT). There was minimal difference between the treatment outcomes of those two therapies, and for this reason, this investigation considered the two groups as one sample. The change index of depressive symptoms, pain levels, functionality, and cognitive conflicts at posttreatment scores was calculated and compared to childhood trauma scores at baseline. In addition, childhood trauma scores and dropouts were analyzed to identify a potential correlation between these two variables.

Results of Study 2 showed that participants with a history of sexual or emotional abuse had an improvement in pain levels at discharge, based on a small size correlation between the change index of pain levels and sexual abuse, and a medium size correlation between the same change index and emotional abuse, suggesting that such a history of CT may impact pain levels in FM. One medium and one small size correlation showed less change in the discrepancy of self-constructions related, respectively, to the items “self” and “ideal self” when participants had a history of emotional abuse and “ideal self” and “others” when they had a history of emotional neglect. These negative correlations may indicate a tendency that a history of emotional abuse and neglect might be a handicap to accessing positive therapy outcomes in terms of a positive view of

oneself and perceived similarity to others. There was one significant positive correlation between the change index of the number of IDs and physical neglect, and one medium size correlation between that same index and emotional neglect. These results might indicate that the impact of childhood neglect lost its strength following therapy, perhaps because of an acceptance of new possibilities for understanding conflicts.

Lastly, the change index of the discrepancy between the “ideal self” and “others” showed a significant negative correlation with five and three types of cumulative maltreatment, suggesting that a cumulative history of CT may affect access to positive therapy outcomes regarding a critical view of others. In addition, one type and absence of maltreatment also showed a medium size negative correlation for this same change index.

No other correlations were found for the indexes of change. Furthermore, there was no correlation between single or cumulative childhood trauma and dropouts.

By exploring the possible impact of childhood trauma on depressive symptoms, pain, functionality, and cognitive conflicts in FM with depressive symptoms, this study intended to generate knowledge to inform psychological treatments and strategies to enhance treatment outcomes.

Keywords: childhood trauma, cumulative trauma, fibromyalgia, depressive symptoms, cognitive behavioral therapy, personal construct therapy.

Resumen

En los últimos años, mucha evidencia científica ha demostrado el papel del maltrato infantil en el desarrollo humano, que afecta todos los aspectos del crecimiento, físico, conductual, emocional y cognitivo. Dependiendo de la extensión del maltrato, puede conducir a un trauma infantil y generar una vulnerabilidad a la salud mental y física. El alcance del maltrato abarca su frecuencia y duración, la edad en que ocurrió y el tipo de maltrato, ya sea un tipo aislado o varios tipos de maltrato. Cuando está presente más de un tipo de maltrato, produce un efecto acumulativo que puede ser potencialmente más dañino que un solo tipo de maltrato.

Aunque hasta la fecha se sabe poco, muchos estudios se centran en descubrir el papel y la influencia del trauma infantil en el dolor crónico. Además, se sabe aún menos sobre el papel de tipos específicos de maltrato experimentados en la infancia o el efecto acumulativo de múltiples tipos de maltrato en el resultado del tratamiento de pacientes con dolor crónico.

Esta investigación examinó el impacto de tipos únicos de trauma infantil y el efecto acumulativo de más de un tipo de maltrato en los niveles informados de síntomas depresivos, dolor, funcionalidad e índices de conflicto cognitivo antes y después del tratamiento psicológico para participantes con Fibromialgia (FM) y síntomas depresivos. La investigación se dividió en dos estudios, el Estudio 1 fue un análisis transversal y el Estudio 2 incluyó análisis de datos previos y posteriores al tratamiento. Para estos dos estudios, 104 mujeres con FM y síntomas depresivos respondieron al cuestionario de trauma infantil en la evaluación inicial.

En el Estudio 1, nuestra muestra se evaluó en cuanto a tipos de maltrato único y acumulativo utilizando un punto de corte indicativo de niveles traumáticos y se comparó con muestras similares de otros estudios. Además, las puntuaciones de trauma infantil se compararon

con puntuaciones de síntomas depresivos, dolor, funcionalidad y conflictos cognitivos antes del tratamiento (línea de base). Los resultados revelaron que nuestra muestra tenía porcentajes considerablemente más altos de participantes con trauma infantil en al menos cuatro dimensiones de maltrato que las muestras comunitarias de otros estudios. En cuanto a las hipótesis sobre las posibles correlaciones entre los síntomas depresivos, el dolor, la funcionalidad y los conflictos cognitivos con las tasas de trauma infantil, tanto para el tipo de maltrato único como acumulativo, solo hubo una correlación de tamaño pequeño que indica una tendencia de aquellas mujeres con FM a mostrar niveles bajos de funcionalidad en presencia de antecedentes de abuso emocional infantil.

En el Estudio 2, los participantes fueron tratados con terapia cognitivo-conductual (CBT) o terapia de construcción personal (PCT). Hubo una diferencia mínima entre los resultados del tratamiento de esas dos terapias y, por este motivo, esta investigación consideró a los dos grupos como una sola muestra. Se calculó el índice de cambio de los síntomas depresivos, los niveles de dolor, la funcionalidad y los conflictos cognitivos en las puntuaciones posteriores al tratamiento y se comparó con las puntuaciones de trauma infantil al inicio del estudio. Además, se analizaron las puntuaciones de trauma infantil y los abandonos para identificar una posible correlación entre estas dos variables.

Los resultados del Estudio 2 mostraron que los participantes con antecedentes de abuso sexual o emocional tuvieron una mejora en los niveles de dolor al momento del alta, según una correlación de tamaño pequeño entre el índice de cambio de los niveles de dolor y el abuso sexual, y una correlación de tamaño medio entre el mismo cambio índice y abuso emocional, lo que sugiere que tal historial de trauma infantil puede afectar los niveles de dolor en la FM. Otras correlaciones de mediano y pequeño tamaño que muestran menos cambio en la discrepancia de las

autoconstrucciones se relacionaron, respectivamente, con los ítems “yo” y “yo ideal” cuando los participantes tenían antecedentes de abuso emocional y “yo ideal” y “otros” cuando tenía un historial de negligencia emocional. Estas correlaciones negativas pueden indicar una tendencia a que un historial de abuso y negligencia emocional pueda ser una desventaja para acceder a resultados positivos de la terapia en términos de una visión positiva de uno mismo y la similitud percibida con los demás. Hubo una correlación significativa positiva entre el índice de cambio del número de dilemas implicativos y la negligencia física, y una correlación de tamaño medio entre ese mismo índice y el negligencia emocional. Estos resultados podrían indicar que el impacto del trauma infantil perdió fuerza después de la terapia, quizás debido a la aceptación de nuevas posibilidades para comprender los conflictos.

Por último, el índice de cambio de la discrepancia del “yo ideal” y los “otros” mostró una correlación negativa significativa con cinco y tres tipos de maltrato acumulativo, lo que sugiere que un historial acumulativo de trauma infantil puede afectar el acceso a resultados de terapia positivos con respecto a una visión crítica de los demás. Además, un tipo y la ausencia de maltrato también mostraron una correlación negativa de tamaño medio para este mismo índice de cambio.

Al explorar el posible impacto del trauma infantil en los síntomas depresivos, el dolor, la funcionalidad y los conflictos cognitivos en FM con síntomas depresivos, este estudio pretendía generar conocimiento para informar los tratamientos psicológicos y las estrategias para mejorar los resultados del tratamiento.

Palabras clave: trauma infantil, trauma acumulativo, fibromialgia, síntomas depresivos, terapia cognitivo conductual, terapia de construcción personal.

CHAPTER 1
INTRODUCTION

1 Introduction

Childhood maltreatment (CM), adversities, and traumatic experiences have been the focus of many psychological studies about the long-term negative impact of these events on physical and mental health (Arnow, 2004). Several studies found that adults who suffered CM were vulnerable to ischemic heart disease, cancer, chronic lung diseases, skeletal fractures, autoimmune disorders, liver diseases, the propensity to headaches and migraines, and also an increased risk of psychiatric disorders (Boyce, 2014; Coppens et al., 2017; Felitti & Anda, 2010; Hazel et al., 2008; Herzog & Schmahl, 2018; Kelly-Irving et al., 2013; Kessler et al., 2010; Low & Schweinhardt, 2012; Shonkoff & Garner, 2012). These vulnerabilities and risks are in direct correlation with the number and magnitude of adversities in childhood, particularly with the cumulative effect of distinct types of CM leading to cumulative trauma (McLaughlin et al., 2017; Nemeroff, 2016), as will be detailed in the subsequent sections of this dissertation. Specifically, among the vulnerabilities and risks, childhood trauma (CT) has been implicated in many psychological disorders that involve complex psychosomatic symptoms, including chronic pain, FM, and depression (Arnow, 2004; Bayram & Erol, 2014; Borsini et al., 2014; Coppens et al., 2017; Fuller-Thomson et al., 2016; Karas et al., 2017; Kiesel, 2018; Shrivastava et al., 2017). An earlier study by our research team has shown that experiencing maltreatment in childhood and adult life may influence the therapeutic outcomes of patients with FM regarding depressive symptoms and the levels of pain and functionality (Aguilera et al., 2018). Based on this previous small-sample investigation by our research team, there was an interest in finding out whether CM alone impacted therapy outcomes for FM women with depressive symptoms.

The data for this investigation originated from the parent study (Aguilera et al., 2022) that compared the efficacy of Personal Construct Therapy (PCT) and CBT (see study protocol in Paz

et al., 2020) in reducing depressive symptoms in a sample of women with FM with depressive symptoms. Both treatments showed efficacy in improving depressive symptoms and psychological distress in FM. However, there was an expectation that both treatments could promote a decrease in pain levels as a secondary outcome because mood can impact the perception of pain (Aguilera et al., 2022). The posttreatment assessments showed that some participants did not have a significant decrease in self-reported pain levels after treatment with CBT or PCT. About 16% to 25% of participants in the parent investigation experienced a significant reduction in pain levels following treatment, with no significant differences between CBT and PCT (Aguilera et al., 2022).

The expectation of a secondary effect on pain levels was based on the likelihood that the perception of high levels of pain (and, consequently, a decreased functionality) might be affected by psychological distress, stress, and untreated depressive symptoms, issues addressed in both protocols. Consequently, lower pain levels would be a secondary effect of decreased psychological distress and depressive symptoms. Thus, finding variables that might have interfered with a less significant decrease in pain would help to improve treatment outcomes regarding the reduction of pain levels in women with FM and depressive symptoms.

One hypothesis for this insufficient result could be that underlying history of CT and cumulative trauma could affect pain levels. Several studies supported this hypothesis that pain levels could refer to untreated CT (Alhalal et al., 2018; Defrin et al., 2017; Lahav et al., 2020; Okifuji et al., 2000; Schore, 2002).

In addition, the PCT protocol considers that self-identity and interpersonal perceptions are fundamental aspects of one's construction system (Kelly, 1955), and the interaction between these foundational constructs and the experience of high pain levels might have played a key role in FM (Compañ et al., 2011). Rather than targeting symptoms and behaviors, PCT focuses on addressing

the interplay of pain and constructs of self-identity and interpersonal relationships to improve pain levels (Compañ et al., 2011). For this reason, it would be worth exploring the role of cognitive conflicts regarding therapy outcomes for pain levels.

This present investigation used secondary data collected by the RCT parent investigation (a two-arm randomized controlled, superiority trial) that compared the effectiveness of individual PCT and individual CBT. The data used in the present investigation was not part of the original RCT, and this is a novel investigation based on CT data in women with FM and depressive symptoms.

1.1. Childhood Adversity, Child Maltreatment, and Childhood Trauma

There is a significant difference between childhood adversity and child maltreatment, explained in the following sections. Child maltreatment occurs in several levels of intensity, different frequencies, and forms. All these elements may interact exponentially to affect the child and lead to CT.

The difference between adversity, maltreatment, and trauma is challenging to exact, and these terms are often used as synonyms. However, it is essential to make that distinction because not all adverse or maltreatment events will lead to a traumatic experience or memory. Children interpret their experiences differently within cultural, social, and family contexts that shape the narrative of those experiences. Thus, a child's experience of adversity or maltreatment may not necessarily be internalized as traumatic, or it may be compensated for by the child's social context or support of a caring parent, while a similar experience can be intensely traumatic for another child (Brock et al., 2006; Chandan, Thomas, Gokhale, et al., 2019; Thornberry et al., 2001). These protective factors, risks, and stressors interact to predict resilience levels. In addition, the timing, chronicity, and severity of child abuse and neglect, as well as the context in which they occur, have

also been shown to impact outcomes (Nemeroff, 2016).

1.1.1. Characteristics of Childhood Adversity, Child Maltreatment, and Childhood Trauma

Childhood adversity refers to events that affect a child's healthy development and global psychological growth at physical and behavioral, emotional, and cognitive levels. The most common source of childhood adversity comes in the form of child abuse and neglect, which usually concur with adversities such as substance abuse or mental illness in the family, divorce, single-parent homes, intergenerational abuse and neglect, death, or loss of loved one, among other adversities (Felitti & Anda, 2010).

Childhood adversities are associated with intense vulnerability to posttraumatic stress disorder (PTSD; Javidi & Yadollahie, 2012; McLaughlin et al., 2017). They include physical abuse, negative emotional relationships with one or both parents, lack of physical affection, domestic violence between parents, as well as parental alcoholism (or other addictions), separations, and poor financial situation before seven years of age, all of which were found to have a potential role in increasing vulnerability to FM (Imbierowicz & Egle, 2003).

In our study, CM is defined as abuse and neglect that occurs in children under the age of 18 in the form of physical, sexual, or emotional abuse, or emotional and physical neglect, which results in actual or potential harm to children's health, survival, development or dignity. Child maltreatment is perpetrated by a parent, relative, caregiver, clergy, teacher, or any adult in a relationship of responsibility, trust, or power with the victim child (World Health Organization, 2022).

The above classification of abuse and neglect covers a broad spectrum of intensity and severity, which has different definitions within diverse cultures or countries, making it difficult to have a global consensus. For instance, in some states of the US, according to the law, slapping a

child or hitting with a belt is not considered a form of abuse if that physical punishment leaves no marks on the child's body (Child Welfare Information Gateway, 2019). This definition does not make hitting with a belt less than physical abuse to a child but changes the way child abuse is recorded and treated as such by American state laws. The definitions proposed by the American child welfare (Child Welfare Information Gateway, 2019) for each category of maltreatment are as follows:

Physical abuse is defined as beating, hitting, shaking, hair pulling, physically forcing an unwilling child to display affection, or any other physical action that purposefully hurts the child.

Emotional or psychological abuse consists of humiliating, ridiculing, denigrating, threatening a child or her loved ones (including threatening or hurting a child's pet), confining, insulting, and other demeaning acts performed to hurt a child emotionally.

Sexual abuse is the engagement in sexual contact (fondling, molestation, penetration), exposure to sexual activities or materials, or verbal communication of obscene, erotic, or sexual comments directed to a child.

Emotional neglect is the absence of initiative or refusal to support the child's emotional needs, such as display of and engagement in affectionate behaviors, encouragement and praise, and the necessary attention and help for the child's healthy emotional development within a critical period for such stimuli.

Physical neglect is defined as failure to provide essential care for the child, such as food, dental or medical care, schooling, shelter, and safety (leaving a child in the care of untrustworthy individuals), despite having the means to act in the child's best interest.

The reversing of parent-child roles, i.e., placing a child in a position of having to care

emotionally for the needs of an adult, such as regularly expecting a child to accept, understand and accommodate for the adult's lack of appropriate parenting due to alcoholism, domestic violence, financial problems, among others, or seeking a child for emotional comfort concerning adult problems, is also a form of child exploitation that can damage a child's emotional development. The community tends to ignore this type of emotional abuse sometimes, as it may be seen popularly as "an implicit role" in families, independently of the age of the child.

According to *The National Child Traumatic Stress Network* (Peterson, 2018), maltreatment becomes traumatic for a child when such incidents are emotionally painful or distressful, and result in lasting mental and physical effects.

More recently, the 11th revision of the International Classification of Diseases (ICD-11), found that a subgroup of individuals with PTSD also suffers from disturbances in emotional regulation, self-concept, and relational functioning (interpersonal skills), which combined are defined as "disturbances in self-organization" (Eidhof et al., 2019). For this reason, the ICD-11 proposed a distinction between PTSD and the new diagnosis termed complex posttraumatic stress disorder (CPTSD). The ICD-11 reviewing team defines CPTSD as an extensive reaction to severe and prolonged stressors, such as repeated child sexual abuse, domestic violence, torture, or slavery (Eidhof et al., 2019; Knefel et al., 2015; Maercker et al., 2013). In this sense, CPTSD involves disorders in the domains of affect, self-concept, and relational functioning, in which chronic abuse appears as one significant stressor (Brewin et al., 2017; Maercker et al., 2013).

1.1.1.1. Risk Factors for Child Maltreatment.

The World Health Organization (2022) lists several risk factors for child maltreatment:

Table 1*Risk Factors for Child Maltreatment*

Child	Parents & Caregivers	Community & Societal
Being either under age four or an adolescent.	Misusing alcohol or drugs, including during pregnancy.	Gender and social inequality.
Being unwanted or failing to fulfill parental expectations.	Having been maltreated themselves as a child.	Lack of adequate housing or services to support families and institutions.
Having special needs or abnormal physical features, constant crying	Experiencing racism or social isolation.	High levels of unemployment or poverty.
	Difficulty bonding or nurturing a newborn or child.	Easy access to alcohol and drugs.
	Deficient grasp of child development or unrealistic expectations.	Inadequate policies and programs to prevent child maltreatment.
	Involvement in criminal activity.	Cultural norms that endorse violence and corporal punishment.
	Financial difficulties.	Rigid gender roles or devaluation of a child in parent-child relationships.
	Lack of support system or social isolation.	Social, economic, and health policies that lead to low living standards or inequality.
	Physical, developmental, or mental health problems of a family member.	
Violence among intimate partners or other family members.		
Family breakdown, separation, incarceration, divorce.		
	Lacking support from the extended family for child-rearing.	

Note. Adapted from *Child Maltreatment* by World Health Organization, 2022. (<https://www.who.int/news-room/fact-sheets/detail/child-maltreatment>). In the public domain.

Protective factors and resilience are also essential components of the complex fabric of

CM. The crucial factor for developing resilience in children is to have at least one stable and lasting relationship with a parent, caregiver, or another responsible adult who provides reliable support. This relationship allows personalized response, protection, and accountability to protect children from developmental disruption (Bensimon, 2012; Camardese et al., 2012; Masten, 2018).

This functional relationship also provides the environment for developing key capabilities — such as the ability to plan, learn how to monitor behavior, and self-regulate — these elements enable children to respond adaptively to adversity and thrive. This combination of supportive relationships, development of adaptive skills, and positive experiences underlie resilience (Afifi & MacMillan, 2011; Dixon et al., 2009; Folger & Wright, 2013; F. Li et al., 2011). The other four critical parental resilience and child protection elements are social connections, concrete support in times of need, parenting and child development knowledge, and children's social and emotional competence (Prevent Child Abuse North Carolina, 2021).

1.1.1.2. Prevalence of Maltreatment.

A systematic review by Hillis et al. (2016) estimated the prevalence of emotional, physical, and sexual abuse or multiple types of violence against children of 2-17 years of age to be around a minimum of 50% or more of children in 2015 in Asia, Africa, and Northern America. The same review estimated that about 1 billion children globally, over half of all children ages 2-17 years, experienced those types of violence in that same year (Hillis et al., 2016).

In terms of the rate of CM in Spain, the data presented here originated from the Unified Registry of cases of suspected child abuse by the *Registro Unificado de Maltrato Infantil* (RUMI; *Observatorio de la Infancia*, 2021). The RUMI database is considered to have an elevated level of efficiency, which informs the publication of the statistical bulletin on child protection measures in the *Boletín Estadístico Sobre Medidas de Protección Infantil* (BEMPI; Bienestar y Protección

Infantil, 2020). The BEMPI supplies relevant and rigorous data on the protection measures taken by the child protection services of autonomous communities and cities, aggregated by *Comunidades y Ciudades Autónomas* (CC.AA; *Dirección General de Gobernanza Pública*, 2021).

Below are presented statistical data on child maltreatment in Spain for 2018, divided into distinct aspects of the demographics.

Table 2 describes the incidence of child abuse and neglect by age group, which reveals that the highest incidence of maltreatment occurs between ages 11 to 17, comprising about 2/3 of the total number for that year. The most afflicted group is the older teenage children aged 15 to 17.

Table 2

Reported Incidence of Maltreatment by Victims' Age in Spain Year 2018

	Total	Age Range				
		0-3	4-6	7-10	11-14	15-17
<i>N</i>	18,762	2,383	1,610	2,670	4,487	7,612
Rate	236.2	30.0	20.3	33.6	56.5	95.8

Note. Rate 1/100,000 children. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2018)*. *Boletín Estadístico N° 21*, by Bienestar y Protección Infantil, 2020.

(https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5999&vengoDe=busqueda_resultado). In the public domain.

Table 3 displays the incidence of maltreatment by the victim's sex, where boy victims surpass more than half the number of girl victims. One reason for this difference may be related to more behavioral acting out (externalizing) by boy victims in their teenage years.

Table 3

Reported Incidence of Maltreatment by Victims' Sex in Spain Year 2018

	Total Victims	Boy Victims	Girl Victims
<i>N</i>	18,801	11,722	7,079
Rate	236.7	147.5	89.1

Note. Rate 1/100,000 children. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2018)*. *Boletín Estadístico N° 21*, by Bienestar y Protección Infantil, 2020.

(https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5999&vengoDe=búsqueda_resultado). In the public domain.

Table 4 reports the incidence of types of maltreatment, divided into four categories: neglect, physical, emotional, and sexual abuse. The highest incidence of maltreatment is neglect, which encompasses both physical and emotional, followed by emotional abuse, physical abuse, and sexual abuse, in that order.

Table 4

Reported Incidence of Maltreatment Types in Spain Year 2018

	Total Victims	Neglect	Physical Abuse	Emotional Abuse	Sexual Abuse	Total Malt. Type
<i>N</i>	18,801	12,679	3,894	4,758	1,209	22,540
Rate	236.7	159.6	49.0	59.9	15.2	259.3

Note. Rate 1/100,000 children. Malt. = maltreatment. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2018)*. *Boletín Estadístico N° 2*, by Bienestar y Protección Infantil, 2020.

(https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5999&vengoDe=busqueda_resultado). In the public domain.

Next, Table 5 reports the incidence of maltreatment types in Spain for the previous year, 2017, which shows a similar pattern to the year 2018 (Table 4). It also indicates a lower rate of abuse than in the year 2018, which a proportional yearly increase in the population of Spain may explain.

Table 5

Reported Incidence of Maltreatment Types in Spain Year 2017

	Total Victims	Neglect	Physical Abuse	Emotional Abuse	Sexual Abuse	Total Malt Type
<i>N</i>	16,777	10,771	3,587	5,270	993	22,540
Rate	211.0	13.4	45.1	66.3	12.5	259.3

Note. Rate 1/100,000 children. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2017)*. *Boletín Estadístico N° 20*, by Bienestar y Protección Infantil, 2018.

(https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5655&vengoDe=busqueda_resultado). In the public domain.

Table 6 displays the incidence of types of maltreatment by the victim's sex, and the severity

level of each type, independently of sex. When both ends of the age spectrum are compared, there is a drastic difference and direct inversion in the number of victims. The highest prevalence rate of maltreatment in Spain occurs within the 15-17 age group, representing 40.6% of the total maltreatment number, while the lowest prevalence rate lies within the 0-3 age group, representing 12.7% of the total maltreatment number. If age groups 11-14 and 15-17 are considered together, the percentage grows to more than half of the prevalence, 64.4% of all incidents of child maltreatment.

Table 6

Reported Incidence of Maltreatment Types and Severity by Victims' Sex in Spain Year 2018

Type	Total		Sex				Severity: Low/Mod		Severity: Severe	
	<i>N</i>	Rate	Girls <i>N</i>	Rate	Boys <i>N</i>	Rate	<i>N</i>	Rate	<i>N</i>	Rate
Sexual abuse	1,209	15,2	813	10.2	396	5.0	445	5.6	764	9.6
Emotional abuse	4,758	59,9	2,331	29.3	2,427	30.5	2,527	31.8	2,231	28.1
Physical abuse	3,894	49,0	2,046	25.8	1,848	23.3	2,137	26.9	1,757	22.1
Neglect	12,679	159,6	3,804	47.9	8,875	111.7	9,328	117.4	3,351	42.2
Total	22,540	283.7	8,994	113.2	13,546	170.5	14,437	181.7	8,103	102.0

Note. Rate 1/100,000 children. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2018)*. *Boletín Estadístico N° 21*, by Bienestar y Protección Infantil, 2020.

(https://www.observatoriodelainfancia.es/oia/esp/documentos_ficha.aspx?id=5999&vengoDe=busqueda_resultado). In the public domain.

This prevalence of maltreatment (Table 6) may refer to the late teenage years as a time of strong confrontation between children and their caregivers. This incidence rate may refer to

teenagers' urges toward assertiveness and independence while still financially dependent on parental support and control. In Spain, conflicts between teenagers' impulses to be self-reliant and independent and parents' expectations of obedience to house rules may exacerbate due to a lack of compatible opportunities to earn some level of financial independence at a young age.

In terms of the victim's sex, by a large margin (double the rate), girls were more often sexually abused than boys, which (proportionally) was the type of maltreatment with the highest percentage (63.2%) of severe abuse. Girls were also slightly more often victims of physical abuse than boys. However, boys had more than double the incidence rate of neglect than girls, although only about ¼ of the total incidence of neglect was severe. The incidence of emotional abuse was more evenly distributed between victims' sex and severity.

Table 7 indicates the incidence of child maltreatment in several counties of Spain, those depicted in this table had at least 900 incidents of reported child maltreatment. It is interesting to note that Cataluña, Baleares, and País Vasco counties had significantly less maltreatment among the national families than the foreign families residing in those counties. All other counties displayed in this table had the inverse relationship; most national families surpassed foreign families in the incidence of child maltreatment.

Table 7

Number of Reported Victims by Counties with the Highest Occurrence Year 2018

Counties	Victims	Female	Male	Spanish	Foreigner	Population
	<i>N</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>N</i>
Cataluña	4,749	635	4,114	691	4,058	7,565,099
Andalucía	3,327	1,723	1,604	3,299	28	8,426,405
Baleares	2,069	1,106	963	0	2,069	1,187,808
Canarias	1,725	697	1,028	1,699	26	2,207,225
País Vasco	1,289	221	1,068	450	839	2,178,048
Madrid	1,271	657	614	851	418	6,640,705

Cast. y León	1,246	583	663	977	269	2,408,083
C. Valenciana	921	495	426	738	183	4,974,475
Total	16,597	6,117	10,480	8,705	7,890	35,587,848

Note. Cast. = Castilla; C. = Comunidad. Adapted from *Portales de internet de las Comunidades Autónomas*, by Dirección General de Gobernanza Pública, 2021.

(https://administracion.gob.es/pag_Home/atencionCiudadana/SedesElectronicas-y-Webs-Publicas/websPublicas/WP_CCAA.html#.YFDcgGhKhPY). In the public domain.

Unfortunately, the child population (0 -18 age) in Spain for 2018 was not available to compare the percentage of CM within this segment of the child population. Table 8 displays the total population of Spain for the year 2018 and the rate of child maltreatment, corresponding to 0.04% of the total population of Spain in 2018, a relatively small percentage when viewed within the context of the general population (all ages). However, this relatively small percentage may reflect an underreporting of child maltreatment discussed earlier in this section.

Table 8

Total Population and Percentage of Reported Victims in Spain Year 2018

Year 2018	Total Population	Total Victims
Spain	46,722,980	18,801
Percentage	100%	0.04%

Note. Adapted from *Sociedad Demografía Población Residente en España de 2008 a 2022*, by Rosa Fernández, 2022. (<https://es.statista.com/estadisticas/725153/evolucion-de-la-poblacion-de-espana/>). In the public domain.

Arroyo and Coronas (2018) found similar numbers in the RUMI 2016 report (14,569 victims, 6,627 females, and 7,942 males). Reports that reach RUMI are received from the police, education system, health departments, and social services, and the counties with the highest numbers of incidents in 2016 were Catalonia (2,555), Andalusia (2,654), Madrid (1,477), Balearic Islands (1,452) and Canary Islands (1,293) (Arroyo & Coronas, 2018). The low rate of child abuse and neglect recorded by RUMI in Spain is possibly related to underreporting.

A German study conducted by Glaesmer (2016) found that a more significant proportion of child maltreatment is not reported, therefore, remaining underrecognized and underreported to child protection agencies and the police (hierarchy of information known as the top-down approach), which are responsible for official statistics on child maltreatment. Compared to data from epidemiological studies (bottom-up approach) with children of varied ages, adolescents, and adults, the prevalence of child maltreatment is more significant than official statistics. The estimation of the true prevalence of child maltreatment seems to be better accounted for with a combination of approaches, top-down and bottom-up (Glaesmer, 2016; Walker et al., 1999).

Confirming the trend of underreporting, in a recent study on the prevalence of child sexual abuse in Spain, Ferragut et al. (2021) interviewed 1,071 participants (539 men and 532 women). This study found that only 27.5% of respondents said they had told someone about the abuse when it occurred. This report to someone, in the case of women, was more often to the mother, and in the case of men, to a friend or colleague. The results indicated that the prevalence rate of sexual abuse is considerable, depending on the type of abusive experiences, ranging from 2.8% to 18.5%, particularly among women and the younger generation (Ferragut et al., 2021). In self-report studies, Pereda (2016) found high prevalence rates of child sexual abuse in the Spanish population. Both researchers acknowledged that prevalence data with representative samples are lacking

(Ferragut et al., 2021; Pereda, 2016).

Previously, the study by Pereda and Forns (2007) interviewed 1033 students at the University of Barcelona between 2001 and 2002 using the Traumatic Life Events Questionnaire. This research found a prevalence of child sexual abuse of 17.9% (14.9% before the age of 13 and 3% between the ages of 13 and 18), with 15.5% male and 19% female (Pereda & Forns, 2007). The percentage of sexual abuse in the form of penetration in men and women before the age of 13 was 26.7% and 42.1%, and from 13 to 18, 27.3% and 25%.

A second study by Pereda et al. (2009), using samples from the community and students in Spain, found similar prevalence rates to the first study for sexual abuse; in the second study, 18.5% reported being sexually abused, and 13.4% were women.

López et al. (1995) determined from their research with 1,821 Spanish participants that in the short term, the consequence of sexual abuse generates distrust, disgust, fear, hostility towards the aggressor, shame, and anxiety, among others. Over the lifespan, it results in a greater tendency to have mental health problems, such as depression, sexual dysfunction, substance abuse, homelessness, and school failure (López et al., 1995).

Table 9 presents a historical evolution of cases of maltreatment. The year 2018 shows an increase in the total number of reports regarding males, 62% of the total compared to 37% regarding females, an increase that did not happen in the previous year and did not repeat in the subsequent years. There was an increase of 14% in total maltreatment notifications in the year 2021, compared to the year 2018; and an increase of 37% compared to the year 2020. Note that 2021 was the second year of experiencing the Coronavirus disease (COVID-19), with several limitations imposed on children and families.

Table 9*Reported Incidence of Maltreatment by Victims' Sex in Spain Years 2017 to 2021*

		2017	2018	2019	2020	2021
Girl Victims	<i>N</i>	7,087	7,079	7,105	7,242	10,473
	Rate	89.2	89.1	108.8	112.1	164.8
Boy Victims	<i>N</i>	9,680	11,722	8,260	8,446	11,048
	Rate	121.7	147.5	126.5	130.7	173.8
Total Victims	<i>N</i>	16,777	18,801	15,365	15,688	21,521
	Rate	211.0	236.7	235.4	242.9	338.6

Note. Rate 1/100,000 children. Adapted from *Boletín de Datos Estadísticos de Medidas de Protección a la Infancia (Datos 2021)*. *Boletín Estadístico N° 24*, by Bienestar y Protección Infantil, 2022.

(https://observatoriodelainfancia.mdsocialesa2030.gob.es/estadisticas/estadisticas/PDF/vers1BOLETIN_Proteccion_PROVISIONAL2021.pdf). In the public domain.

The data from maltreatment reports showed that rarely a child suffered just one type of maltreatment or adversity, and the occurrence of several types of maltreatment produced a cumulative effect that led to higher vulnerability to physical and mental illnesses in adulthood. Similarly, the Adverse Childhood Experiences (ACE; Arnow, 2004) questionnaire produced data on the long-term negative impact of childhood adversities on physical and mental illnesses, particularly the cumulative effect of several types of adverse experiences.

The ACE questionnaire has ten “yes or no” items, each item counting one point. The total points on the ACE predict the susceptibility to illnesses in adulthood – the higher the total, the higher the risk. The ACE gave the first evidence that child abuse and neglect, from the early developmental phases to adulthood, are at the root of various medical and psychological disorders

in adulthood (Felitti & Anda, 2010). Several studies showed that the number of types of maltreatment (cumulative effect) and magnitude of childhood adversities positively correlated with increased vulnerability and risk of developing physical or mental illness (McLaughlin et al., 2017; Nemeroff, 2016). For this reason, the present investigation examined each single type and the cumulative effect of types of maltreatment and their potential impact on therapy outcomes for women with fibromyalgia.

1.1.2. Neurobiological Impact of Child Maltreatment

Children depend on stable relationships with caring and safe adults from infancy through childhood to survive and thrive. Parent-child attunement (Stern et al., 1985; Subramaniam & Mulcahy, 2021), also called biobehavioral synchrony (Bell, 2020; Feldman, 2012), refers to the implicit process of non-verbal resonance, based on sensing the other through kinesthetic, somatic, and emotional cues (Stern et al., 1985; Subramaniam & Mulcahy, 2021). These connections are implicit, pre-verbal, and made through gestures, touch, tone of voice, smell, and eye contact (Devereaux, 2014; Schore & Schore, 2008; Subramaniam & Mulcahy, 2021). A parental figure who can adequately reflect the experience of the other through body movements, facial expressions, tone of voice, and vocabulary contributes to the regulation of arousal and affective states of the baby, calming the child's emotions and physiology (Bell, 2020; National Research Council, 2014; Ostlund et al., 2017; Subramaniam & Mulcahy, 2021). With the new technological advances in research, this interpersonal synchrony has also been proposed at the behavioral, physiological, and neural levels of attunement (Markova et al., 2019).

The regularity of attuned interactions from infancy through child development generates the ability to self-regulate one's own body and emotions (Ostlund et al., 2017), build an early understanding of oneself and others and, over time, build self-care skills and a sense of resilience

and safety (Schore, 2002; Stern et al., 1985).

Thus, an attuned relationship with a parent forms the framework for the infant's emotional growth and regulation of the stress response and provides a reference for fundamental aspects of future social interactions (Bell, 2020; Feldman, 2012).

These experiences of biobehavioral synchrony will also be passed on to the next generation through these foundational experiences being consistently and lovingly raised, creating a transmission of attachment patterns across generations (Feldman, 2012).

However, when there are ruptures in patterns of positive, protective, and nurturing attunement or biobehavioral synchrony because of neglect or abuse or both, a child's ability to self-regulate emotionally, cognitively, and physiologically may be compromised (Agorastos et al., 2019; Ostlund et al., 2017; Schore, 2002; Schore & Schore, 2008).

Neglect of a child is characterized by a caregiver's lack of necessary input and proper care, stimulation, and absence of interactions during a critical period of child development. In child abuse, the caregiver becomes a trigger of emotional ambiguity and dysregulation by being both a source of (either inconsistent or intermittent) care and, at the same time, of fear, threat, and danger at a stage of development in which the child is vulnerable and utterly dependent on an adult for protection and care (National Research Council, 2014).

Lack of experiences of co-regulation in childhood may lead to difficulties in adulthood concerning interpreting physiological, emotional, and cognitive-adaptive needs, predisposing the future adult to vulnerability to illnesses because of a lack of self-management skills and self-agency (Brock et al., 2006; DeGangi, 2017; Heleniak et al., 2016; Oshri et al., 2015; Schore, 2002; Schore & Schore, 2008). More severely, inadequate caregiving in the form of neglect affects the

neurobiological development of children because of missed timelines and windows of opportunity for essential input and interpersonal exchange at each stage of neurobiological maturation that is interaction-dependent (National Research Council, 2014). One example, sensory stimulation is intrinsically time-sensitive. Lack of stimulation during the period in which this stimulation is formative and necessary may have irreversible effects on human development (Craig, 2010; Kelly-Irving et al., 2013; Miskovic et al., 2010; Morey et al., 2016; Teicher & Khan, 2019).

Child maltreatment is associated with altered neural activity in several processes (Insana et al., 2016): a) cognitive functioning and executive control; b) socioemotional regulatory processes; c) autonomic functions of sleep/wake regulation, related to increased and decreased brain activity in six areas of the brain, the frontal, parietal lobe -temporal, cerebellar, limbic and midbrain regions.

There is evidence of differential effects of subtypes of CM on brain structure volume, activity, and connectivity (Cassiers et al., 2018; Hart & Rubia, 2012; Lippard & Nemeroff, 2020; Nemeroff, 2016; Pereda & Gallardo-Pujol, 2011; Pereda et al., 2011). However, common deficits, such as reduced frontal cortical volume, glucocorticoid deregulation (Hypothalamus-Pituitary-Adrenocortical axis deregulation), and inflammatory cytokines may contribute to disease vulnerability, and severe disease course were found in all subtypes of maltreatment (Lippard & Nemeroff, 2020). Chronic exposure to threatening conditions was identified as a possible cause of damage to the brain due to glucocorticoid deregulation, associated with dysregulation of the Hypothalamus-Pituitary-Adrenocortical (HPA) axis (Vidlock et al., 2009).

Regarding different maltreatment subtypes Cassiers et al. (2018) found that:

- 1) Sexual abuse was associated with structural deficits within the reward circuit and genital representation field of the somatosensory cortex and amygdala hyperreactivity while recalling sad

autobiographic memories. Some outcomes from sexual abuse seemed to be related to adaptive neurophysiological plasticity for protection, such as a reduction of the genital sensory cortical volume and associated sexual dysfunction (Heim et al., 2013; Pereda & Gallardo-Pujol, 2011).

2) Although no distinct structural or functional effects were found for physical abuse, a history of physical abuse appeared to be implicated in developing antisocial or narcissistic personality traits (Cassiers et al., 2018).

3) Emotional maltreatment outcomes include widespread abnormalities in fronto-limbic activity and connectivity, especially in networks involved in emotional processing in a social context, such as the processing of facial expressions (Tottenham et al., 2011). Emotional maltreatment is correlated to a higher risk of developing a depressive disorder.

4) Neglect was associated with extensive deficits of white matter integrity and connectivity in several large brain networks involved in various functions, such as interoceptive monitoring (Schaan et al., 2019). Lack of interoceptive awareness, from the absence of positive interactions with a caretaker, has been linked to psychopathology and alexithymia, the inability to identify and describe one's own emotions (Khalsa et al., 2018; Murphy et al., 2017)

According to most reviews, these are the basic neurobiological systems and brain structures implicated in the aftermath of early CM: the amygdala, hippocampus, corpus callosum, cerebellum, prefrontal cortex, and hypothalamic-pituitary-adrenal axis. adrenal gland (HPA). They have an extensive role in neurological, psychological, emotional, cognitive, social, and adaptive aspects of human development throughout life. For this reason, it is worth mentioning each of them (Anderson et al., 2017; Teicher et al., 2016):

1.1.2.1. The Amygdala.

The amygdalae are almond-shaped nuclei found deep and medially within both temporal

lobes of the human brain, involved in emotional regulation and processing. The amygdala enables the formation and storage of memories associated with events that have an emotional valence, and indirectly, it may be related to the perception of pain (Veinante et al., 2013; Youssef et al., 2016a, 2016b) – a pivotal point to consider in FM pain.

For the amygdala structure to develop well in the first years of life, the developmental context has to offer the necessary incentives for learning about emotions within a specific timing. In this process, the amygdala responds intensively to threats and adversities in early life and reinforces response patterns according to the environmental circumstances (Casey et al., 2019; National Research Council, 2014; Tottenham et al., 2010, 2011). To date, there is evidence from functional magnetic resonance imaging (fMRI) studies that the function of the amygdala in abused and neglected children is compromised (Keding & Herringa, 2016; Sherin & Nemeroff, 2011; Tottenham et al., 2010, 2011). This dysfunction manifests in maltreated children as deficits in emotional processing, which leads to behavioral and emotional reactivity to neutral situations with fear and anger, internalization problems, increased anxiety, and emotional dysregulation (DeGangi, 2017; Streeck-Fischer & van der Kolk, 2000).

1.1.2.2. The Hippocampus.

The hippocampi are a set of brain structures found under the cerebral cortex in the allocortex, inserted deep into both temporal lobes, one hippocampus on each side of the brain, involved in learning, spatial and contextual processing, and memory. The hippocampi and amygdalae are part of the limbic system and participate in processes of reflexive or primary emotions, such as fear and anxiety, with complementary functions in fear-conditioning processes. The amygdala stores memories of fear-related stimuli, while the hippocampus appears to keep the context in which the fear-related stimulation occurred (Alvarez et al., 2008; Monti et al., 2015;

National Research Council, 2014).

Acute stressors in the environment, such as CM, lead to high levels of stress-related hormones that can cause direct anatomical and functional damage to the hippocampus (Anand & Dhikav, 2012; Campbell & MacQueen, 2004; Champagne et al., 2008; MacQueen & Frodl, 2011; Maguire et al., 2000; Sapolsky, 2001; Tyng et al., 2017).

Memory problems, reduced volume, and abnormal hippocampus function have been detected in several mental illnesses, such as depression and PTSD. In male patients with depression, the hippocampus may shrink by up to twenty percent, possibly due to the hypercortisolism (excess of cortisol) generated by dysfunction of the HPA axis, and each recurrence of depression further decreases the size of the hippocampus (Apfel et al., 2011; Lambert et al., 2017; Logue et al., 2018; McNerney et al., 2018; Sapolsky, 2001).

The volumes of the right and left hippocampi in depressed women without abuse were like those in healthy individuals. Interestingly for our investigation, only women with depressive disorder and a history of severe and prolonged physical or sexual abuse or both in childhood had a lower volume of the hippocampus (Vythilingam et al., 2002).

1.1.2.3. Corpus Callosum.

The corpus callosum is the largest white matter structure of the human brain, located below the cerebral cortex. It is involved in integrating complex functions between the two cerebral hemispheres.

The impact of CM on the corpus callosum is visible through fMRI and easy to measure because it appears as a massive reduction in size compared to the general population, probably due to early exposure to elevated levels of cortisol (National Research Council, 2014; Teicher et al.,

2016). The reduced corpus callosum may cause less efficient cognitive functioning among children who experience early adversity, as the anatomical bridge to connect the two hemispheres of the brain is impaired (Cyprien et al., 2011; Jackowski et al., 2008; Li et al., 2016; Streeck-Fischer & van der Kolk, 2000; Teicher et al., 2004; Teicher & Khan, 2019; van der Kolk, 2003).

Lack of communication between the two hemispheres causes lateralization of information, which obstructs integrative emotional and cognitive processes (Alves et al., 2008; Silberman & Weingartner, 1986). The most prevalent hypothesis of hemispheric lateralization of emotions is one in which the right hemisphere prevails in emotional processing (Gainotti, 2019b). Another theory posits that the right brain processes negative emotions, and the left hemisphere processes positive emotions and related behaviors (Packheiser et al., 2021; Silberman & Weingartner, 1986). Other two hypotheses posit that both hemispheres take part in emotional processing in separate ways (Ross, 2021) or that the left and right hemispheres participate in emotional processing, with specific prevailing of one or the other at distinct stages of emotional processing (Gainotti, 2019a; Wyczesany et al., 2018). The most critical aspect of integrating cognition and emotions is the ability to transit information between the two hemispheres.

Studies on CM found that patients with a history of child abuse have difficulty integrating both systems. They seem to predominantly use the left hemisphere when thinking of neutral memories and the right hemisphere when recalling a disturbing early memory (Killgore & Yurgelun-Todd, 2007; Moeck et al., 2020; Shobe, 2014; Teicher et al., 2004; Teicher & Khan, 2019; van der Kolk, 2003).

This decrease in the integration of right-left hemispheres because of child abuse is significantly higher in boys with a history of severe abuse or neglect than in control groups (Jackowski et al., 2008; National Research Council, 2014; Teicher et al., 2004; K. R. Wilson et al.,

2011; Wilson et al., 2021). In boys, neglect had a far more significant effect on the corpus callosum than any other type of maltreatment; physical and sexual abuse had relatively more minor effects. In girls, however, sexual abuse was a more decisive factor, associated with a substantial reduction in the size of the middle portions of the corpus callosum (Pereda & Gallardo-Pujol, 2011; Streeck-Fischer & van der Kolk, 2000; Teicher et al., 2004; Teicher & Khan, 2019; van der Kolk, 2003).

1.1.2.4. Cerebellum.

A structure divided into ten lobules, found at the base of the brain, separated from the rest of the brain by a layer of resistant dura mater, involved with motor and non-motor functions that include cognition, emotion, and the default mode network.

The cerebellum appears to be involved in many psychiatric disorders, including attention deficit hyperactivity disorder, autism spectrum disorders, schizophrenia, bipolar disorder, major depressive disorder (MDD), attention deficit hyperactivity disorder, autism, and anxiety disorders (Phillips et al., 2015). Traditionally, the cerebellum has been proposed to support balance and motor control and coordination of balance and movement, including fine motor skills. However, in the last two decades, the cerebellum has been found to have multiple functions, being involved in emotional regulation, inhibition of impulsive decision-making, attention, working memory, and connection to areas of the brain that monitor errors (Phillips et al., 2015).

Children and adolescents with a history of maltreatment, PTSD, or comorbid conditions were found to have decreased cerebellar volume (Carrión et al., 2010; Hart & Rubia, 2012; National Research Council, 2014; Phillips et al., 2015). Also, there was decreased brain connectivity in children who suffered neglect, probably due to a general absence of feedback (positive or negative) characteristic of neglect (Cassiers et al., 2018).

1.1.2.5. Prefrontal Cortex.

The prefrontal cortex (PFC) is the cerebral cortex that covers the frontal lobe and is highly interconnected with most of the brain, involved in higher-order cognitive functions.

The prefrontal cortex development extends from birth to the third decade of life, being responsible for a variety of higher-order executive functions, and it is susceptible to experiences of early adversity (Hart & Rubia, 2012; McLaughlin et al., 2010, 2017).

Early adversity and child maltreatment compromise several of the structures that feed the frontal lobe for higher-order processing, such as the emotional processing of information from the amygdala, spatial and memory processing of data from the hippocampi, and highly associative processes facilitated by the corpus callosum (National Research Council, 2014).

Anomalies in prefrontal cortex size and functioning have been correlated to traumatic experiences and poorer executive functioning in children with a history of maltreatment (abuse and neglect) and trauma. Those anomalies show patterns of neural activation similar to patterns of attention deficit hyperactivity disorder (ADHD), with particular difficulty in sustaining attention during tasks that require mental skills (executive and inhibitory controls), such as working memory, flexible thinking, and self-control to stop impulsive behaviors (Carrión et al., 2010; Loman & Gunnar, 2010; McDermott et al., 2012; Mueller et al., 2010).

1.1.2.6. The Hypothalamus-Pituitary-Adrenocortical Axis.

The HPA axis is formed by the integrated functioning of three organs, the hypothalamus, the pituitary, and the adrenal glands, and is known as the stress response system. The hypothalamus and pituitary gland are located just above the brainstem, while the adrenal glands are found at the top of the kidneys.

The HPA axis regulates the use of neurobiological resources and circadian rhythms, such as waking up, sleeping, and energy levels (Gunnar & Cheatham, 2003; K. R. Wilson et al., 2011). It also optimizes survival by responding to stresses and unexpected events, integrating physical and psychosocial influences to help the organism to adapt effectively to the environment. To that end, HPA triggers neurobiological events to promote survival behavior, distributing energy to processes critical to immediate survival (e.g., glucose metabolism for the “flight or fight” response). In survival mode, it decreases activities that are not critical for immediate survival, such as immune system functions, growth hormones, and digestive and reproductive systems (Gunnar & Cheatham, 2003). Thus, chronic stress may lead to a dysregulation of the whole organism, started by excessive activation of the HPA axis and sympathetic responses and a constant stressful state of hypervigilance (Agorastos et al., 2019; Nikkheslat et al., 2020; Pereda & Gallardo-Pujol, 2011).

The HPA axis is overly sensitive to early childhood relationships and experiences. These events will determine a pattern of survival within the early life environment, which may condition its functioning for life (Fuller-Thomson et al., 2016). A comprehensive review (Nemeroff, 2016) found several variables that impact HPA axis activity, described below:

- The type of CM, i.e., whether it was sexual, physical, or emotional abuse or neglect; the number of incidents, cumulative period, age at the first incident, and chronicity.
- Presence or absence of psychosocial support.
- Presence of traumatic events in adulthood.
- Family history of major psychiatric disorders.
- Genetic and epigenetic factors.

Children who suffered CM and institutionalized children present with flat patterns of

cortisol volume during daytime regulation instead of the appropriate pattern of fluctuation that supports circadian rhythms and daytime function that is found in the low-risk group of children (Bernard et al., 2010; J. Bruce et al., 2009; V. Bruce et al., 2000; Carlson & Earls, 1997; Dozier et al., 2006; Fisher & Kim, 2007; Gunnar & Vazquez, 2001; Shonkoff & Garner, 2012). The flat daytime pattern of cortisol volume may reflect the negative regulation of the HPA axis activity after the previous hyperactivation in early childhood. In addition to this system affecting a low activation pattern, disorders may manifest in the opposite direction as excessively high cortisol production at baseline or reactive levels (Bernard et al., 2017; Fries et al., 2005).

1.1.2.7. Neurobiological Summary.

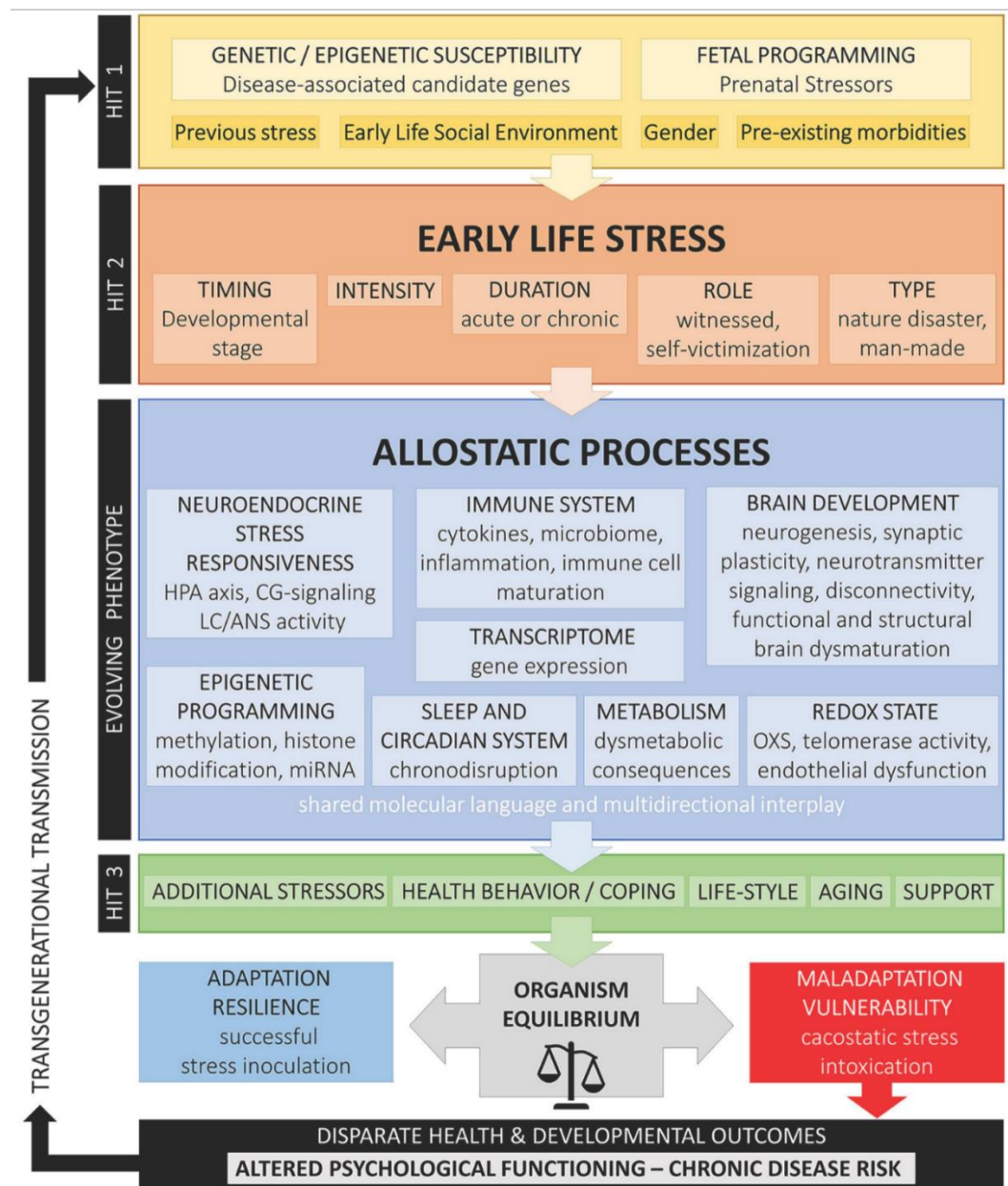
CM has been linked to moderate to severe impact in several brain structures and the hormonal HPA axis. The combination of genetic factors with CM, particularly early CM, can disrupt the developmental programming of neural circuitry and alterations in neuroendocrine, immune, circadian, emotional, and autonomic systems (Agorastos et al., 2019). This disruption leads to structural, functional, and epigenetic modifications in both the brain and peripheral tissues (Agorastos et al., 2019). Failure to attend to developmental timing may compromise the child's global development, causing extensive neuro-psycho-biological vulnerability to meet age-appropriate milestones. Lack of developmental readiness can lead to neuropsychological, emotional, behavioral, and cognitive problems associated with deficits in cognitive skills, attention, and executive functioning (Pereda & Gallardo-Pujol, 2011; K. R. Wilson et al., 2011; Young & Widom, 2014). The developmental phase of exposure to maltreatment will determine structural and functional deviations that could lead to a higher risk for mental illnesses in adulthood, and chronic diseases, such as chronic pain and diabetes (Fuller-Thomson et al., 2016).

The diagram (Figure 1) below summarizes the impact of CM and chronic stress on child

development (Agorastos et al., 2019):

Figure 1

Developmental Impact of Childhood Maltreatment



Note. Reprinted from *Developmental Trajectories of Early Life Stress and Trauma: A Narrative Review on Neurobiological Aspects Beyond Stress System Dysregulation*, by A. Agorastos, P. Pervanidou, G. P. Chrousos, and D. G. Baker, 2019, *Frontiers in Psychiatry*, 10, p. 118. Copyright 2019 by Agorastos, Pervanidou, Chrousos and Baker (CC BY).

Agorastos et al. (2019) explain that this schema (Figure 1) depicts possible paths of early life stress during development. This conceptual model includes moderating factors, neurobiological network adjustments to the biopsychological aftermath of early life stress and CT. It shows how early life stress and CT can disrupt brain development in critical phases of development, generating altered and reduced adaptability to stress from childhood onwards. The idiosyncratic consequences in each individual will vary according to genetic background, fetal programming, timing, duration, intensity, and type of early life stress and CT, along with cumulative stressors as life progresses, lifestyle, coping strategies, and other factors that will explain variation in resilience and health outcomes.

1.1.3. Psychological Aspects of CM

The term “psychological” broadly encompasses a set of environmental influences, including cultural, social, and family environments; genetic and epigenetic trends; neurobiological functioning; developmental process; affective-emotional expressions; cognitive constructs in the form of thoughts, creativity, values, beliefs, and spirituality, and the cognitive structure itself with its conscious and non-conscious processes; motivation, and temperament. These aspects interact to form the individual’s psychological profile and context (Ainsworth et al., 2015; Beckmann & Wood, 2017; Fletcher & Schurer, 2017; Kelly, 1955; Kinderman et al., 2013; M. Liu & Huang, 2015; Loginova & Slobodskaya, 2021; Pozzi et al., 2021; Prinzie et al., 2009; Schultz & Schultz, 2017; Wilson et al., 2021; Wright et al., 2015).

This interaction of systems conditions concepts such as self-esteem, self-image, social and interpersonal constructs, and worldview, involving the emergence of internalizing and externalizing patterns of behaviors and attachment styles (Bevilacqua et al., 2021; Leve et al., 2005; McCann & Pearlman, 1992; Montero-Marín et al., 2020; Oshri et al., 2015; Quenneville et al., 2020; Suarez & Feixas, 2020; Zdankiewicz-Ścigala & Ścigala, 2020).

Within this context, CM exposure is a core vulnerability affecting personality expression, associated with multiple forms of psychopathology, which puts an individual at risk for more than one mental health diagnosis and problems with emotional regulation (internalizing and externalizing), identifying emotions (alexithymia), sexuality, interpersonal and intimate relationships (attachment), health, parenting, socializing, criminal and risk behaviors, among other psychosocial problems (Alhalal et al., 2018; Bruce et al., 2012; Brühl et al., 2019; Carlson & Earls, 1997; Danese & Baldwin, 2017; Hahn et al., 2016; Maughan & Cicchetti, 2002; Oshri et al., 2015; Romano et al., 2015; Romeo et al., 2020; Teicher, 2020; Yates et al., 2012; Young & Widom, 2014, 2014). CM and CT have been associated with low self-esteem or a low sense of worth in adulthood; linked to several psychiatric disorders, such as depression and anxiety, and social withdrawal; and physical problems, such as autoimmune disorders (Bungert et al., 2015; Duprey et al., 2019; Macarenco et al., 2021; Xiang et al., 2018). It also connects to negative social emotions that prevent the person from relating to others in a positive social or intimate contact because of feelings of inferiority and inadequacy (Xiang et al., 2018).

Children exposed to CM develop coping styles encompassing externalizing behaviors or disorders characterized by actions in the external world or towards others, such as antisocial behavior, impulsivity, hostility, and aggression. In terms of externalizing behaviors, Pereda et al. (2009) found that sexually abused children exhibited sexualized behaviors, compulsive

compliance, aggressive and disruptive behaviors, and suicide. Alternatively, some children may display internalizing behaviors or disorders, which are characterized by internal processes, such as anxiety, somatization, and depression, or harmful behaviors towards oneself, such as self-harming and eating disorders (Achenbach et al., 1987; Celik & Hocaoglu, 2015; Dada et al., 2012; Hankin et al., 2016; Heleniak et al., 2016; Loeber & Burke, 2011). Either way, in adolescence, these children may have difficulty understanding their own emotions and those of others and controlling their emotional reactions, exhibiting frequent and abrupt changes in mood throughout the day (Moreno-Manso et al., 2021).

Externalizing and internalizing disorders may overlap; for example, children with internalizing disorders might negatively affect their peers, siblings, and parents. Conversely, children exhibiting externalizing behavior might have internal or somatic problems (Loeber & Burke, 2011). As children mature, one or the other pattern of behavior might become more prevalent, according to personality and temperament (Leve et al., 2005). Usually, symptoms of externalizing or internalizing tendencies first appear in early childhood, and they precede conduct disorders, anxiety disorders, or MDD (Loeber & Burke, 2011; Willner et al., 2016).

Internalizing (e.g., anxiety and depression), externalizing (e.g., hyperactivity, conduct disorder), and psychotic experiences (e.g., schizophrenia and bipolar disorder) are factors that seem to be related to comorbidity (Bevilacqua et al., 2021; Selzam et al., 2018), which is one characteristic of our sample of women with FM with depressive symptoms.

1.1.3.1. Externalizing disorders.

Substantial research associated the history of CM and various conduct problems, such as oppositional-defiant, conduct disorder, or hyperactivity (Batum & Yagmurlu, 2007; J. Bruce et al., 2009; Heleniak et al., 2016; Moylan et al., 2010, 2010; Muniz et al., 2019; Renner & Boel-Studt,

2017). In oppositional-defiant disorder, the patient shows a frequent pattern of angry or irritable mood, argumentative or defiant behavior, and revenge. A repetitive or persistent pattern of behavior violates the fundamental rights of others or major social norms or rules, including aggression against people or animals, destruction of property, fraud or theft, and serious rule violations or legal issues.

Children with a history of physical abuse were more likely to display conduct disorder or oppositional-defiant disorder; however, physical abuse in childhood was not associated with conduct disorder when sexual abuse was also present (Lewis et al., 2016). Sexual abuse has been studied as a lifelong handicap with pervasive symptomatology of externalizing and internalizing nature (Bellis et al., 2011; DiLillo et al., 2006; Leserman et al., 1996; Lewis et al., 2016; López et al., 1995; Paras et al., 2009; Pereda et al., 2009; Shrivastava et al., 2017).

1.1.3.2. Internalizing disorders.

Internalizing behaviors are directed inward, which are indicative of a child's psychological and emotional negative state. Internalizing is highly correlated to mistreatment or adversity in childhood, such as neglect, abuse, violence, grief, and separation from parents, which increase the risk of depression, anxiety, and somatic complaints, due to an inability to express emotions (Bevilacqua et al., 2021; Liu et al., 2011).

Internalizing symptoms in childhood can predict the development of depressive disorders, anxiety disorders, somatic complaints, and suicide in adulthood (Bevilacqua et al., 2021; Esteves et al., 2017; Liu et al., 2011; White et al., 2015; Zahn-Waxler et al., 2000).

Maternal childhood exposure to physical abuse was significantly associated with her child's internalizing symptoms; this effect remained after considering child sex, maternal

depressive symptoms, severe parenting practices, and the child's exposure to stressful life events (Esteves et al., 2017; Heim & Nemeroff, 2001). Girls can be particularly affected by internalizing behaviors, including suicide, in the presence of a history of sexual abuse and precocious puberty (Coe et al., 2020; Davis et al., 2014; Lewis et al., 2016; Mendle et al., 2014). Some studies showed that exposure to violence in childhood was strongly related to externalizing behaviors but not internalizing behaviors (Milaniak & Widom, 2015; Renner & Boel-Studt, 2017). Internalizing symptoms can concur with social isolation, withdrawal, and self-mutilation.

1.1.3.3. Alexithymia.

Luminet et al. (2021) defined Alexithymia as “difficulties in identifying own feelings and distinguishing them from bodily sensations, difficulties in describing one's feelings to others, and an externally oriented cognitive style.” Alexithymia is associated with emotional and physical neglect and physical abuse. It contributes significantly to the complexity of internalizing (e.g., somatization as a consequence of lack of emotional and interoceptive awareness) and externalizing (acting out instead of being able to identify and verbalize feelings and emotions about “self” and “others”) patterns of behaviors (Batum & Yagmurlu, 2007; Göbel et al., 2016; Kopera et al., 2020; Loeber & Burke, 2011; Stein & Newcomb, 1994; White et al., 2015; Zlotnick et al., 2001). Parents need to help children name their feelings and emotions, distinguish one from another, validate their emotional experiences, and teach them how to self-soothe (self-regulate) when they experience strong positive and negative emotions. This process must occur in a consistent and caring fashion conducted by an empathic and attentive caregiver from the beginning of children's lives, when they first start to communicate verbally or otherwise, throughout childhood.

The lack of awareness of emotions being experienced implies deficits in the cognitive processing of emotional excitement and disturbances in regulating emotions and self-regulation.

The individuals' deficiency in recognizing and naming specific emotions hinders the choice of appropriate and effective strategies for their regulation. As a result, the process of self-regulation will be predominantly random or based on short-term consequences and, therefore, inadequate (Aust et al., 2013; Farooq & Yousaf, 2016; Zdankiewicz-Ścigała & Ścigała, 2020; Zorzella et al., 2020). The deficits in emotional development generated by alexithymia as a consequence of CT may result in adopting lifelong unhealthy behaviors. These behaviors include smoking, alcohol or drug use, and overeating to regulate distressing emotions (Porcelli & Taylor, 2018), which may lead to ongoing somatic disturbances and complaints (Güleç et al., 2013; Macarenco et al., 2021; Sifneos, 1973). In addition, the combination of all areas impacted by alexithymia, i.e., social inadequacy, lack of emotional self-awareness, faulty strategy for the regulation of emotions and self-regulation, among others, may result in a higher vulnerability to mental illness (Leweke et al., 2012). In many cases, alexithymia plays a mediating role between CT and symptomatology (Macarenco et al., 2021; Paivio & McCulloch, 2004). Among the mental illnesses associated with alexithymia are obsessive-compulsive disorder (Carpenter & Chung, 2011), eating disorders (Franzoni et al., 2013), alcohol misuse (Cruise & Becerra, 2018; Shishido et al., 2013; Thorberg et al., 2009), depression (Bos et al., 2022), and PTSD (Sistad et al., 2021; Spitzer et al., 2007).

1.1.3.4. Attachment Patterns.

According to the ANAR (Fundación ANAR, 2021), CM is perpetrated by parental figures, either one or both parents, in 78% of cases of child maltreatment in Spain. Thus, a parent or primary caregiver usually is the prevalent perpetrator in most cases, with life-long implications for children's psychological development and organization.

Attachment theory describes the nature of a child-parent emotional bond developed from birth, based on the child's need for protection, care, love, and security. The establishment of an

attachment is based on a set of motivational, behavioral, and interactional patterns that characterize the child-parent relationship, such as motivation to engage in all aspects of caring for a child, shown by appropriate behaviors in safe and loving relationships. The quality of the attachment is fundamental for healthy emotional, psychological, interpersonal, and social development, providing a blueprint for future engagements with others (Bowlby, 1988; Schore, 2002; Schore & Schore, 2008).

When children are in stressful situations, such as feeling emotionally or physically unsure, insecure, inconsolable, hurt, fearful, uncomfortable, or overwhelmed, they will seek closeness to and comfort from their parents. Ideally, parents will understand the child's need and respond with proper behaviors and emotions, such as comforting, reassuring, holding the child in their arms, calming the child down, and thus providing the child with a gratifying feeling of security (Schore, 2002; Schore & Schore, 2008). Over time, these experiences of feeling safe in a 'secure base' help children learn how to regulate their emotions and slowly develop coping strategies when facing fear or distress (Bowlby, 1988; Schindler, 2019). Thus, attachment patterns regulate distance and closeness between parents (or primary caregivers) and children and influence their ability to regulate their affect and emotions in the future.

Early experiences with caregivers gradually give rise to a system of thoughts, memories, beliefs, expectations, emotions, and behaviors about self, others, and the world, with a broad implicit basis not readily available for explicit retrieval. This system forms the child's internal working model of social relations and continues to develop over time and experience, being carried into adulthood as an attachment or personality style (Schore & Schore, 2008).

Within the attachment theory perspective, children develop secure attachments to parents who are responsive to them when distressed. Suppose parents are very anxious, abusive, or

unavailable. In that case, children are likely to develop an insecure attachment and a pattern of affect dysregulation (the child attempts to seek out caregivers who do not provide relief from stress or fear; Ainsworth et al., 2015; Asok et al., 2013; Bowlby, 1953; Marshall et al., 2018; Romeo et al., 2020).

A child who is raised with physical or emotional maltreatment, such as hitting, shaking, punching, witnessing domestic violence, name-calling, humiliation, shaming, blaming, or is a victim of sexual abuse by a caretaker, receives conflicting information about the role of the parental figure and their predictability of loving care and develops an insecure attachment style (Marshall et al., 2018; Romeo et al., 2020). Studies on insecure attachment patterns demonstrated two main patterns: the anxious-preoccupied and the avoidant-dismissive or avoidant-fearful. According to research, anxious individuals fear abandonment, display obsessive traits, and expect high levels of reciprocity with others, while avoidant individuals fear intimacy and closeness and avoid committed relationships (Bowlby, 1953; Oshri et al., 2015).

Insecure attachment patterns resulting from CM exposure have complex effects on types of adaptive responses or coping mechanisms, categorized into two basic attitudes, the externalizing or internalizing style of adaptation, as described previously (Fisher & Kim, 2007; Gander et al., 2018; Oshri et al., 2015; Schindler, 2019).

These styles of adaptation convey a failure to develop effective strategies for emotional regulation, partly because of misinterpreting emotional signals and even facial expressions based on the inadequate quality of a relationship with the primary caregiver. The psychological dynamics set in motion by CM, coupled with the neurobiology of early or chronic maltreatment in childhood, are risk factors for a myriad of psychiatric disorders (Göbel et al., 2016; Heleniak et al., 2016; Lewis et al., 2016; Loeber & Burke, 2011; Moylan et al., 2010; Muniz et al., 2019; National

Research Council, 2014; Thornberry et al., 2001; White et al., 2015).

1.1.3.5. Personal Construct and Constructivist Self-Development Theories.

Personal construct theory (Kelly, 1955) is a constructivist theory that comprehends a thorough study of a single individual in order to obtain an in-depth understanding of that person's cognitive structure (idiographic approach), giving a particular emphasis on how self-identity and interpersonal perception are organized into a cognitive system (Harter et al., 2004). This cognitive structure functions to describe current experiences, ascribe meaning and predict future events. For example, anxiety is "the recognition that the events we are confronted with are beyond the capacity of one's construction system" (Kelly, 1955, p. 495). In other words, anxiety occurs when the person realizes their current meaning-making system is insufficient to produce interpretations and predictions of future events (Harter et al., 2004). Failure to predict events may trigger feelings of incompetence in anticipating, understanding, and assigning meanings within one's preexisting personal construction system (Kelly, 1955).

The constructivist view of trauma is based on the postulate that an individual's unique history shapes their experience of traumatic events (and vice versa) and defines their adaptation to trauma (Saakvitne et al., 1998). Traumatic events, like all other events, are processed through categorization based on preexisting constructs, reorganization of preexisting constructs, or creation of new constructs (Aguilera et al., 2018). Trauma victims might initially tend to interpret traumatic events in overly simplistic terms that discourage integration of the event within the more extensive construction system (Sewell & Cromwell, 1990).

The inability to integrate a traumatic event with preexisting constructs, form new constructs, and assimilate these new constructs is likely to develop chronic PTSD (Harter et al., 2004; Sewell & Cromwell, 1990). In this perspective, PTSD results from undeveloped and isolated

constructions of traumatic events (Harter et al., 2004; Sewell, 1996) and assumes that disruption of preexisting constructions affects the system of meanings referring to one's identity and the view of significant others (Aguilera et al., 2018). Those who suffered CT were found to be at greater risk of having a fragmented construction of their own identity and of having a markedly different perception of their identity and ideal self, and of others compared with persons without a history of CT (Aguilera et al., 2018; Cason et al., 2002; Harter, 2001).

According to Harter et al. (2004), one of the reasons for this finding might be that perpetrators may impose their "positive" constructions on the sexual abuse, rejecting any negative expressions from the child and further invalidating their attempts to construct the experience meaningfully. The sexually abused child may face denial by the non-offending parent, whether because the parent does not want to accept the sexual abuse or because the parent is not attuned to the environmental or psychological indicators (Harter et al., 2004). Lacking an empathic listener, sexually abused children may have little opportunity to elaborate on their experience and be left alone with negative feelings they can't express (Harter et al., 2004). In adulthood, those survivors may continue to perceive their emotional construction as unlikely to receive validation or unlikely to be important in predicting future events (Harter et al., 2004).

Thus, CT has a pervasive impact on a person's construction system as it affects the entire hierarchical structure of the system. At a higher level, moral values and social rules can be compromised by shame and guilt. At a lower level of the system's hierarchy, a person's interactions and relationships may not be seen as validating and supportive. In addition, victims of CT are prone to experience re-victimization as adults and continued cycles of re-traumatization (Alexander & Follette, 1987), despite the psychological damage that this entails. This theory confirms Kelly's (1955) central concept of anticipation and prediction, in which victims "choose"

to stay with abusive partners because they are predictable (for them) due to their history (Clarke & Llewelyn, 1994; Freshwater et al., 2001).

Those who suffered CT struggle to understand what an event means about them, about those involved in it, and the world at large (Harter et al., 2004). Analyzing their personal construct systems may be particularly useful to help patients examine, evaluate, review, or create meanings related to these events (Feixas & Saúl, 2005), which is the central focus of PCT. In this therapy, asking clients to describe their constructs in their own words can lead to the understanding of the way they position the construct “self” concerning the construct “others” and the recognition of inconsistencies in their meaning system (Cason et al., 2002; Feixas & Saúl, 2005; Feixas & Villegas, 2000). As an example of reevaluations, an attack considered preventable may be reframed to be something out of one’s control.

The reorganization of the system of constructs can be understood in three different ways: (1) as a change in the frequency with which the person uses the construct; (2) a refinement of the construct through the addition of subordinate constructs, for example, the construct “dangerous” can be described in various gradations instead of an absolute concept; or (3) the realignment of a specific construct under different superordinate constructs, such as associating “dangerous for me” with a construct such as “rare events” rather than “common events” (Cason et al., 2002).

In the process of producing new narratives, old guilt feelings about not protecting oneself may be re-signified under a new understanding, in which a person realizes that they were outnumbered at the time of the traumatic event, or too immature or small to self-defend, unable to fight physically despite having attempted, or afraid beyond reasonable limits (Cason et al., 2002). The use of the RGT to elicit constructs may reveal traumatic interpersonal or event-related constructs and facilitate the integration of trauma (Aguilera et al., 2018; Feixas & Cornejo, 1996).

PCT has been used to work with cognitive conflicts (Feixas et al., 2007, 2009, 2010; Feixas & Villegas, 2000) and can be applied to help understand the problems faced by trauma survivors (Cason et al., 2002; Harter et al., 2004).

In addition to the personal construct perspective on trauma, a developmental constructivist approach has recently emerged. While most approaches to CT point out symptoms and psychological problems in adulthood, such as depression or anxiety, constructivist self-development theory (CSDT; Briere, 2002; McCann & Pearlman, 1992; Saakvitne et al., 1998) seeks to elucidate how CT impacts the developing self and its self-regulatory capacities (a sense of self-worth and affect regulation). The CSDT draws from research and theory on attachment, psychoanalytic view, self-psychology, social learning, and cognitive development.

CSDT defines three qualities (self-capacities) present in healthy people: 1) the inner sense of connection that allows connection with other positive people; 2) tolerance to affects that allows experiencing, tolerating, and integrating intense affects; and 3) sense of self-worth. These self-capacities help to perceive oneself as “workable” (viable), good and positive – all of which can be interrupted by CT. Briere (2002) proposes that CT disrupts self-functioning in three areas: 1) affect regulation, 2) identity, and 3) relatedness with others. Briere’s self-trauma theory also includes the construct of self-capacities (Briere, 2002), suggesting that the myriad psychological symptoms and difficulties suffered by survivors of CT are often manifestations of underdeveloped self-capacities.

The ability to maintain a sense of connection with others is posited to form the basis from which the other self-capacities develop. Child maltreatment victims are prone to identity confusion, boundary problems, inability to self-soothe, clear overreactions to stressful events, and difficulties separating self from others, which reflect deficits in self-capacities (Brock et al., 2006). Early research found that more poorly developed self-capacities correlated with measures of

depression, suicidality, substance abuse, dysfunctional sexual behavior, and some features of borderline and antisocial personality disorders (Brock et al., 2006). More research is needed to examine the self-capacity deficits that may underlie psychological symptoms in adult survivors of child maltreatment.

1.1.4. CT in Mental Disorders

Earlier studies found strong evidence that a history of CT is associated with high risk or a latent vulnerability for manifesting psychopathologies in general (Arnou, 2004; Bowlby, 1953; Heim & Nemeroff, 2001; Kessler et al., 2010; Paras et al., 2009). Recent research has confirmed the association between CT and most psychopathologies (Keyes et al., 2012; Kisely et al., 2018; Mills et al., 2013; Morales et al., 2020), with almost a third of psychiatric disorder cases associated with adverse childhood experiences, an actual epidemic problem in public health (Etter & Rickert, 2013). The cumulative effect of types of victimization was also associated with psychopathologies and physical health (Fergusson et al., 2008; Garon-Bissonnette et al., 2022; Hodges et al., 2013; Steine et al., 2017). Individuals with a history of CT are at increased risk of developing PTSD compared to adult trauma victims (Bruce et al., 2012; Brühl et al., 2019; Kessler et al., 2010; Kisely et al., 2018; McLaughlin et al., 2010; Talaga et al., 2018; Wingenfeld et al., 2011). Furthermore, a robust association between CT and conduct disorders or suicidal thoughts was found (Tubman et al., 2021). CT has been associated with psychopathy within a sample of adult offenders and is considered an environmental factor in homicidal ideation (Heirigs, 2021).

Although physical health does not directly affect mental health, it is important to mention the relationship between CT and physical health because of the limitations and stresses that illnesses can impose, particularly chronic ones. Childhood Trauma predicts physical illnesses in adulthood (Afifi et al., 2016; Basu et al., 2017; Cicchetti et al., 2016; Monnat & Chandler, 2015;

Widom et al., 2012), which supported this research about the possible association between FM symptomatology and CT. The Child Welfare Information Gateway (2019) listed several diseases that were found to be associated with CT: diabetes, lung disease (including chronic bronchitis, emphysema, and chronic obstructive pulmonary disease), malnutrition, vision problems, functional limitations (limited in activities), heart attack, arthritis, back problems, high blood pressure, stroke, brain damage, migraine headaches, cancer, bowel disease, and chronic fatigue syndrome.

Another line of research has explored the potential association between specific types of CT to specific psychiatric disorders, discussed earlier in this chapter (Chandan, Thomas, Gokhale, et al., 2019; Lewis et al., 2016; McKay et al., 2021; McLaughlin et al., 2017; Shrivastava et al., 2017), for example, childhood sexual or physical abuse has been related to paranoid and antisocial personality issues (Bierer et al., 2003). Those who suffered emotional abuse and neglect had more severe mental adverse effects as adults and showed the strongest association with lifetime depression (Kisely et al., 2018).

In addition, different types of maltreatment have sex-specific consequences for the expression of internalization and externalization psychopathology, suggesting sex-specific etiological paths between CT and psychopathology (Coe et al., 2020; Mills et al., 2013; Streeck-Fischer & van der Kolk, 2000; Teicher & Khan, 2019; van der Kolk, 2003; White et al., 2015). A study of 1,134 boys and girls aged 12 to 13 years in Sweden (Hagborg et al., 2017) found that emotional abuse had significant effects on the mental health of both sexes. However, girls reported decreased mental health and well-being in response to lower degrees of emotional maltreatment than boys, whose resilience appeared to be more significant. Also, girls react to emotional maltreatment with more significant increases in internalization symptoms than boys (Hagborg et

al., 2017).

Other research focused on the relationship between CT and general factors present in many psychiatric disorders, such as internalization, externalization, and dysfunctional thought processes (Caspi et al., 2014; Caspi & Moffitt, 2018; Cowell et al., 2015; Morales et al., 2020; Selzam et al., 2018).

In summary, CT is a risk factor in mood disorders (depression and anxiety), PTSD, behavioral disorders, and substance addiction (Abajobir et al., 2017; Brühl et al., 2019; Cicchetti & Handley, 2019; Heim & Nemeroff, 2001; Keyes et al., 2012; Lewis et al., 2016; Lippard & Nemeroff, 2020; Moylan et al., 2010; Rakesh et al., 2021; Thornberry et al., 2001). Personality disorders (Pereda et al., 2011); schizophrenia, psychosis, and psychotic symptoms also showed a strong association with CT (Buswell et al., 2021; Lang et al., 2020; McKay et al., 2021; Oshri et al., 2015; Wilson et al., 2021). CT predicted chronicity, comorbidity of mental illness, and poor treatment response (Chandan, Thomas, Gokhale, et al., 2019), as well as poor outcomes across treatments for MDD (Combas et al., 2022; Gardoki-Souto et al., 2022; Lippard & Nemeroff, 2020; Perna et al., 2021). The severity of CT contributes to a lack of response to antidepressant treatment (J. Nelson et al., 2017; Nikkheslat et al., 2020; Williams et al., 2016) and contributes to treatment-resistant depression as well (O'Brien et al., 2019; Yroni et al., 2021).

These associations between types of CT, psychological disorders, physical illnesses, and sex-related vulnerabilities (physical and psychological) are supporting this investigation with FM sample of women with depressive symptoms, with a view to improve therapy protocols and outcomes.

1.2. Fibromyalgia

Fibromyalgia means “muscle and fibrous connective tissue pain,” which reflects the initial

understanding of this disease as an inflammation of muscle or fascia tissues. FM symptoms were first conceptualized in medical history by French doctor Guillaume de Baillou in the 16th century, based on reports of symptoms like those found in the modern definition of FM. However, only recently, in the 1970s, FM was accepted as a medical disorder and diagnosis (Borchers & Gershwin, 2015; Häuser & Fitzcharles, 2018). Defining FM as a disorder generated controversy and stigma because its symptoms were elusive and could be classified as symptoms of other conditions, such as arthritis and depression, instead of an illness in its own right. The skepticism of the medical community was due to the lack of abnormalities in the physical examination and the absence of objective diagnostic tests that could classify FM symptoms in one specific disorder (García Rodríguez & Abud Mendoza, 2020; Taylor & Morris, 2020).

Evolving research (Littlejohn & Guymer, 2020) revealed that FM is not an inflammation process but a change in muscle physiology, in which the response of the muscle membrane to a stimulus is excessive, independent of the strength of the load or amount of muscle activity. In addition, several myofascial trigger points were identified, which modulate generalized oversensitivity to muscle pain in FM (Littlejohn & Guymer, 2020). This exacerbated reaction suggests that there is a central nervous system dysregulation that misreads muscle activation.

The American College of Rheumatology (ACR) classifies FM as a functional somatic syndrome; the European League Against Rheumatism committee classifies FM as a neurobiological disorder to be treated with pharmacotherapy (Wolfe et al., 2010). The International Classification of Diseases (ICD) version ICD-10 listed FM as a diagnosable “disease of the musculoskeletal system and connective tissue,” classified as a functional somatic syndrome rather than a mental disorder. However, it commonly presents comorbidity with various mental illnesses and some physical diseases (Wolfe et al., 2010).

Following a proposal (Nicholas et al., 2019) from the International Association for the Study of Pain (IASP; Merskey et al., 1979; Raja et al., 2020), FM moved from its previous umbrella in the ICD-10 as a disease of the musculoskeletal system and connective tissue, to a new parent umbrella MG30.0 Chronic Primary Pain (Häuser et al., 2019; Henningsen et al., 2019; Treede et al., 2019) in the new ICD-11. Fibromyalgia is currently coded under MG30.01 Chronic Widespread Pain, which was found to be a more accurate coding based on its primary symptom being a pain (Barke et al., 2022).

FM can be considered as belonging to a spectrum of syndromes, such as irritable bowel syndrome, chronic fatigue syndrome, and other conditions, namely, somatic syndrome, functional symptoms, medically unexplained symptoms, or somatization disorder (Borchers & Gershwin, 2015). These syndromes share symptoms such as myalgia, fatigue, and sleep problems, as well as diagnostic or classification criteria for one or more syndromes (Borchers & Gershwin, 2015).

These various classification systems from diverse branches of medical specialties have their understanding of FM. For instance, in neurobiology, it might be classified as a pain disorder; in psychiatry, it might be understood as a persistent somatoform pain disorder, a masked depression, or a somatic symptom disorder; or in neurology, it might be diagnosed as a small fiber neuropathy or brain disease (Klaus et al., 2017; Kumbhare & Tesio, 2021; Lodahl et al., 2018).

In the past, FM diagnosis has relied on the assessment of trigger points to ascertain a measure of its pain symptom (Shah et al., 2015). More recently, the consensus has been that FM can be established by a general practitioner when symptoms meet recognized criteria, following the guidelines of the ACR (Galvez-Sánchez & Reyes del Paso, 2020; Littlejohn & Guymer, 2020), and any other somatic disease that could explain those symptoms have been ruled out (Häuser et al., 2009; Häuser & Fitzcharles, 2018). In our study, participants were referred to our program after

being diagnosed by a physician, following the guidelines of the ACR for establishing a diagnosis of FM syndrome.

The prevalence of FM diagnosed by a physician in Europe and the United States was around 2 – 4% (Creed, 2020; Häuser & Fitzcharles, 2018; Valenzuela-Moguillansky et al., 2017), with a worldwide mean of 2.7 % (Queiroz, 2013). Another review showed a significant increase in the prevalence of FM in the general population worldwide placed between 0.2 and 6.6% (men and women); between 2.4 and 6.8% in women; between 0.7 and 11.4% in urban areas; between 0.1 and 5.2% in rural areas; and, in special populations (with comorbidities) between 0.6 and 15% (Marques et al., 2017). A more recent study (Gayà et al., 2020) of 141 FM patients found the prevalence of FM in adults in Spain and Europe significantly stable between 2000 and 2016, estimated at 2.45%; female sex being the variable most associated with FM, with an odds ratio of 10.156 (95% CI, 5.068-20.352); peak prevalence was 60-69 years of age; and, 68% more frequent in obese individuals (Gayà et al., 2020).

A nationwide study in Spain, known as EPIFFAC, the Work, family, and social environment in patients with FM in Spain: An epidemiological study (Collado et al., 2014), included 325 diagnosed patients, established a profile for FM patients as 96.6% female, of an average age of 52 years, the mean age of 37 years at the beginning of FM symptoms, and an FM history of about 15 years in average (Cabo-Meseguer et al., 2017; Collado et al., 2014).

1.2.1. Characteristics of Fibromyalgia

FM is classified as a disorder marked by generalized chronic pain, with increased pain responses to stimuli perceived as nociceptive, with or without joint rigidity, and accompanied by allied symptoms, such as problems with sleep, memory, clear thinking, and concentration, digestion, headaches, among other issues (Creed, 2020; Häuser et al., 2009; Häuser & Fitzcharles,

2018; Lodahl et al., 2018; Taylor & Morris, 2020). The strongest associations with allied symptoms were sleep disorders, fatigue, headaches, other pains, depression, and behavioral disorders, suggesting the existence of several etiological pathways for FM (Creed, 2020).

The most identified individual risk factors were sex (female), middle-aged/older, smoking, obesity, and pre-existing medical conditions in adulthood (Creed, 2020). The most common environmental factors found to play a potential role in increasing vulnerability to FM were CM, poor emotional relationship with both parents, lack of physical affection, witnessing domestic violence between parents, as well as parental alcohol abuse or other addictions, separations in the family, and a deprived financial situation before seven years of age (Creed, 2020; Gündüz et al., 2018; Häuser et al., 2012; Imbierowicz & Egle, 2003).

The usual features of FM are exacerbated pain attributed to a hyperactive sympathetic nervous system (stress); dysfunctions in processing and modulating noxious stimuli by the central nervous system, namely pain sensitization, amplification, and hypersensitivity (Arnold et al., 2016; English, 2014; Haefeli & Elfering, 2006; Kumbhare & Tesio, 2021). Along with these core pain-related features, there are depleted attentional and cognitive resources, leading to a sense of “poor concentration” and “foginess” (Bell & Shelley-Tremblay, 2016; Compañ et al., 2011; Klaus et al., 2017).

In addition, other FM etiological bases have been proposed, such as abnormalities in biochemical, metabolic, immunoregulatory, and genetic systems and alterations in the functional and chemical connectivity of the pain processing system of the brain (García Rodríguez & Abud Mendoza, 2020; Häuser et al., 2009; Lodahl et al., 2018; Taylor & Morris, 2020). Since the ACR’s initial criteria definition of FM in 1990 and its revision in 2010 (Wolfe et al., 2010), most hypotheses about the etiological bases of FM have concentrated in five areas of research: the

peripheral system, the spinal cord, the brain, the psychological base, and social contexts.

Table 10 describes the fundamental mechanisms underlying FM proposed by ACR in 1990 (Littlejohn & Guymer, 2020):

Table 10

American College of Rheumatology Mechanisms of Fibromyalgia in 1990

Neural Mechanisms	Type of Mechanism
Peripheral	Mechanoreceptor input
	Referred pain
	Nociception
	Sympathetic nervous system
	Neuroinflammation
Spinal cord	Central sensitization
	Descending spinal cord control
Brain	Neurotransmitter changes
	Connectivity changes
	Neuroinflammation
Other mechanisms	Type
	Genetic
	Psychological
	Stress reactivity
	Social factors

Note. Adapted from *Key Milestones Contributing to the Understanding of the Mechanisms Underlying Fibromyalgia*, by G. Littlejohn and E. Guymer, 2020, *Biomedicines*, 8(7), 223.

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The mechanisms relevant to this investigation are explored in the following sections under FM's neurobiological impact and psychological aspects.

1.2.2. Neurobiological Impact

Several neurobiological mechanisms affect FM; conversely, the chronicity of FM can also strengthen dysfunctional patterns of neurobiological mechanisms. Still, these mechanisms appear to offer etiological possibilities to FM and not the opposite. Within this logic, FM does not cause dysfunctional mechanisms. Instead, it reinforces them.

To better understand the pain mechanisms involved in FM, it is relevant to go through the old and current definitions of pain according to the IASP. The old version (Merskey et al., 1979) states that pain was an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage, while the more recent version defined pain as an unpleasant sensory and emotional experience related to, or resembling an association with, actual or potential tissue damage (Raja et al., 2020). This current definition reflects the acceptance of a subjective experience of pain instead of just a perception process, which assumes that pain can be experienced even if not objectively associated with the presence of actual or potential tissue damage. Pain experience could *resemble* being related to existing or potential tissue damage.

The IASP added to their revised definition of pain six-bullet notes that explain the complexity of pain experience and its indissociable connection to biological, psychological, and social factors (Raja et al., 2020):

- Pain is always a personal experience, influenced to varying degrees by biological, psychological, and social factors.
- Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in

sensory neurons.

- Individuals learn the concept of pain through their life experiences.
- A person's report of an experience of pain should be respected.
- Although pain usually serves an adaptive role, it may cause adverse effects on function and social and psychological well-being.
- Verbal description is only one of several behaviors to express pain; the inability to communicate verbally does not negate the possibility that a human or a nonhuman animal experiences pain.

Thus, it is essential to describe several neurobiological mechanisms found in FM that impact the etiology and course of this syndrome. They are peripheral mechanisms of pain and central sensitization, dysregulation of neurotransmitters, dysfunctional descending neural pathways, and altered brain connectivity (Cagnie et al., 2014; Littlejohn & Guymer, 2018, 2020; Pujol et al., 2014).

1.2.2.1. Peripheral Pain Mechanisms.

Hypersensitivity after a peripheral nerve injury, inflammation, or tissue lesion (e.g., a cut in the skin) is a homeostatic safeguarding mechanism that allows the injured tissue to heal by continually informing the brain about that lesion to prevent further injuries in that area. This phenomenon can be temporary, related to injury sites to protect an injured region, and this hypersensitivity should decrease as the lesion heals (Wei et al., 2019). However, in some cases, it lingers without a discernible reason and evolves into peripheral sensitization. In addition, it can occur after an injury to the nerves themselves, a mechanism of chronic neuropathic pain to which some people may be genetically more prone (Costigan et al., 2010).

This peripheral sensitization is caused by the triggering of nerve endings much more

quickly than usual (lower transduction threshold, higher membrane excitability). These reflex responses evoked by nociceptive fibers are seen in patients with FM, in which less peripheral stimulation is needed to cause reflex muscle changes, showing an increase in neural sensitivity in the spinal cord (Costigan et al., 2009; Littlejohn & Guymer, 2020).

This exaggerated response (primary hyperalgesia) may occur due to an increased sensitivity to chemical modulators released at the site of injury or tissue inflammation, which can activate and sensitize peripheral sensory neurons (Wei et al., 2019). To magnify this dysfunctional processing, there is evidence of pathology in the small nerve fibers in approximately 50% of patients with FM (Littlejohn & Guymer, 2020).

This dysfunctional processing may also occur due to decreased threshold for stimuli. In these cases, non-noxious stimuli are perceived as painful (primary allodynia), which can impact the pain experience. Allodynia, a key clinical feature of FM, is an increased sensitivity in the group of mechanoreceptor fibers (peripheral fibers), particularly in response to dynamic tactile stimuli (dynamic allodynia), a pain reaction to a neutral touch on the skin, pressure hyperalgesia, post-sensations and increased temporal somatization (Meeus et al., 2012; Woolf, 2011). This mechanism translates innocuous peripheral sensory inputs into pain outputs that interfere with daily activities, movements, postures, touch, or physical contact that cause FM pain (Woolf, 2011). Allodynia is also relevant for mechanoreceptors deeply placed in and around spinal structures, such as the lower neck and back, which are areas commonly affected by chronic pain.

1.2.2.2. Central Sensitization.

According to current research (Chandan, Thomas, Raza, et al., 2019; Meeus et al., 2012; Suzuki et al., 2021; Vij et al., 2019; Woolf, 2011), chronic pain is associated with an undue central nervous system (CNS) reactivity to pain, a reactivity known as chronic “central sensitization.”

Pain can be amplified as a result of more vital nerve impulses coming from the tissues (peripheral sensitization) and of an overreaction of the CNS to less numerous, weaker, or even absent signals (central sensitization).

Central sensitization and peripheric sensitization are not consensus theories, and some researchers consider peripheric sensitization to be an aspect of central sensitization, while others see these two theories as different mechanisms that interconnect (Latremoliere & Woolf, 2009; Richard et al., 2019; Sluka & Clauw, 2016; Vardeh & Naranjo, 2017). Whether these theories are one mechanism or two, abnormal processing of pain and other sensory inputs occurs in the brain, spinal cord, and periphery, thus related to both central and peripheral sensitization processes (Littlejohn & Guymer, 2018).

Central sensitization is increased responsiveness in the central nervous system to standard or subthreshold afferent inputs from nociceptive neurons (Suzuki et al., 2021). In central sensitization, the functions of circuits of nociceptive pathways are hyperactive, and the nociceptive systems appear in an abnormal state, possibly because of the plasticity of the somatosensory nervous system and its connection with associative areas of the brain, sites related to emotional and cognitive inputs (Suzuki et al., 2021). This plasticity in the case of central sensitization appears as a change in the somatosensory system from an ordinarily high threshold to register a stimulus to a low threshold, which turns into a hypersensitive pain response in the absence of noxious stimuli or no stimuli at all (allodynia) and or in the presence of a low-intensity stimulus (hyperalgesia) (Suzuki et al., 2021).

In central sensitization, chronic pain often survives its original causes, worsens over time, and takes on a life of its own (Littlejohn & Guymer, 2018; Thernstrom, 2010). Left untreated, it can rewrite the CNS, causing pathological changes in the brain and spinal cord concerning how

the pain is processed (Littlejohn & Guymer, 2018; Thernstrom, 2010). This process, in turn, causes more pain, closing the circle of chronic activation.

This central mechanism seems to be linked to other comorbid clinical symptoms present in FM, such as irritable bowel syndrome, irritable bladder syndrome, migraine, restless legs syndrome, chronic fatigue syndrome, temporomandibular disorder, chronic pelvic pain, interstitial cystitis, multiple chemical sensitivity, among others (Latremoliere & Woolf, 2009; Suzuki et al., 2021; Vij, 2020; Vij et al., 2019). These pain disorders were linked by a similar pathological process of dysregulated centrally mediated nociception, clustered under central sensitivity syndromes (CSS; Vij, 2020). Currently, the most accepted diagnosis of FM by researchers is based on the symptoms of CSS (Barbosa-Torres & Cubo-Delgado, 2021).

These pathophysiological changes postulated how the CNS processes pain in central sensitization contribute to the clinical characteristics of FM, including edema and dysesthesia (Littlejohn & Guymer, 2020; Maletic, 2009). Central sensitization can also explain some of the most common physiological and biochemical correlates of FM, such as reduced pain thresholds, increased pain sensitivity outside of tender point locations, enlargement of pain receptive area, abnormal increase (over time) in pain intensity for a given stimulus when it is repeated above the critical rate, and persistent, prolonged pain even after the removal of painful stimuli (Vij, 2020). Other biochemical correlates of FM also present in central sensitization are nerve growth factors in cerebral spinal fluid and increased levels of substance P, which engages in primary afferent sensory neurotransmission at its highest levels in the dorsal horn (Vij, 2020). Substance P is also involved in some psychiatric disorders (e.g., anxiety and depression), partly because the actions triggered by substance P send and integrate nociceptive signals and control their consequences (Vij, 2020; Zieglgänsberger, 2019).

The postulate of central sensitization also helps to justify some problematic over-reactivity to stimuli that can generate pain in FM. These stimuli can include light touch, which becomes painful; bright or flashing light that hurts; loud, grating, or repetitive noise; strong or chemical odors; heat, cold, or both; and textures, such as scratchy fabric against the skin. Over reactivity to those complex stimuli may fluctuate, going through periods of intense reactivity (flares) and periods of fewer or less severe symptoms (remission).

1.2.2.3. The Gateway Theory.

The PCT protocol used in our investigation included an educational component about the gateway theory of pain control. Patients receiving PCT were educated about this theory as a resource to help them manage their pain levels using the top-down understanding proposed in this model.

The gateway control (Melzack & Wall, 1965) pain theory is among many new theories existing today (Moayed & Davis, 2012). Still, it continues to be considered one of the most plausible explanations for how pain is delivered to the brain (Braz et al., 2014).

In this theory, nociceptive stimulation is conducted by afferent C fibers (slow conduction unmyelinated fibers) that ascend through the dorsal horn of the spinal cord, mediated by two subtypes of inhibitory interneurons, activated by a gelatinous substance of the gamma-aminobutyric acid (GABA) and glycinergic types (Melzack & Wall, 1965). Many studies have revealed various populations of excitatory and inhibitory interneurons in the dorsal horn, invalidating the original theory (Melzack & Wall, 1965) of (only) two interneuron subtypes. However, the idea that there is a “key” in the dorsal horn that can open (facilitate) or close (inhibit) the flow of information to the brain is still valid (Braz et al., 2014). These circuits activated in the dorsal horn open the portal in response to primary unmyelinated C afferent entrances of small

caliber. At the same time, close the portal to large diameter A β myelinated fibers.

In the gateway theory, non-painful tactile receptors that register innocuous sensations, soft or light touches (conducted by large diameter A β myelinated fibers) can cancel or reduce pain because these myelinated tactile fibers are faster to reach the brain and can overlap with the slow nociceptive C fiber impulses decreasing the access of the slower fibers to the brain (Turk, 2014), i.e., “closing the access gate to the brain” for nociceptive fibers.

According to Melzack and Wall (1965), three factors influence the opening and closing of the control portal:

- 1) The volume of activity in the nociceptive conduction C fibers, which tends to open the portal. The stronger the nociceptive stimulation, the greater the activity of the C fibers, and they open the gate at the dorsal horn for painful information to ascend.

- 2) The volume of activity in other peripheral myelinated fibers that carry information about harmless stimuli, such as touching, rubbing, or lightly scratching the skin. The activity in the myelinated A β fibers, which are faster in conducting the impulse, tends to close the portal to the slower fibers, inhibiting the perception of pain or nociceptive sensation. This would explain why gently massaging or applying heat to sore muscles lessens the pain.

- 3) Messages that descend from the brain can contribute to top-down regulation through efferent pathways from the brain stem and cortex towards the spinal cord, which sends stimuli that can open or close the portal. The effects of some processes, such as anxiety, can have a widespread impact, opening or closing the gate for all entrances from any area of the body. But the result of other brain processes can be specific, applying only to certain inputs from certain parts of the body. An example of the latter is positive visualizations or competing for environmental distractions

(like watching a comedy or listening to music) that may block the painful mechanism of C fibers, proposing a competing event that takes the attention away from pain or injury. Many techniques, such as hypnosis, visualizations, mindfulness, and others (top-down cortical influence), can be used as a central (from the CNS) distraction to peripheral pain.

1.2.2.4 Neurotransmitters.

The input of nociceptive stimuli by peripheral afferent neurons is sent through the dorsal horn of the spinal cord to the upper brain centers involved in the perception of pain. As nociceptive signals enter the brain, a descending inhibitory response to the spinal cord mitigates the nociceptive effects (Ackerman, 1992). Numerous neurotransmitters participate in the process of receiving a harmful stimulus and sending an analgesic response, including serotonin, dopamine, norepinephrine, and substance P (Becker & Schweinhardt, 2011; Stahl, 2009; Vij, 2020; Zieglgänsberger, 2019). These same neurotransmitters control mood, sleep regulation, and cognitive function by other neuronal pathways in the brain, providing a neurochemical substrate for the wide range of symptoms seen in FM (Becker & Schweinhardt, 2011; Stahl, 2009). Thus, the downregulation of pain is neurochemically involved with mood, sleep, and cognitive function in one aspect or the other and implies reciprocal reverberations.

Once there is central sensitization, several neurotransmitters appear elevated in comparison to levels found in healthy individuals; among these neurotransmitters are the substance P and glutamate, which are part of the chain of neurochemicals that promote transmission of pain, influencing higher activity at the dorsal horn level and lowering pain threshold, respectively (Vij, 2020). Levels of substance P are elevated, up to three times normal levels, in the cerebrospinal fluid in patients with FM, allowing intensification of nerve impulses, in response to sensory stimuli, to reach the brain. Substance P is also strongly associated with 5-

hydroxytryptamine/serotonin (5-HT) in the brain, particularly in areas of emotion and pain perception in the brain (Harris, 2010; Littlejohn & Guymer, 2020).

FM patients also show an increase in glutamate after nociceptive stimulation, which results in increased sensitivity of spinal cord and brain pathways that process sensory information, particularly those related to pain, and lowers the threshold for stimulus perception (Littlejohn & Guymer, 2017). This increase in glutamate can be reversed by administering the effective NMDA (N-methyl-D-aspartate) antagonist ketamine, considered to be a potent “dissociative analgesia” (Littlejohn & Guymer, 2017). Users report the dissociative side effect of ketamine as altered consciousness and self-perception; it is not known whether this side effect is linked to the ketamine acute and longer-lasting results (Ballard & Zarate, 2020), but it has been related to the increased use of ketamine as a “recreational drug” as one aspect of this drug’s appeal to users (Curran & Morgan, 2000).

In FM and other rheumatic diseases, neuropeptides are also elevated. One is the nerve growth factor, which enhances the production of substance P in afferent neurons, increasing an individual’s sensitivity to or awareness of pain (Zieglgänsberger, 2019). Other neurotransmitters, such as the peptide related to the calcitonin gene, brain-derived neurotrophic factors, corticotrophin-releasing hormone, chemokine-1, neurokinin A, neurokinin B, adrenomedullin, vasoactive intestinal peptide, neuropeptide Y and gastrin-releasing peptide are also altered in varying degrees, impacting the sensitivity to pain in FM (Harris, 2010; Littlejohn & Guymer, 2020).

These variations in neurotransmitter actions can be translated into changes in brain volume in FM. Patients with FM have lower total gray matter than healthy control groups, and the longer the history of FM, the greater the loss of gray matter, particularly in the cingulate gyrus and insular,

medial, and frontal cortices, and the thalamus (Arbuck, 2012; Feraco et al., 2020; Lutz et al., 2008). Given that chronic pain is associated with brain alterations, the interplay of chronic pain, brain structure, and aging may place FM patients at greater risk of functional decline and faster aging of the brain (Arbuck, 2012; Ceko et al., 2013; Cruz-Almeida & Cole, 2020; Moayed et al., 2012).

Concomitantly, FM increases the gray matter in the striatum and cerebellum, possibly due to an increase in neurotransmitters such as dopamine in these areas. In extreme cases, excess dopamine is associated with the delusional somatic disorder (monosymptomatic hypochondriacal psychosis), somatization disorder, factitious disorder, pain disorder, and hypochondriasis. These manifestations may be accompanied by bizarre or peculiar symptoms, disproportionately to the identified pathology, requiring pharmacological treatment with dopamine antagonists (Arbuck, 2012; Bransfield & Friedman, 2019; Häuser & Henningsen, 2014).

1.2.2.5. Brain Connectivity.

In the last twenty years, the study of the stability and rhythm of interactions between different brain regions that are not anatomically connected has become a focus of network neuroscience in the search for biomarkers for psychiatric disorders (Lydon-Staley & Bassett, 2018; Woodward & Cascio, 2015). This functional connectivity (as opposed to structural connectivity) has been studied in great depth when subjects were at (awake) rest without any tasks or demands. These studies identified the baseline of healthy brain connectivity across life-span, which has been named the Resting State Network (RSN; Damoiseaux et al., 2006), and the measure of strength and stability of the RSN connectivity is becoming a biomarker of mental health (Hausman et al., 2020; Pozzi et al., 2021; Terrasa et al., 2020; Woodward & Cascio, 2015).

Several fMRI studies found various networks within the RSN connectivity, thought to be the brain's functional architecture. There are seven major networks within the RSN connectivity:

the default mode network (DMN), the dorsal attention network (DAN), the frontoparietal control network (FPCN), the cingulo-opercular network (CON) – also known as salience or ventral attention network, the limbic network, the visual network and the somatomotor network (Hausman et al., 2020). These networks are characterized by attention, memory, cognitive control, standard mode, motor, and sensory systems, and they behave within a stable rhythm and functional configuration.

Investigations of the RSN using fMRI studies with FM patients suggest an anomalous activity, visible in abnormal connectivity patterns between pain-related regions and remaining areas of the brain (Cifre et al., 2012; Flodin et al., 2014, 2015). FM was primarily associated with decreased connectivity between several pain-related areas and sensorimotor regions, which could reflect a deficiency in pain regulation, showing a less efficient systemic level of control of pain circuits (Flodin et al., 2014, 2015).

Several researchers found evidence of decreased functional connectivity in the descending system for pain modulation in FM patients and increased activity in the pain matrix related to central sensitization (Cagnie et al., 2014; Marusak et al., 2016; Stevens et al., 2011). Patients with FM were found to have a deficiency in pain inhibitory pathways involving the pregenual anterior cingulate cortex (pgACC). This limited functional connectivity of the pgACC seems responsible for inhibiting connectivity of the dorsal lateral prefrontal cortex with the DMN hubs and pain inhibitory pathway (Stevens et al., 2011). This limited pgACC connectivity may cause spontaneous pain in FM patients, consequently increasing functional connectivity between the salience network (SN) and the DMN. The higher activity of the SN, which is a network associated with monitoring the inner and outer environment, leads to an increase in salience attached to pain and a deficiency in pain inhibitory mechanisms, creating a self-sustained cycle of pain (Stevens et al., 2011). The

DMN connectivity facilitates introspective, self-referential cognitive processing, which in the case of FM patients may lead to pain becoming an integrated part of their (negative) self-referential narrative, causing painful states to become the norm (Cifre et al., 2012; Fallon et al., 2016; Vanneste et al., 2017).

When this abnormal connectivity pattern in the brain is therapeutically addressed with repetitive transcranial magnetic stimulation (rTMS), there is improvement in symptoms characteristic of FM, particularly pain; however, more research is needed to ascertain the consistency and permanence of positive results. A systematic review by Su et al. (2021) involving 18 studies and 643 FM participants found reductions in pain, depression, and anxiety, which persisted for at least two weeks after the last intervention, and the effects on pain and depression remained significant up to one and a half months after the final session. A systematic review by Sun et al. (2022) involving 14 studies and 433 FM participants found that rTMS relieved pain and enhanced the quality of life of patients with FM but did not improve anxiety, depression, or other symptoms. A previous systematic review of rTMS efficacy found similar results (Knijnik et al., 2016), and one randomized study found no positive results for rTMS (Guinot et al., 2021).

A randomized study (Tanwar et al., 2020) with the Real-rTMS group and Sham-rTMS group, with 45 participants in each group, found significant improvement post-Real-rTMS in the average pain ratings and associated FM symptoms, which lasted up to 6 months in the follow-up phase, and no significant change in pain ratings for the sham group. A randomized study with Deep TMS also found positive results, i.e., decreased pain levels in FM (Cohen et al., 2017).

1.2.3. Psychological Aspects

Galvez-Sánchez and Reyes del Paso (2020) summarize FM patients' common psychological problems as follows: a) the development of psychiatric comorbidities, in particular,

anxiety and depression; b) the presence of PTSD; c) living with side effects of antidepressant and anxiolytic drugs; d) pain catastrophizing; d) alexithymia; e) communication and trust problems with partners; f) processing of child maltreatment, in particular, history of sexual abuse; g) chronic stress; h) problems with sexual functioning; and, i) negative body image and negative self-image. Some of these factors are neurobiological, emotional, and cognitive, and others are psychosocial, but generally, these areas are not discreet. Instead, they are configured as interdependent and mutually influential, constituting the realm of “psychological experience.”

Researchers (Galvez-Sánchez & Reyes del Paso, 2020) also found that patients with FM exhibit personality traits such as elevated levels of neuroticism and perfectionism, stress, anger (expressed or contained), and catastrophizing as distorted cognitive assessment. In addition, their negative self-image and body image perception are accompanied by low self-esteem and devalued opinions about their self-efficacy because of reduced functioning in physical, psychological, and social spheres. They also suffer from a low cognitive performance at work, in personal relationships (including sexual intimacy and parenting), and in activities of daily living (Galvez-Sánchez & Reyes del Paso, 2020). Socially, FM is perceived as a stigmatized and invisible disorder, which accentuates negative self-perception and impairs the ability of FM patients to adapt to the disease.

Catastrophic thinking in FM patients includes rumination about the pain, being unable to stop thinking about it, magnification of the pain by thinking that it represents something serious, and a sense of helplessness in which there is nothing the person can do to manage the severity of the pain (MacDonald et al., 2021). Pain catastrophizing refers to anticipating pain or magnifying its intensity, an association that persists in FM patients even when anxiety and depression factors are controlled (MacDonald et al., 2021).

Another factor, alexithymia, the lack of emotional awareness, indicative of an inability to identify emotions or put them into words, was found to be related to a history of poor parental engagement or early attachment failures because of parental abuse or indifference (Pedrosa Gil et al., 2008; Romeo et al., 2020). Alexithymia might have occurred because of those parental dynamics that created a chronic lack of emotional regulation and validation of feelings and emotions in childhood. Alexithymia, in turn, has been identified as one factor that might influence levels of pain in FM patients (Aaron et al., 2019; Di Tella & Castelli, 2013; Di Tella et al., 2017; Güleç et al., 2013; Huber et al., 2009; Montoro et al., 2016; Orrù et al., 2019; Pedrosa Gil et al., 2008; Romeo et al., 2020).

The self-administered twenty-item questionnaire Toronto Alexithymia Scale (TAS-20; Leising et al., 2009) assesses three subscales of emotional experiences: 1) difficulty identifying feelings (e.g., *“I am often confused about what emotion I am feeling”*); 2) difficulty describing feelings (e.g., *“It is difficult for me to reveal my innermost feelings, even to close friends”*); and, 3) externally oriented thinking (e.g., *“I prefer to analyze problems rather than just describe them,”* inverse scoring). Many studies using this scale to assess FM patients have shown a high prevalence of alexithymia in this group (Aaron et al., 2019; Huber et al., 2009; Maes & Sabbe, 2014; Pedrosa Gil et al., 2008). Specifically, items 3, 7, and 13 of the TAS-20 questionnaire highly correlated with FM patients: *“I have physical sensations that even doctors don’t understand”*; *“I am often puzzled by sensations in my body”*; and *“I don’t know what is going on inside me”* (Orrù et al., 2019). These typical responses place the group of FM patients within the subscale of the TAS-20 labeled as “difficulty identifying feelings” (Leising et al., 2009).

Craig (2002) pointed out that interoceptive awareness, the awareness of how the body feels from the inside, is the primary basis of emotional awareness and self-awareness. Interoception is

an intrinsic part of homeostatic mechanisms in charge of keeping bodily systems healthy and functional, allowing for somatic (autonomic system) and behavioral (central nervous system) adjustments to be made to keep the individual's well-being (DeVilje et al., 2020; Klabunde et al., 2017; Yoris et al., 2015). In other words, interoception is associated with survival, reproduction, and emotion regulation by supplying awareness of physiological feelings (Pace-Schott et al., 2019). Quadt et al. (2018) proposed interoception as an encompassing concept that includes (1) afferent signaling (body-to-brain) via distinct neural and humoral pathways (including immune and endocrine); (2) the neural encoding, representation, and integration of this information about the body's internal state; (3) the influence of such information on other perceptions, cognitions, and behaviors; and, (4) the psychological expression of these representations as consciously accessible physical sensations and feelings. This broader concept of interoception comprises all pain signals, to extensive research on this topic (Borg et al., 2018; Ceunen et al., 2016; Craig, 2002, 2010; Di Lernia et al., 2020; Werner et al., 2009). Most importantly, interoception, emotions, and pain form a complex structure for the psychological experience of pain (Baliki & Apkarian, 2015; Di Lernia et al., 2020; Gilam et al., 2020; Pace-Schott et al., 2019).

In that respect, Lumley et al. (2011) explain that pain is emphasized more by individual sensitivity than by the injury itself, adding that the interaction of affective and sensory dimensions is responsible for the variation in the perception of pain intensity. Referring to psychological research, these authors add that increased pain is related to emotional stress and limited emotional awareness, expression, and processing. Referring to social research, these researchers point to the importance of emotional communication, empathy, attachment, and rejection, concluding that emotions are essential for the conceptualization, assessment, and treatment of persistent pain, encouraging theory and practice to integrate emotion in cognitive-behavioral models of chronic

pain (Lumley et al., 2011).

In FM patients, a lack of awareness of the interrelatedness of internal bodily sensations with emotional states leads to a negative cognitive assessment, in which any internal sensation may be perceived in a distorted, distressful, or threatening way (Khalsa et al., 2018; Murphy et al., 2017; Price & Hooven, 2018; Schaan et al., 2019; Valenzuela-Moguillansky et al., 2017). Negative emotional states, tendencies to calamity in stressful situations, and weak coping skills usually overlap, creating a chain reaction in which stress is linked to top-down processes that modulate pain control centers downward, from the brain and midbrain to the dorsal horn, undermining the possible positive effects of these top-down processes (Littlejohn & Guymer, 2020).

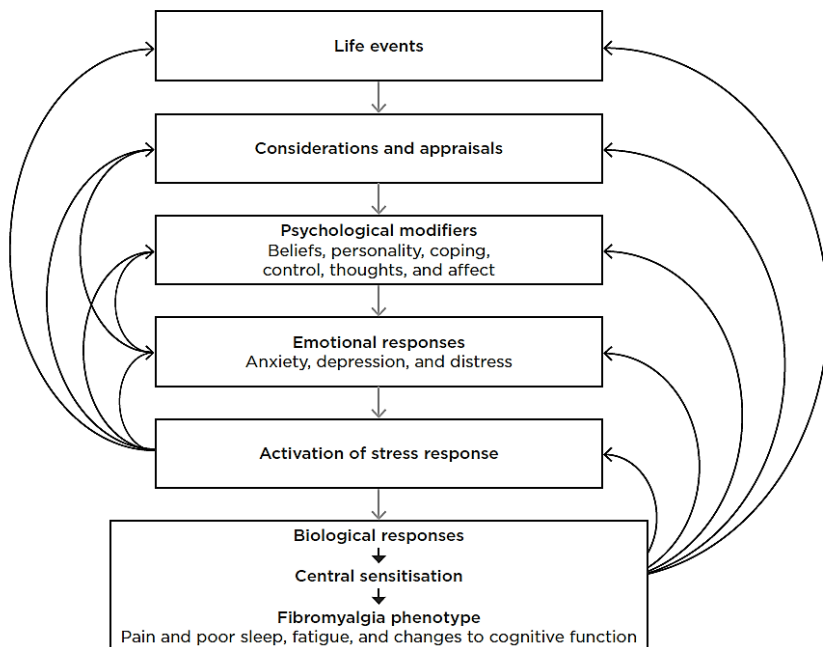
Figure 2 proposes a top-down model of FM, in which psychological triggers start with a cognitive evaluation or appraisal of an event followed by an emotional reaction, usually interconnected to several psychobiological factors (Littlejohn & Guymer, 2018).

Subsequently, the top-down model may be disrupted by bottom-up responses (physical and emotional responses), making it difficult to determine precisely what level of this model will predominate in triggering and maintaining the FM symptomatology.

In our study, our treatment approaches addressed top-down choices (cognitive therapies) and bottom-up components (relaxation techniques) to reduce responses from either level that could trigger the cycle of pain.

Figure 2

A Top-down Model of Fibromyalgia



Note. Reprinted from Central processes underlying fibromyalgia, by G. Littlejohn and E. Guymer, 2018, *European Medicine Journal*, 3, 79–86. Copyright 2018 by Littlejohn and Guymer (CC BY-NC 4.0).

1.2.4. Fibromyalgia Co-Morbidity with Mental Illness

Several medical conditions have been associated with FM, such as Parkinson’s disease and multiple sclerosis, inflammatory bowel disease; irritable bowel syndrome; Crohn’s disease; endocrine disease and obesity; chronic fatigue; systemic lupus erythematosus; ankylosing spondylitis, spondylarthritis, psoriatic arthritis, osteoarthritis; migraines, generalized chronic pain, and neuropathic pain (Maletic, 2009). Many of these conditions in FM also overlap the leading psychological and psychiatric conditions found in comorbidity with FM are anxiety, panic disorder, sleep disorders, PTSD, and depression (Bayram & Erol, 2014; Buskila & Cohen, 2007; Gündüz et al., 2018; Hudson et al., 1992; McCrae et al., 2020; Mohanty et al., 2016; Smith & Barkin, 2010). According to these researchers, depression was present in 75.1% of FM patients

and anxiety in 56.5% of them, 50.6% of whom had insomnia, and 20.3% had restless legs syndrome (Fitzcharles et al., 2018). In addition, chronic pain was found to be sustained not only by physical injury but also by stress and emotional issues (De Roa et al., 2018), and it has been highly associated with vulnerable individuals with a history of trauma.

While some of these disorders and symptoms may concur with FM, a history of trauma or PTSD has been proposed as possibly related to the etiology of FM disease. This relationship is addressed in the next section.

1.2.4.1. Comorbidity of Fibromyalgia and PTSD.

Research suggests that many patients who have PTSD often have functional somatic syndromes such as FM and vice-versa (Afari et al., 2014; Bell & Shelley-Tremblay, 2016; H. Cohen et al., 2002; Whipple et al., 2016). Chronic pain and PTSD co-occur frequently and are often associated with more significant distress and functional interference than in patients with no PTSD (Otis et al., 2003). However, it has been difficult to identify the prevalence of this occurrence more precisely, as there is significant heterogeneity in the prevalence among the various studies on this topic. So far, the sources of this heterogeneity have not been identified (Siqueland et al., 2017).

Siqueland et al. (2017) reviewed 21 studies, and the variation in PTSD prevalence ranged from 0 to 57%. When dividing the studies into subgroups, the prevalence of PTSD was 20.5% for people with chronic generalized pain, 11.2% for people with headaches, and 0.3% for people with back pain (Siqueland et al., 2017). The prevalence in clinical populations was 11.7%, while in non-clinical populations, it was less than half of that percentage, 5.1% (Siqueland et al., 2017). Interestingly, studies that used self-reported PTSD symptoms had a 20.4% prevalence of PTSD, and in studies that used structured clinical interviews to diagnose PTSD, the prevalence dropped

to 4.5%.

Yavne et al. (2018) reviewed data from a total of 51 cross-sectional, case-control, cohort, and systematic review studies to evaluate the association of physical (20 studies) or emotional trauma (31 studies), or both with FM and widespread chronic pain. This review (Yavne et al., 2018) also found a broad fluctuation in the prevalence rate of sexual and physical abuse among the various studies, varying from 11% to 61% (S. Nelson et al., 2017; Waller et al., 2016) before the diagnosis of widespread chronic pain. However, the prevalence of patients who developed FM after physical trauma showed closer rates, between 15.6% to 21.6% (Yavne et al., 2018). Other studies also found that psychological trauma, physical trauma, and central sensitization were implicated in the onset of FM disease (Al-Allaf et al., 2002; Clauw, 2014; S. Nelson et al., 2017).

A UK-based online survey (Furness et al., 2018) suggests that the prevalence may be higher. The survey gathered data from a large sample of 941 respondents (both men and women) diagnosed with FM, of whom 596 (63.34%) described traumatic incidents that met the criteria for PTSD before the diagnosis of FM (Furness et al., 2018).

A Spanish study (Miró et al., 2020) with a sample of 173 FM patients and 53 healthy controls of both sexes found that FM patients had a higher percentage of emotional and physical trauma (75.2%), higher mean number of traumas (2.47) and higher scores in PTSD symptoms (8.91) than healthy participants (52.9%, 1.16 and 5.62, respectively). In the group that experienced trauma, 64.4% reported that the trauma occurred before pain onset, and 13.48% stated that some pain was felt since childhood but was aggravated by trauma. Both these groups received a diagnosis of FM after the trauma.

Another study (Gota et al., 2019) involved 593 consecutive patients (men and women), of which 85.2% met the ACR criteria for FM. From this sample, 223 patients reported a history of

abuse, of which 125 (56.5%) had sexual abuse, 155 (69.5%) had physical abuse, and 78 (34.9%) had both sexual and physical abuse (Gota et al., 2019).

A cross-sectional analysis of 3,081 individuals presenting with chronic pain showed that 470 participants (15.25%) had a history of abuse, which worsened their symptoms of depression, anxiety, physical functioning, pain severity, pain interference, catastrophizing, and higher scores on the FM survey compared to the group that did not have a history of abuse (Nicol et al., 2016). Benedict et al. (2020) found that veterans with PTSD presented with significantly higher levels of pain intensity, pain catastrophizing, disability, and healthcare utilization relative to Veterans without PTSD.

One study by Häuser et al. (2013) found that 66.5% of patients experienced the most overwhelming traumatic event and PTSD symptoms before the onset of widespread chronic pain. On the other hand, 29.5% of patients reported that their most overwhelming traumatic experience and PTSD symptoms happened after the onset of widespread chronic pain. In 4.0% of the patients, the most overwhelming traumatic experience, PTSD, and FM symptoms occurred in the same year (Häuser et al., 2013).

Otis et al. (2003) found that among those with PTSD, 25% and 80% may also experience chronic pain. However, in a recent booklet for professionals involved with treating PTSD comorbid chronic pain in veterans, Popish et al. (2019) described a prevalence rate between 15% to 35%.

A large observational cohort study with 5,791 men from the Vietnam Era Twin Registry found that 53.21% of the participants experienced trauma consistent with DSM-IV Criterion A for PTSD and multiple indicators of pain (Gasperi et al., 2021). Criterion A of the DSMV states:

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of the actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse).

Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures unless this exposure is work-related. (American Psychiatric Association, 2013, p. 271)

A large-scale study by Lawrence-Wolff et al. (2021) investigated the prevalence of FM in 4,376 military service members. These participants came from four studies; three were treatment trials for service members diagnosed with PTSD, and one was a survey of service members before a military deployment. The prevalence of FM in the pre-deployment cohort was 2.9% (similar to the general population); within this pre-deployment study, the percentage of those who had FM without PTSD was 0.8%, compared to 10.8% in those with PTSD. For participants from the three PTSD treatment trials, the prevalence of FM was 39.7% before treatment (Lawrence-Wolff et al., 2021). The higher prevalence of FM in pre-deployment service members with PTSD and those seeking treatment for PTSD suggested that chronic pain might be impacted by PTSD symptoms from traumatic events than by traumatic events alone when they do not meet the criteria for PTSD (Lawrence-Wolff et al., 2021).

In older studies, Sharp and Harvey (2001) found that chronic pain is reported in 20 to 80% of individuals with a history of trauma, and 10 to 50% of individuals with PTSD report chronic pain. Cohen et al. (2002) investigated 40 women and 37 men diagnosed with FM. They found that 57% had substantial PTSD symptoms, a significantly higher prevalence than the general population. The prevalence of PTSD in the general population was reported to be 3.6% in the United States and 1.1% in Europe within 12 months (Siqueland et al., 2017). In that study (Cohen et al., 2002), women reported more past traumatic events than men.

Whipple et al. (2016) found that patients with FM comorbid PTSD symptoms compared to a healthy (no FM) control group showed poorer mental health levels partially or fully mediated by PTSD symptoms. In other studies, FM patients reported more traumatic incidents than the control group and more PTSD symptoms (Miró et al., 2020); the gravity of PTSD symptoms was associated with more intense FM symptoms, such as pain levels and interference, functional impairment, lower quality of life, and lower outcomes (Langford et al., 2018; Miró et al., 2020; Theodore et al., 2016).

In addition, trauma and depression often coexist, and each can worsen the other; their symptoms may overlap, and in some cases, depression can mediate PTSD symptoms and pain (Morasco et al., 2013; Poundja et al., 2006; Roth & Richardson, 2021).

1.2.4.2. Fibromyalgia with Depressive Symptoms.

FM as a medical (rheumatological) disorder and MDD as a mental disorder often coexist, and recent studies confirmed high rates of FM comorbidity with MDD (Aguilera et al., 2019; Compañ et al., 2011; Finset et al., 2004; Gracely et al., 2012; Häuser et al., 2012; Løge-Hagen et al., 2019; Paz et al., 2020). One recent meta-analysis study found a combined weighted prevalence of comorbidity of 25% and a lifetime prevalence of 65% through structured clinical interviews

(Løge-Hagen et al., 2019). Another meta-analysis found that depressive disorder and MDD were the most prevalent psychiatric comorbidities with FM in all reviewed studies, with a weighted prevalence of up to 63% at some point in the lifetime of FM patients (Kleykamp et al., 2021).

A small study with 30 FM patients found that 83.3% had clinically significant depressive symptoms, which were associated with an increased perception of pain, worse quality of life, and a history of more serious life events (Aguglia et al., 2011). This study found that depressive symptoms lowered the pain threshold, showing an association between depression and greater severity of FM symptoms. Gracely et al. (2012) suggested that the subgroup of FM patients with comorbidity with depression may represent two manifestations of the affective spectrum disorder, as they share similar pathophysiology and are widely treated by the same drugs with double action in the serotonergic and noradrenergic systems. Another study suggests that for additional pharmacological therapeutic options, FM can be treated with first- and second-generation antipsychotics that have shown analgesic properties (Calandre & Rico-Villademoros, 2012).

However, depression has not been studied as a causal factor of FM but only as a usual comorbid factor (Littlejohn & Guymer, 2018, 2020) that can have a detrimental effect on the course of chronic pain disorders and vice-versa (Antioch et al., 2020).

Several studies showed that FM with depressive symptoms might share the same element that affects these two conditions separately, namely, a history of trauma (Aguilera et al., 2019; Bayram & Erol, 2014; Buskila & Cohen, 2007; Finset et al., 2004; Gracely et al., 2012; Gündüz et al., 2018; Maletic, 2009; Okifuji et al., 2000). The correlation between depression and a history of traumatic exposure has been demonstrated in several studies, and some of those studies suggested that unresolved trauma might be a factor in developing depression later on in life (Camardese et al., 2012; Celik & Hocaoglu, 2015; Connell et al., 2018; Gander et al., 2018; Güleç

et al., 2013; Marshall et al., 2018; Nixon & Nearmy, 2011; Salokangas et al., 2018; Slopen et al., 2018; Talaga et al., 2018; Thompson et al., 2019; Vitriol et al., 2014). This correlation encourages an analysis of how CT and FM are associated, whether this common element may link FM with depressive symptoms, and how to approach this triangulation in psychological treatments.

1.3. Childhood Trauma and Fibromyalgia

The correlation between FM and a history of traumatic exposure, both as an adult and as a child, has been proposed in several studies, in particular, exposure to childhood adversities and CT (Crofford, 2015; Furness et al., 2018; Gündüz et al., 2018; Haviland et al., 2010; Imbierowicz & Egle, 2003; Littlejohn & Guymer, 2018; Ming & Coakley, 2017; Moeller-Bertram et al., 2012; Nicol et al., 2016; Varinen et al., 2017; Waller et al., 2016; Whipple et al., 2016).

A specific history of CT, as defined in the childhood trauma questionnaire (CTQ; Bernstein & Fink, 1998) in the form of abuse and neglect, has also been associated with chronic widespread pain and FM (Connell et al., 2018; Gracely et al., 2012; Gündüz et al., 2018; Haviland et al., 2010; Lee & Enright, 2014; MacDonald et al., 2021; Nicol et al., 2016; Waller et al., 2016), and with high rates of pain sensitization typical of FM (Mansiz-Kaplan et al., 2020).

Another research by Raphael and Widom (2011) has shown that having a history of child abuse does not significantly increase the risk of suffering physical pain thirty years later. Still, this study showed that a combination of childhood abuse and a traumatic event in adulthood substantially increases the risk of suffering pain later (Raphael & Widom, 2011). This research suggests that a series of unresolved stressors throughout a lifespan may be more relevant to persistent pain than CT or PTSD alone (Raphael & Widom, 2011). In this sense, CM that has occurred in infancy or the preverbal development phase may contribute as an earlier (unresolved) stressor, albeit present as implicit memory only and not as a conscious recollection.

This model is set in motion by family dynamics. The quality of the parent-child relationship and the continuous interactions between parents and children may influence the co-occurrence of PTSD symptoms and chronic pain. Olivieri et al. (2012) found a statistically significant difference between the control group and FM patients who had: grown up with someone who was depressed when respondents were between 0 and 18 years; been physically abused or insulted or cursed by their parents; and those who were forced to have sex with someone at least five years older than them or with an adult. Interestingly, Olivieri et al. (2012) found no correlation between the development of FM and the following variables: growing up with divorced or separated parents, growing up with someone condemned to serve time in prison, or having parents who abused each other.

While several studies found a correlation between sexual or physical abuse and FM (Boisset-Piolo et al., 1995; Borchers & Gershwin, 2015; DiLillo et al., 2006; Häuser & Fitzcharles, 2018; Imbierowicz & Egle, 2003; Olivieri et al., 2012; Paras et al., 2009; Walker et al., 1997; Walling et al., 1994); other studies found a relationship between childhood sexual abuse and depression and chronic pelvic pain in adult women, but not directly with FM (Gündüz et al., 2018; Lampe et al., 2003; Walker et al., 1997; Walling et al., 1994). A correlation was found between experiencing physical violence in childhood and the development of FM (Boisset-Piolo et al., 1995; Lampe et al., 2003; Olivieri et al., 2012). The data suggest that sexual and physical victimizations in childhood lead to different patterns of pathology in adulthood, in which sexual abuse in childhood is associated with chronic pelvic pain and depression, and physical abuse and emotional abuse are associated with FM and other pain-related syndromes (Boisset-Piolo et al., 1995; Lampe et al., 2003; Mansiz-Kaplan et al., 2020).

Timmers et al. (2019) proposed the hypothesis of a learned threat response associated with

pain to understand the link between trauma and FM (Lee, 2010; Matthias & Pollatos, 2014; van Houdenhove & Egle, 2004; Videlock et al., 2009). In this hypothesis, a maladaptive learning mechanism, enforced by cortisol and the HPA axis response, mediates the relationship between stress and chronic pain, with pain being associated with emotionally stressful threats (Olivieri et al., 2012; Timmers et al., 2019). In this maladaptive response, stress and pain interact and influence each other, moderated by psychosocial factors such as fears, beliefs, goals, and social context (Timmers et al., 2019). Continued pain may have a cumulative effect on the FM disease course, becoming one more stressful event, which results in changes in the major brain networks that modulate stress responses and threat learning, worsening the harmful effects of threat learning (Olivieri et al., 2012; Timmers et al., 2019).

1.4. Theory of Personal Constructs

Personal construct theory (Kelly, 1955) postulates that a real world exists, which can only be accessed and understood indirectly (subjectively) through how each person perceives, thinks, interprets, and experiences it, according to each person's system of meaning (Morano, 2007). In other words, "everything we know about reality has been mediated not only by our senses but also by our complex associative systems that interpret and reinterpret sensory information" (Feixas & Villegas, 2000, p. 34). These systems are arranged in each person in an idiosyncratic manner, according to one's history and temperament, leading to the construction of a unique world of experiences that does not require correspondence with an ontological reality (Feixas & Villegas, 2000).

Similarly, around the same period in which Kelly published his book, Jung (2014) wrote that every person "makes for himself his own segment of the world and constructs his own private system" (p. 139). In other words, each individual builds a structure that organizes subjective

experiences into a coherent sense of self and the world by creating their own theories about events, people, and relationships (Harré, 1984; Young-Eisendrath & Hall, 1991).

In this logic, each person constructs and reconstructs reality to develop a predictive system that provides a sense of mastery and knowledge of the world according to each person's experiences, cognitive appraisals, and belief system. This philosophical, sociological, and psychological epistemology was developed by George Kelly (1905-1967) into a cognition and personality theory, from which he derived a (cognitive) psychotherapy method, the personal construct therapy (Raskin, 2002) or PCT.

Kelly (1955) proposed that people organize their experiences by situating these experiences in a continuum within reference axes termed "personal constructs" (as opposed to theoretical constructs). These constructs are pairs of opposing aspects of a distinction drawn by the person, the duality contained in conceptions such as strength (strong-weak), temperature (hot-cold), sex (male-female), values (right-wrong), and so forth. The pairs of opposing qualities of constructs form bipolar dimensions that constitute one's personal system of meaning applied to the world. Constructs are used to anticipate and predict how the world functions and how people might behave and respond to events and changes in their environment (Dada et al., 2017; Morano, 2007) to have a sense of mastery and control.

Constructs are hierarchically interrelated; some are central (or core) constructs (Kelly, 1955), referring to more complex and abstract conceptions, for instance, one's vision of justice (fair-unfair), which can be found at higher levels of the hierarchy of one's system of meaning. Core constructs are intimately related to one's identity, sense of selfhood, and coherence in interpersonal relationships. Thus, core constructs can be relatively resistant to changes because changes may threaten one's sense of identity (Compañ et al., 2011; Dada et al., 2017). More peripheral

constructs that orient day-to-day behaviors and conduct might lie at the base of the hierarchy concerning core constructs. They are considered at a lower level of significance within the hierarchy of constructs and, therefore, flexible to adjust to events and changes in the environment if they are not closely related to core constructs (Feixas & Villegas, 2000; Walker & Winter, 2007).

People continually test their personal constructs, monitoring how well those constructs predict life circumstances and reviewing them when they are found inefficient by not being validated with real experiences. To describe this behavior, Kelly used the metaphor of individuals as personal scientists who continually put their constructs to the test (Raskin, 2002) to keep or correct them according to how well their constructs endure life's challenges. As a theory of personality and cognition, Kelly's theory of personal constructs establishes that personality is shaped by those mental constructs, which proved to be fit to explain one's world and phenomena (Raskin, 2002).

From the perspective of the theory of personal constructs, people may push the limits of their constructs by proposing alternative interpretations of a changing world to increase predictability and adapt to change (Walker & Winter, 2007). Processes related to the development, application, and modification of constructs are central to understanding the differences between individuals and facilitating more adaptive changes.

Kelly's postulate about people's need for predictability was recently validated by the field of neuroscience that studies the Bayesian brain theory, which understands brain activity as essentially seeking predictability to decrease surprises and instability in the system (the whole organism). Bayesian brain theory proposes that the brain makes probabilistic inferences about the world based on an internal model created from earlier experiences, statistically calculating the "best guess" on interpreting what is being perceived (Friston, 2012; Miyamoto et al., 2021).

In this theory, the brain actively constructs hypotheses about how the world works, using those hypotheses to explain experiences and fill in missing data (Knill & Pouget, 2004). This process is attributed to an evolutionary adaptation, in which predictability eliminates surprises and random decisions with no basis on previous experiences, ensuring the survival and stability of the organism. In its design, the Bayesian theory proposes a hypothesis of brain functioning that resembles Kelly's theory of cognitive (and personality) functioning, in which a person's constructs are used to predict and anticipate events, ultimately providing stability in the system of meaning.

More recently, cognitive neuroscience corroborated more support for the theory of personal constructs in recognition of the "theory of mind" (ToM; Dodell-Feder et al., 2014; Medina, 2018; Weimer et al., 2017), defined as the ability to attribute mental states to oneself and others, considered one of the essential elements of social interaction. This theory is represented in Kelly's theory as the corollary of "Sociality" (see below; Schultz & Schultz, 2017, p. 303).

Developmentally, children between the ages of 10 and 12 develop an elementary understanding that mental processes that select and interpret reality will affect their knowledge, decisions, and judgments about self, others, events, and relationships (Weimer et al., 2017). Considering these two theoretical perspectives, ToM can be seen as evolving interweavingly with the theory of personal constructs, in which these two systems conceptually feed each other. Weimer et al. (2017) named six (constructivist) mental processes associated with ToM: attention, memory, comprehension, inference, comparison, and planning; these cognitive processes overlap with forming personal constructs.

Both ToM and the theory of personal constructs share the basic units or elements of those six processes: formation of memory, joint attention, complex perceptual recognition (such as face and gaze processing), language, executive functions (such as tracking of intentions and goals, and

moral reasoning), emotion processing-recognition, empathy, and imitation. These two theories are shaped by personal experience, parenting, social relations, training, and education, which require intense interactions between brain development and (social) environment (Corbella et al., 2009; Korkmaz, 2011; Weimer et al., 2017).

Those elements of ToM's cognitive processes seem to translate, in terms of the theory of personal constructs, into a continuous psychological process of creating, testing and revising personal constructs that will allow individuals to attribute meaning and predict events (Montesano et al., 2009). Furthermore, those shared elements produce contents that can be categorized within the six thematic areas proposed in the Classification System for Personal Constructs (CSPC; Feixas et al., 2002). These categories encompass moral, emotional, relational, personal, intellectual, and value (or interest) themes.

The CSPC proposes a set of constructs for each category:

a) moral constructs refer to contents that reveal a moral assessment or value about a described person or element in the Repertory Grid Technique (RGT; Feixas & Cornejo, 1996; Fransella et al., 2004; Kelly, 1955), e.g., good-bad;

b) emotional constructs consist of aspects of emotionality or sexuality of the person described, the described person's emotional attitude towards life or their specific emotions, e.g., optimist-pessimist;

c) relational constructs deal with aspects that indicate a modality of relationship with others, e.g., introverted-extroverted;

d) personal constructs refer to qualities ascribed to someone's personality or way of being, e.g., mature-immature;

e) intellectual constructs concerned with capacities, abilities, and knowledge, both of an intellectual and procedural nature, e.g., creative-dull;

f) constructs related to values and interests refer to ideological, religious, social, political, or other specific values and diverse interests, e.g., liberal-conservative.

Lastly, the concept of implicit memory in child development and attachment theories may contribute to the understanding of a possible early basis for the formation of personal constructs (Bowlby, 1988; Bretherton, 1991; Erreich, 2017; Graf & Schacter, 1985; Hazan & Shaver, 1994; Pietromonaco & Barrett, 2000). Implicit memories are formed from early attachment relationships and events that happened before the child could produce (oral) narratives about those events and attribute meaning to them, between ages 0-3 years; and from procedural (conduct/behavior) memory; therefore, most of an automatic and unconscious nature (Graf & Schacter, 1985).

Implicit memory is relevant in the context of child maltreatment during the pre-verbal phase of child development (Ecker & Toomey, 2008). The inability to recollect events leaves pre-verbal memories unreachable from a conscious narrative perspective, although they still are highly influential on behavior and emotions in an unconscious manner (Ecker & Toomey, 2008; Graf & Schacter, 1985; Schacter, 2019). Some patients who completed the RGT have described that they had never (consciously) formulated some personal constructs they verbalized during the RGT. Nevertheless, during the RGT interview, they came to recognize the strength of those personal constructs within their cognitive system, to their surprise. This subliminal process may indicate an implicit memory system exerting control over some constructs.

In line with the unconscious nature of implicit memories, “Coherence Therapy” proposes to deconstruct maladaptive unconscious personal constructs on the basis that constructs can change (Ecker & Toomey, 2008; Toomey & Ecker, 2007), which is one of the assertions of the theory of

personal constructs as well (Feixas & Saúl, 2005; Kelly, 1955; Salla et al., 2015; D. Winter et al., 2007).

Most importantly, Kelly's theory is based on one fundamental postulate and eleven corollaries. The basic postulate is that "a person's processes are psychologically channelized by how he [or she] anticipates events" (Kelly, 1955, p.46), referring to that scientific attitude every person develops to predict and confirm expectations of events by putting their constructs to test.

From this fundamental postulate, Kelly derived eleven corollaries that indicate how various influences, such as time and circumstances, may shape how a person construes and attributes significance to their experiences. The corollaries are (Schultz & Schultz, 2017):

1. Construction: Repeated events are similar and create a pattern that can help to predict or anticipate how the same event will be experienced in the future.
2. Individuality: People perceive events differently according to their history, temperament, implicit memory, and other influences.
3. Organization: Constructs are arranged in hierarchical patterns according to how people perceive their similarities and differences.
4. Dichotomy: All constructs are bipolar; for example, an opinion about honesty must include the concept of dishonesty.
5. Choice: The choice of a construct to interpret an event is based on what works best for the person, the one that allows the person to predict the outcome of anticipated events.
6. Range: Constructs have a wide range of applications; they may apply to many situations or people or be limited to a single person or situation.
7. Experience: Constructs are continuously tested against life's experiences to ascertain their validity and usefulness.

8. Modulation: Constructs may be modified because of new experiences (here, therapy can be a powerful tool to reconstruct maladaptive constructs).
9. Fragmentation: Within the overall construct system, contradictory or inconsistent subordinate constructs may exist.
10. Commonality: People in compatible groups or cultures may hold similar constructs, although they are unique to each individual.
11. Sociality: People try to understand how other people think to predict what they will do (similar concept to ToM) and adapt their behaviors accordingly.

These corollaries are embedded in the theoretical support for the analysis derived from the Repertory Grid Technique results, providing a stance from which to understand the individual's system of meaning.

1.5. The Repertory Grid Technique

Kelly had a straightforward attitude about assessment techniques, and his primary choice of assessment was interviewing. He thought, "If you don't know what is going on in a person's mind, ask him; he may tell you!" (Kelly, 1958, p. 330), even though a person might deliberately lie or distort the reported version of events. He adopted this credulous attitude and accepted the client's words at face value, believing this was the best way to figure out the person's constructs (Schultz & Schultz, 2017). He developed the theory of personal constructs and RGT, also known as Role Construct Repertory Grid (RepGrid; Harter et al., 2004), which is based on guided conversations between researcher and interviewee to explore the interviewee's world of meaning (Kelly, 1958).

Unlike standard approaches to research, such as structured questionnaires, the RGT explores relationships with significant people in the interviewee's life (Fransella et al., 2004).

During the application of the RGT, interviewees are asked to list by name those people who have played a significant role in their life, such as mother, father, spouse, closest friend, maybe the most interesting person they know, as well as a person who is perceived as a *persona non-grata*, someone with whom they had a difficult relationship (Compañ et al., 2011; Feixas et al., 2002). While other instruments, such as attitude scales, multiple choice questionnaires, or observation techniques, use terms offered by the creators of these instruments, the RGT takes interviewees to elaborate their personal constructions, choosing their words to represent feelings, thoughts, perceptions, values about self, others, events, and relationships, providing a global understanding of their experiences (Montesano et al., 2009). This way, interviewees have an opportunity to fit their very history in the context of this instrument, making it a tool for self-awareness done with their language and narrative – instead of confining their history within a “one-size fits all” instrument.

A review of studies relevant to the topic of CT in women, specifically survivors of sexual abuse, showed that the RGT results facilitate a qualitative analysis of its content and comparison of the content of constructs with constructs extracted from people with no history of abuse since the dimensions of the constructs are obtained in discrete blocks, differently from the complex content analysis of free narratives (Harter et al., 2004). In addition, the content of the constructs can supply valuable information about the alternatives available to people for making sense of interpersonal experiences (Dada et al., 2017; Harter et al., 2004). From this angle, the constructivist approach can deepen the understanding of CT experiences by focusing on the child victim's and adult survivors' attempts to make sense of their experiences, including the relational contexts in which they occurred (Harter, 2001).

The basic procedure for applying the RGT interview, also known as Rep Test Technique,

has not changed significantly since it was proposed by Kelly (1955) and has kept most of its original development (Paszowska-Rogacz & Kabzinska, 2012; Zuber-Skerritt & Roche, 2004).

The interview is a multiphase process proposed in an ordered sequence: a) definition of a topic; b) elements; c) constructs; d) ratings; e) analysis; and f) interpretation:

- a) The topic refers to the interview, perhaps the interviewee's life, work, relationships, and many other possibilities. In our study, the topic was an exploration of essential constructs that oriented the lives of our research sample based on how they perceived their relationships.
- b) Elements are elicited from significant people in the interviewee's life, often using role titles such as parents, siblings, friends, self, ideal self, and a *persona non-grata*. To find the interviewee's identity or core self, it is essential to include the elements "self" and "ideal self;" the latter will provide insight into the interviewee's higher expectations for self.
- c) Constructs are elicited from suggesting a comparison between pairs of elements (a modification of Kelly's original method with three elements
- d) The words or constructs that the interviewee attributes to each pair of elements generate an axis of reference; for instance, someone is a "good" person as opposed to being a "mean" person, defining the axis good-mean as a construct. These bipolar constructs are not necessarily equal to standard opposite concepts, such as good-bad and cold-warm. Still, instead, they will reveal the interviewee's choice of words for each axis, for instance, cold-lively, good-selfish, and so forth. These unique bipolar axes offer a qualitative insight into the interviewee's idiosyncratic construction of a system of meaning.
- e) Ratings are entered once the elements and main constructs are placed within the grid matrix, with the elements on top and the constructs down the left side of the grid. The interviewee is asked to rate each element against each construct in the grid according to a Likert rating scale

of 1 to 7 in our investigation (a further development from Kelly's original method using bipolar ratings).

- f) Analysis is performed once the RGT is completed by quantitatively computing the resulting data matrix and observing the qualitative information. This is the part that has seen more significant development since Kelly's years (see Feixas & Cornejo, 1996; Fransella et al., 2004).
- g) Interpretation is based on qualitative observations and statistical scores, which in combination, will provide information to assess the interviewee's complex network of personal constructs, depicted in a hierarchical construction of a system of meaning, and the analysis of these results with regards to the original topic of investigation.

Among the indexes and measures used to analyze the RGT data, this investigation explored indexes of self-construction (dissimilarity between "self" and "ideal self," "self" and "others," "ideal self" and "others"), IDs, and index of polarization because of their importance for the hypotheses of both studies of this investigation. However, some other indexes and measures can be obtained from the interview, which shows how constructs articulate with one another to support or obstruct a consistent and positive system of meaning (indicators of cognitive structure and cognitive conflicts) and a coherent sense of self and others (self-construction and identity). These measures may show the presence of cognitive conflicts, dysfunctional cognitive structures, and insecure self-constructions that make it difficult for the interviewee to change or adapt to events, relationships, or situations (Dada et al., 2012; Feixas, Montesano, Compañ, et al., 2014; Montesano et al., 2014; Suarez & Feixas, 2020).

These indexes and measures are obtained from relationships between the following factors:

- a) "Self" and "ideal self" discrepancy, an index calculated from the scores assigned to the "self"

and “ideal self” elements, and the correlation or Euclidian distance between those scores.

- b) Perceived social isolation index calculated using the correlation or distance between the scores for the elements of “self” and the average scores of the “others” included in the grid.
- c) Perceived adequacy of others is an index estimated by the correlation or distance between the elements of the “ideal self” and the average scores of the “other.”
- d) Presence of ID. The ID refers to the cognitive conflict in which the construct that represents the symptom is associated with one or more central constructs linked to the person's positive identity and the positive qualities that define that person. In this case, abandoning the construct that represents the symptom brings negative implications regarding the core construct with which the person identifies.
- e) Presence of polarization. Polarization refers to rigid concepts or constructs about oneself and others. This black-and-white perspective does not accommodate nuances in understanding others and oneself, as opposed to the ability to build a nuanced, flexible, and accepting worldview.
- f) Presence of dilemmatic conflicts. A dilemmatic construct is one in which neither extreme of the pole is attractive enough to offer the subject a straightforward course of action, leaving the person ambivalent about the advantages and disadvantages of either side of the construct, centered in the middle of a dichotomy.

The qualitative data of the RGT results can supply information about the interviewees’ system of meanings, insight into the nature of their relationships, the level of their cognitive development, and identification of lifelong themes. Part of the qualitative observation that can be obtained from the RGT includes the identification of core constructs which are the interviewee’s high-level values, which are usually central constructs to define the interviewee’s sense of identity

and continuity of the self in the world (Ortíz-Garzón, 2017; Paz, 2016). In this analysis, the element (current) self plays a key role based on the similarities or differences between this element and the desirable (ideal) self because it denotes the perceived self-worth or self-esteem (Feixas, Montesano, Erazo-Caicedo, et al., 2014).

Likewise, it is possible to quantitatively analyze the relationship between the current self, the ideal self, and significant others and extract several measures of cognitive functioning (Paz et al., 2020). Different measures of construction of “self” and “others,” indicators of cognitive structure, as well as the presence and number of cognitive conflicts, can be obtained through a data processing program (RECORD 5.0; Feixas & Cornejo, 1996; Feixas et al., 2012; Ortíz-Garzón, 2017).

Summarizing the main advantages of the RGT (Curtis et al., 2008):

- a) It is highly personal and representative of the interviewee's world. The technique reduces researcher bias, offers transparency, and generates meaningful results by inviting interviewees to articulate their experiences in their own words, from their unique perspective of interpreting the world, according to their constructs, untainted by the opinion or biases of the researcher.
- b) The RGT is an ideal tool to reveal the uniqueness of the interviewee's constructs and a valuable tool for planning and assessing tailored changes.
- c) Although it can be time-consuming compared to other standard instruments, the RGT is easy to administer by trained interviewers. It uses a simple instruction protocol, pencil and paper, and a software package to analyze the RGT results.
- d) The RGT facilitates both qualitative and quantitative analysis, combining both methodologies: qualitative data gathered from personal history and quantitative data to be analyzed statistically from its Likert rating scales. This integration of methodologies in the RGT allows enhanced

analysis of comparability and validity.

Next, a more detailed description of indexes derived from the RGT for use in this investigation is presented.

1.5.1. Index of the Construction of “Self”

In the context of our study, it is essential to find how CM may have impacted the basic construction of one’s identity and selfhood, core constructs within the network of constructs that reflect the person’s system of meaning. According to the CSDT view of trauma (Pearlman, 1997; Saakvitne et al., 1998), the self-construct is based on self-capacities, which are internal abilities that allow an individual to keep a (generally positive) continuous, consistent, and cohesive sense of identity.

These skills or abilities are developed through first relationships with caregivers caring for regulating the children's internal states, contributing to their well-being through the regulation and balanced interaction with their physical, emotional, and mental states. In this process, three self-capacities are described as core capacities: the ability to keep an inner sense of connection with others; the ability to experience, tolerate and integrate strong emotions; and the ability to maintain a viable, benign, and positive sense of identity (Pearlman, 1997; Saakvitne et al., 1998). The first capacity of the self (connection) makes the other two (affect regulation and self-worth) possible through the internalization of firmly established bonds in the context of secure attachments or a containing and supportive environment.

The CSDT (Saakvitne et al., 1998) names five areas that reflect the experiential and cognitive ways of organizing the self, which can be affected by trauma:

1. The frame of reference that concerns the usual way of understanding oneself and the world (e.g., *“I am lovable, and the world is a safe place”*), and of organizing everyday experience,

including spirituality (e.g., “*my needs are met, and I can trust they will be in the future*”).

2. Self-capacities are the abilities to relate to oneself and others, in which the person can recognize, tolerate, and integrate affection and keep a benevolent inner connection with oneself and others.
3. Resourcefulness, as the person's adequate resources to meet one's psychological needs maturely. More specifically, inner resources such as self-observation skills and using cognitive abilities and social skills to sustain relationships and protect oneself.
4. The five basic relationship tenets of security, trust, control, esteem, and intimacy are core psychological needs that may signal disrupted cognitive schemas in the presence of trauma.
5. Perceptual and memory systems include biological (neurochemical) adaptations and sensory experiences that trauma may disrupt.

The self-capacities identified by the CSDT for organizing experience can be captured in the RGT results from observation and analysis of indexes of self-worth and self-esteem based on constructs generated from relationships with significant others and between “self” and “ideal self” (Dada et al., 2012; Ortíz-Garzón, 2017). Self-construction measures, such as the “self” and “ideal self” discrepancy, can be obtained from the RGT data matrix and other self-constructions, such as self-definition, self-perceived isolation, and perceived adequacy with others (Compañ et al., 2011; Ortíz-Garzón, 2017).

In this investigation, some aspects of the three self-capacities related to the core self (Pearlman, 1997; Saakvitne et al., 1998), i.e., the abilities to keep connected with others; to experience, tolerate and integrate strong emotions; and to maintain a positive sense of identity, may be weighted from three specific indexes of self-construction generated from the RGT: “self” and “ideal self” discrepancy, “self” and “others” discrepancy, and “others” and “ideal self”

discrepancy.

1.5.1.1. Discrepancy between “Self” and “Ideal Self.”

The relationship between the constructs of “self” and the “ideal self” can be described as congruent or incongruent. A congruent relationship exists when the “self” and “ideal self” constructs show a difference equal to or less than one point on the Likert scale, indicating a positive assessment of the current self about the ideal desired self (Dada et al., 2012). Congruent Constructs refer to personal continuity and coherence, suggesting a connection with personal values, beliefs, and attitudes that define an individual's core identity. These constructs are more resistant to change because any change can lead to self-invalidation (Montesano et al., 2009, 2014; Montesano, Gonçalves, et al., 2017).

An incongruent relationship describes a discrepancy between the person's self-representation and the “ideal self.” It is set up by a difference of 4 or more points on the Likert scale between assessments attributed to the “self” and “ideal self,” which in this case are represented in opposite poles of the construct axis (Dada et al., 2017). Incongruence between “self” and “ideal self” are representations of discontentment with the status of the “self” and a need to change towards an “ideal self.” For example, the current “self” might be identified with the pole “stingy,” and the “ideal self” might have been placed at the opposite pole, “generous” of this construct, showing the desired shift to the positive pole (“generous”) of the construct.

The larger the discrepancy between the “self” and the “ideal self,” the more difficult it will be for the person to sustain a viable, benign, and positive sense of identity (Pearlman, 1997). This negative or excessively idealized view of “self” may affect the person's sense of worth, self-esteem, and ability to establish positive connections with “self” and others.

Research has shown that FM patients have a greater distance between their “self” and their “ideal self,” which is an indication of low self-esteem, identified through the application of the RGT in recent research with these patients (Aguilera et al., 2018; Compañ et al., 2011). These findings identified with the RGT assessment are consistent with findings from various studies about the impact of childhood maltreatment on the victims’ self-esteem. Child maltreatment was found to negatively correlate with self-esteem and affect it directly. In contrast, low self-esteem functioned as a mediator between child maltreatment and psychological distress, i.e., depression, anxiety, and stress, both in childhood and adulthood (Berber Çelik & Odacı, 2020; Mwakanyamale & Yizhen, 2019). The joint effect of multiple types of child maltreatment also negatively affected self-esteem among high school students (Mwakanyamale et al., 2018).

1.5.1.2. Discrepancy between “Self” and “Others.”

While self-esteem and a sense of worth are based on similarities between the perception of the “self” and the “ideal self,” the similarities between the “self” and “others” indirectly might reflect, in a broader sense, a feeling of social acceptance and belonging, a person's perceived social status. The construction of the self, on the other hand, is intrinsically connected to others because a person's sense of identity is constructed through contrasting their meaning system, particularly constructs related to personal values, attitudes, discernment, and ideals, with the meaning system of other people (Dada et al., 2017).

This discrepancy index between “self” and “others” can be congruent (social identification and integration) or incongruent with the self. The perceived social integration or isolation can be calculated using the correlation (or distance) between the scores attributed to the elements of “self” and the average scores of the “others” included in the RGT (Aguilera et al., 2018, 2022; Compañ et al., 2011). An incongruent “self” and “others” index shows dissatisfaction with oneself in social

relationships or a perceived unpleasantness, awkwardness, and inadequacy in social interactions. This index also suggests one's perceived social isolation, which has been associated with several psychological disorders (Ortíz-Garzón, 2017). A small difference between “self” and “others” scores may indicate social adjustment but also an identification with others, in some cases without a healthy degree of separation in which to assert oneself (Aguilera et al., 2018; Feixas & Cornejo, 1996; Ortíz-Garzón, 2017). Social maladjustment and fear of others' judgments have been linked to a lack of self-confidence, poor self-esteem, and perceived inadequacy (Dada et al., 2017).

1.5.1.3. Discrepancy between “Ideal Self” and “Others.”

The “ideal self” construct holds one's high values and expectations for self-development and performance, linked to aspiration and achievement. When contrasted with others, this index is relevant to show how the person's social environment meets the person's lofty ideals and aspirations. In other words, this index shows the degree of personal satisfaction with social inclusion, adjustment, and belonging, both from the angle of how worthy one feels of their social group and how valuable one perceives the social group to be (Aguilera et al., 2018, 2022; Compañ et al., 2011; Feixas et al., 2010).

This index is estimated using the correlation (or distance) between scores of the “ideal self” and the average scores of the other elements listed in the RGT (Compañ et al., 2011). A negative correlation shows a person's dissatisfaction with their social or familial group and perception of others as inadequate, perhaps considering the social group distant or in opposition to one's aspirations and ideals. A positive correlation may suggest a positive or an excessively idealized image of others, with different implications in either case.

Regarding differences between control and FM groups in measures of the construction of “self” and “others,” research has found that these patients have lower perceived adequacy of others,

indicating dissatisfaction with the circle of personal relationships (Compañ et al., 2011). In summary, the correlation between the “ideal self” and “others” is considered a measure of the adequacy/inadequacy perceived in others and of the (current) “self” within one’s social environment (Aguilera et al., 2018, 2022).

1.5.2. Indexes of Cognitive Conflicts

This investigation intended to clarify whether a history of CM affected personal constructs about self, others, and the world, in ways that prevented patients from improving with treatment. The organization of one’s system of personal constructs and how this system behaves dynamically are known as cognitive structures, described as a person’s patterns of self-construction (Feixas, 2016; Feixas et al., 2009, 2000; Montesano, Gonçalves, et al., 2017). The RGT offers a wide range of applications in research, which in this investigation allows the identification of specific conflicts in the patients’ meaning systems and cognitive structure (Feixas et al., 2013).

Cognitive conflicts may be a factor in various mental disorders, particularly depressive disorders (Dada et al., 2012; Feixas, Montesano, Compañ, et al., 2014; Feixas, Montesano, Erazo-Caicedo, et al., 2014; Melis et al., 2011; Montesano et al., 2014). The existence of conflicts or dilemmas in the cognitive structure can explain blockages in the way to psychological change and relapses during treatment (Feixas et al., 2016). Frequently, common dilemmas and conflicts found through the RGT instrument reveal that the symptom or psychological discomfort appears congruent with a part of their cognitive system. In contrast, for another part of the individual's cognitive system, there is a desire for change (Feixas et al., 2013).

1.5.2.1. Implicative Dilemmas.

This investigation focused on the impact of CT on the number of IDs, which generally reflect the existence of conflicts linked to one's identity, therefore, indirectly associated with self-

worth and self-esteem. One of the hypotheses of this investigation is that FM patients with depressive symptoms and a history of maltreatment in childhood may have a high number of IDs resistant to therapy. Thus, the presence of IDs was contrasted with the presence of CT to verify whether, at cognitive levels, the experience of CT in the hands of loved ones or responsible adults had left unresolved conflicts that manifested as IDs.

An ID is a cognitive conflict in which the construct embodied by the symptom is associated with one or more core constructs that usually represent positive characteristics of the patient's core identity (Feixas, Montesano, Erazo-Caicedo, et al., 2014). There is extensive research on the impact of IDs on elevated levels of symptomatology at physical, behavioral, and cognitive levels (Aguilera et al., 2018; Feixas & Saúl, 2004; García-Mieres et al., 2020; Montesano, Feixas, et al., 2017). FM patients were more likely to have IDs, in which the symptom was associated with positive characteristics of the person's identity (Aguilera et al., 2018; Feixas et al., 2007). In a dysfunctional way, positive core constructs associated with one's identity, representing the type of person the person is and wants to remain, link with negative constructs or symptoms that the person desires to change to feel better (Feixas et al., 2000, 2009).

For example, a person who finds herself overly concerned and anxious about others would like to shift that behavior to being less involved in other people's problems and consequently free from anxiety. However, in her construction system, people who care about others are perceived as generous and well-intentioned. In contrast, people who don't care about others are perceived to be more selfish and exploitative. Therefore, decreasing concern for others becomes an ambivalent goal because it threatens her positive sense of identity as a generous and well-meaning person, implying a (negative) shift towards becoming selfish. This cognitive conflict can impair her ability to move toward the desired (anxiety-free) change in the symptomatic construct because this change

can affect other core constructs of her identity (generous and well-intentioned).

In a study about the prevalence of IDs in clinical samples, Feixas et al. (2009) found a significant difference between the clinical sample (52.10% presented IDs) and the control group (only 33.90% with IDs). A systematic review of cognitive conflicts (Montesano et al., 2015), concentrating on clinical populations, found a statistically significant correlation between the presence of IDs and various clinical conditions, in which the higher the level of conflict, the greater the severity of symptoms in those samples. These results are derived from several clinical conditions, such as MDD, dysthymia, anxiety, and bulimia, as well as other disorders, which showed the transdiagnostic nature of IDs because of the similar role IDs play in many clinical conditions (Feixas et al., 2016). More recent studies (e.g., Benasayag et al., 2021) include other clinical conditions, such as functional gastrointestinal disorders (mostly irritable bowel syndrome), frequently found among FM patients. The inference from these results is that IDs are more prevalent in clinical samples, regardless of the type of diagnosis, and they express ambivalence towards change, which, untreated, may prevent positive therapeutic outcomes (Montesano et al., 2015). These findings suggest that IDs deserve attention in therapeutic protocols because they may affect the likelihood of therapeutic changes and positive outcomes from treatments (Feixas et al., 2010; Rouco et al., 2019).

1.5.2.2. Polarization

Polarization indicates cognitive rigidity in which there is an “all or nothing” thinking style (Feixas et al., 2010). Polarized thinking was described by Beck (1979) as a cognitive distortion, an extreme simplification of reality. In this thought process, the narratives created are black or white, good or bad, without the nuances between one extreme and the other. It becomes an automatic thought process to generalize without examining the variables involved in each situation

to seek understanding and offer empathy. This thought process tends to be applied to oneself, others, and events. Thus, this tendency to generalize and compress different life experiences, relationships, and affections using words like “always,” “never,” “everything,” and “nothing” becomes part of the construction of one's own identity.

In the literature, cognitive rigidity has been associated with borderline personality disorder (BPD) as a tendency to evaluate one's experience with extreme polarization.

This cognitive rigidity can decrease the ability to change maladaptive thinking or update beliefs to accommodate new information and adapt to new environments, develop tolerance, or accept ambiguity and uncertainty. In our investigation, it was important to explore the relationship of polarization with treatment outcomes because it could interfere with the ability to change during and after the treatment.

1.6. Psychological Treatments for Fibromyalgia

According to the most recent update from the American College of Rheumatology (Amigues, 2019), there is no cure for FM, although its symptoms can be improved with a multi-component approach to its treatments (Maffei, 2020; Serrat et al., 2020). They recognized that combining cognitive and behavioral therapies and various rehabilitation therapies (e.g., physical therapy or exercise programs) increases the effectiveness of the treatment. Among the non-pharmacological and non-psychological therapies, physical exercise was found to be the most effective modality of treatment for decreasing FM pain (Amigues, 2019; Clauw, 2014; Flodin et al., 2015; Serrat et al., 2020). For this reason, the American College of Rheumatology recommends a physical exercise regimen in addition to any pharmacological treatment, highlighting those regular aerobic exercises are the most beneficial (Amigues, 2019).

Similarly, the American Psychological Association suggests that a combination of

treatment approaches, i.e., psychological, pharmacological, and rehabilitative therapies are most helpful in addressing the many areas of life affected by FM (American Psychological Association, 2020). They also recommend CBT to change cognitive patterns and lifestyle (movement, sleep, and weight management), physical therapy and exercise programs, and pharmacotherapy to reduce inflammation and attenuate pain.

The American College of Rheumatology stressed the importance of addressing FM risk factors and triggers related to daily life. These factors and triggers include sleep apnea, inability to sustain sleep, stress, anxiety, panic, and depression. Cognitive therapies, such as CBT, mindfulness, and compassion therapy, have been used to identify and control risk factors in FM and to treat the condition in combination with education on stress reduction protocols and self-awareness practices (Alda et al., 2011; Bennett & Nelson, 2006; Bernardy et al., 2013, 2018; Falcão et al., 2008; Gritzner et al., 2012; Lee & Enright, 2014; Malin & Littlejohn, 2016; McCrae et al., 2020; Menga et al., 2014; Montero-Marin et al., 2020). Two cognitive approaches have been shown to improve FM symptoms significantly, mindfulness-based stress reduction (Amigues, 2019; Cash et al., 2015; Pérez-Aranda, Feliu-Soler, et al., 2019) and guided imagery (Bernardy et al., 2011; Gómez-de-Regil & Estrella-Castillo, 2020; Onieva-Zafra et al., 2015). Meta-analyses on the outcome of CBT treatment indicate that the effect size ranges from small to moderate (Bernardy et al., 2018; Eccleston et al., 2013; Williams et al., 2012). Given this, at the best moderate result, several studies recommend the customization of psychological treatments to the needs of FM patients due to the complexity of elements involved in the therapeutic response of this clinical population (Aguilera et al., 2022; van Koulil et al., 2011). These complex elements refer to physical functioning, levels of pain, and psychological aspects – such as depressive symptoms, and how these elements combine in FM subgroups that have different clinical presentations

(Ellingson et al., 2018; Sarzi-Puttini et al., 2020). These subgroups may require a tailored treatment to obtain long-term effects.

In our research sample, FM patients showed various levels of severity of depressive symptoms, not necessarily diagnosed as depression, and those symptoms were a target of the treatments offered to them. Unlike other chronic pain diseases, the combination of FM with depressive symptoms occurs more often and has a longitudinal prevalence of 63% to 65%, suggesting comorbidity that may imply a bidirectional relationship (Aguilera et al., 2019, 2022; Sarzi-Puttini et al., 2020). In addition, FM patients with depressive symptoms have more sleep disturbance, worse sexual health, lower levels of general physical functioning, and worse quality of life (Carta et al., 2018; Galvez-Sánchez et al., 2019; Steiner et al., 2017). Interestingly, the economic factor in this comorbidity is greater than the sum of the costs of these disorders separately – all the factors weighed.

It is important to offer treatment for depressive symptoms in managing FM (Robinson et al., 2004). FM and depressive disorders share several similarities, such as a negative view of self and others, sleep problems, pain, fatigue, or cognitive impairment, and the presence of IDs, among other specific cognitive conflicts (Compañ et al., 2011; Feixas et al., 2013; Feixas & Compañ, 2016). Despite the similarity in symptoms between FM and depression, in FM, there are specific cognitive dissonances and distortions, such as pain catastrophizing, fear-based functional avoidance, and maladaptive self-defeating cognitions (Schütze et al., 2010). These distorted cognitions are associated with emotional and behavioral responses that lead to depressive symptoms in FM patients (Schütze et al., 2010).

The parent investigation (Aguilera et al., 2022), a superiority-efficacy trial that generated the data used in this investigation, offered two types of cognitive therapy modalities, traditional

CBT and PCT (Paz et al., 2020). The goals of the parent investigation were to decrease depressive symptoms primarily, and secondarily, decrease pain and consequently achieve positive therapeutic changes in levels of functionality, as depressive symptoms could exacerbate other symptoms. The parent investigation (Aguilera et al., 2022) compared the differential outcomes from both CBT and PCT, and found that both protocols were successful, with insignificant differences between their outcomes.

1.6.1. Cognitive-Behavioral Therapy

According to current research (Bennett & Nelson, 2006; Bernardy et al., 2013; Falcão et al., 2008; Hopcian & Lindsay, 2015; McCrae et al., 2020), CBT is the mainstream psychological treatment for FM and can potentially improve pain-related behaviors by fostering awareness and control over triggers and risk factors (Ehde et al., 2014; Gritzner et al., 2012). CBT has been established as the treatment of choice to address cognitive dissonances and emotional distress in both conditions separately, depression and FM (Alda et al., 2011; Bennett & Nelson, 2006; Bernardy et al., 2013; Driessen & Hollon, 2010; Falcão et al., 2008; Gautam et al., 2020; Gritzner et al., 2012; Hassett & Gevirtz, 2009; Menga et al., 2014; Teneycke, 2012), as well as both conditions in comorbidity (Arnold, 2008; Bernik et al., 2013; Goldenberg, 2008).

The theory underlying CBT postulates that people's belief systems can negatively impact their emotions and behaviors. For this reason, CBT interventions focus on finding distorted or dysfunctional thoughts and beliefs that negatively affect their symptomatology and hinder positive changes in behavior and cognition.

This therapy involves helping patients gain awareness and control of their negative belief systems that generate dysfunctional behaviors and emotions. In this process, the patient is encouraged to create helpful thoughts and adopt more adaptive attitudes that will lead to positive

emotions and healthy behaviors. CBT promotes positive cognitions and emotions to significantly improve general mood, motivation, and self-efficacy (Driessen & Hollon, 2010; Finset et al., 2004, 2004; Hopcian & Lindsay, 2015).

Most CBT treatments are coupled with a complementary multidisciplinary program to achieve these goals, including physical exercises, relaxation modalities, physical and emotional self-regulation, guided imagery, or pharmacological support. CBT goals are to provide patients with insight into the disease process, a specific set of skills for symptom management, and a structured program through which these skills are applied to everyday life situations (Ehde et al., 2014; Hassett & Gevirtz, 2009; Hopcian & Lindsay, 2015).

However, CBT alone does not directly address the impact of FM on a patient's identity, and the failure to face this issue seems to negatively influence the effectiveness of treatments for FM patients (Compañ et al., 2011; Paz et al., 2020), an issue that is addressed in the PCT protocol.

1.6.2. Personal Construct Therapy

PCT is thought to be a process of reconstruction of constructs, allowing for elaborating, loosening, or tightening constructs according to what is needed for a particular patient. For this reason, it is technically eclectic, using various techniques and modes of action to work with personal meanings, usually identified with the RGT (Winter & Viney, 2005). The techniques used in the PCT protocol in this investigation are described in section 3.4.1.2.

The broad spectrum of PCT techniques has the Theory of Personal Construct as a foundation (Kelly, 1955), and these techniques focus on addressing the meaning of experience (such as the meaning of pain); interpersonal relationships; one's self-concept, including identity reconstruction, self-appraisal and esteem; and, cognitive conflicts that interfere with one's change and growth processes (Compañ et al., 2011; Feixas et al., 2013; Feixas & Compañ, 2016; Feixas

& Saúl, 2005; Fernandes et al., 2009; Senra et al., 2005).

Self-constructions are often intertwined with the meaning of symptomatology. For this reason, finding meaning in pain or illness depends on the patient's self-concept (identity). According to Compañ et al. (2011), this relationship between identity and meaning of pain or illness involves the “connections between a person, her body, her interpersonal relationships, and her attitude toward treatment and the health system in general” (p. 57).

In the Theory of Personal Constructs (Kelly, 1955), the formation of one's identity or self would be interconnected to interdependent constructs within a complex hierarchy in which the constructs of a lower or peripheral hierarchical level can be related to other higher constructs, that is, related to personal identity (Compañ et al., 2011). For example, the axis of the “with-pain” and “without-pain” constructs may be related to the axis of the “patient-impatient” construct or “weak-strong” construct, which may be core constructs in one's identity. In this example, associating the constructs “without pain” and “strong” may make pain experience a threat to the identity based on being a strong person. This conflict may make it impossible to assimilate pain experienced in FM because it opposes or conflicts with positive constructs (being strong) about oneself. This lack of acceptance of pain correlates with more significant depressive symptomatology because denial does not empower the person to implement pain resolution behaviors.

The concept of self or identity is implicated in the experience of pain processes and chronic illnesses due to a regular assessment of one's resilience in the face of such challenges and an insertion of the disease into a narrative about oneself. For example, some cancer patients may identify with the narrative of being “cancer survivors” and feel a sense of belonging to that group of patients, adding a new social dimension to a new aspect of their identity. In the case of FM, specifically, experiencing pain might be felt or understood as outside the identity of the “self” or

“ideal self”; therefore, it is not accepted as a consistent (with the self) experience, causing a distinct dissonance within the system of constructs.

A different dilemma may also occur if the construct “with-without” pain becomes an integral part of one’s identity and is associated with a positive construct about self, such as being empathetic (axis “empathetic and not-empathetic”). In this example, “letting go” of the FM pain may be associated with losing empathy for other people’s suffering.

Either way, those cognitive conflicts may negatively affect psychotherapy outcomes. In such cases, the presence of IDs is thought to be at the basis of psychological processes such as resistance and ambivalence to changes because patients may perceive changes as destabilizing their sense of self-identity (Dada et al., 2012; Engle & Arkowitz, 2006; Montesano, Gonçalves, et al., 2017). However, IDs are susceptible to change and decrease in number as a result of treatment with PCT, with subsequent improvement of depressive symptoms (Feixas, Montesano, Erazo-Caicedo, et al., 2014; Feixas & Saúl, 2005).

While these dilemmatic conflicts can be detected in the RGT results and treated with the PCT protocol, CBT does not identify nor address these cognitive conflicts (Medina, 2018). By recognizing the role of IDs in FM patients with depressive symptoms, the PCT supplies personalized treatment based on each patient's personal constructs and system of meaning, factors that justified the use of PCT protocol in this investigation.

CHAPTER 2

OBJECTIVES AND HYPOTHESES

2. Objectives and Hypotheses

The interest in this line of research arose from the results of a previous study by Aguilera et al. (2018), which showed the impact of CT on the therapeutic outcomes of patients with FM regarding their levels of depressive symptoms, pain, and functionality.

This research is based on data collected by the parent investigation of Aguilera et al. (2022). That data (Aguilera et al., 2022) were not analyzed regarding the impact of CT in women with FM and depressive symptoms – the focus of this research. The parent investigation was a randomized efficacy trial comparing PCT and CBT for the treatment of women diagnosed with FM with depressive symptoms. Both treatments were, to some extent, effective in reducing symptoms. However, pain levels (studied as a secondary outcome in the parent investigation) decreased to a lesser extent. Therefore, pain may have been influenced by other psychological issues not addressed in the parent investigation. This present investigation focuses on one of these possible factors, namely an unaddressed history of CT, which may have affected the results regarding improvement in pain levels.

2.1. General Objective

The general objective of this research is to investigate the potential impact of CT on the limited improvement in levels of depressive symptoms, pain, functionality, and cognitive conflicts in a sample of women with FM and depressive symptoms. In pursuing this general objective and the specific objectives described below, this investigation sought evidence to ultimately inform and improve treatment protocols for women with FM.

To achieve this objective, two studies were carried out; Study 1 verified the prevalence of CT in our sample and the effect of CT on the symptomatology and cognitive conflicts before treatment; and Study 2 verified the impact of CT on the sample's response to treatment and on the

number of dropouts.

Study 1 analyzed the prevalence of CT in our sample and compared it to clinical and community samples; and analyzed the impact of each type of CT and cumulative CT on baseline scores of pain, depressive symptoms, and functionality, and indicators of cognitive conflicts, namely, self-construction discrepancy indexes, polarization index, and number of IDs. Study 2 analyzed the influence of each type of CT and cumulative CT on change indexes from baseline to outcome assessments at six months after treatment, for the same symptoms and cognitive conflicts investigated in Study 1; and assessed the influence of each type of CT and cumulative CT on the number of dropouts.

2.2. Specific Objectives and Hypotheses

Several objectives promoted the formulation of hypotheses for investigation in two studies, as follows:

2.2.1. Study 1

Objective 1.1

Describe the prevalence of CT in our sample of FM patients with depressive symptoms compared with other studies, including community samples of women from the general population.

Hypothesis 1.1.1: We expect that the sample of this study will have a higher prevalence rate for single or more types of CT than community samples; and an equal or higher means and SD than a comparable clinical sample.

Hypothesis 1.1.2: We expect that the sample of this study will have a higher prevalence rate of cumulative CT than community samples.

Objective 1.2

To identify the relationship of CT with depressive symptoms in our sample at baseline assessment.

Hypothesis 1.2.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline levels of depressive symptoms.

Hypothesis 1.2.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline depressive symptoms.

Objective 1.3

To identify the relationship of CT with pain levels in our sample at baseline assessment.

Hypothesis 1.3.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline pain levels.

Hypothesis 1.3.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline pain levels.

Objective 1.4

To identify the relationship of CT with levels of functionality in our sample at baseline assessment.

Hypothesis 1.4.1: We expect that the sample of this study will have single or more types of CT negatively correlated with baseline levels of functionality.

Hypothesis 1.4.2: We expect that the sample of this study will have cumulative CT

negatively correlated with baseline levels of functionality.

Objective 1.5

To identify the relationship of CT with the indexes of self-construction in our sample at baseline assessment.

Hypothesis 1.5.1: We expect that the sample of this study will have single or more types of CT positively correlated with high discrepancies in self-construction indexes (“self” and “ideal self,” “self” and “others,” and “ideal self” and “others” discrepancies) at baseline assessment.

Hypothesis 1.5.2: We expect that the sample of this study will have cumulative CT positively correlated with high discrepancies in self-construction indexes (“self” and “ideal self,” “self” and “others,” and “ideal self” and “others” discrepancies) at baseline assessment.

Objective 1.6

To examine the relationship of CT with internal conflict in the cognitive system as depicted by the number of IDs in our sample at baseline assessment.

Hypothesis 1.6.1: We expect that the sample of this study will have single or more types of CT positively correlated with a high baseline number of IDs.

Hypothesis 1.6.2: We expect that the sample of this study will have cumulative CT positively correlated with a high baseline number of IDs.

Objective 1.7

To identify the relationship of CT with polarization in the cognitive system of our sample

at baseline assessment.

Hypothesis 1.7.1: We expect that the sample of this study will have single or more types of CT positively correlated with a baseline high polarization index.

Hypothesis 1.7.2: We expect that the sample of this study will have cumulative CT positively correlated with a baseline high polarization index.

2.2.2. Study 2

Objective 2.1

To identify the influence of CT on the degree of change of depressive symptoms after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.1.1: We expect women with single or more types of CT will present a low degree of reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.1.2: We expect the cumulative CT to be associated with a low degree of reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).

Objective 2.2

To identify the influence of CT on the degree of change in the perception of pain levels after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.2.1: We expect that women with single or more types of CT will present a low degree of reduction in pain levels at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.2.2: We expect the cumulative CT to be associated with a low degree of

reduction in pain levels at the end of therapy (for combined PCT and CBT samples).

Objective 2.3

To identify the influence of CT on the degree of change of functionality levels after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.3.1: We expect that women with single or more types of CT will present a low degree of improvement in levels of functionality at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.3.2: We expect that the cumulative CT will be associated with a low degree of improvement in levels of functionality at the end of therapy (for combined PCT and CBT samples).

Objective 2.4

To identify the influence of CT on the degree of change of self-construction indexes for women with CT after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.4.1: We expect that women with single or more types of CT will present a low degree of reduction in self- construction discrepancies (“self” and “ideal self,” “self” and “others,” “ideal self” and “others”) at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.4.2: We expect the cumulative CT to be associated with a low degree of reduction in self- construction discrepancies (“self” and “ideal self,” “self” and “others,” “ideal self” and “others”) at the end of therapy (for combined PCT and CBT samples).

Objective 2.5

To identify the influence of CT on the degree of change in the number of IDs after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.5.1: We expect that women with single or more types of CT will present a low degree of reduction in the number of IDs at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.5.2: We expect the cumulative CT to be associated with a low degree of reduction in the number of IDs at the end of therapy (for combined PCT and CBT samples).

Objective 2.6

To identify the influence of CT on the degree of change in the degree of polarization of the cognitive system after psychological treatments (for combined PCT and CBT samples).

Hypothesis 2.6.1: We expect that women with single or more types of CT will present a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).

Hypothesis 2.6.2: We expect the cumulative CT to be associated with a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).

Objective 2.7

To identify the influence of CT on treatment dropout in PCT and CBT psychological treatments.

Hypothesis 2.7.1: We expect women with single or more types of CT will be more likely to prematurely terminate their psychological treatments (for combined PCT and CBT samples) than those without a history of CT.

Hypothesis 2.7.2: We expect the cumulative CT to positively correlate with the number of women who prematurely drop out of their psychological treatments (for combined PCT and CBT samples).

CHAPTER 3

METHOD

3. Method

This investigation was based on a re-analysis of the data gathered in the context of a randomized controlled trial of our group named *Tratamiento psicológico de la depression en mujeres con fibromyalgia: eficacia diferencial y factores predictores de resultado*” (Psychological treatment of depression in women with FM: Differential efficacy and outcome predictors). It was conducted by our research group, funded by the *Ministerio de Economía y Competitividad* (Spanish Ministry of Economy and Competitiveness, ref. PSI2014-57957-R). The clinical trial was registered on Clinicaltrials.gov (NCT02711020) in March 2016 before participant recruitment, and the study protocol was also made available in an open-access publication (Paz et al., 2020). The clinical sample of patients with FM with depressive symptoms was collected from public health services (two mental health centers and eight primary care centers) between 2016-2019. In December 2019, the last part of the schedule (6-month follow-up) of this trial was completed. The role of CT was not contemplated among the objectives of the problem, but a questionnaire exploring CT was included as an assessment instrument. For that purpose, an amendment to the bioethics committee of the *Universitat de Barcelona* was submitted and approved.

3.1. Design

Using secondary data from a parent study (Aguilera et al., 2022), the present investigation focused on the role of CT in the symptomatology and cognitive structure of women with FM with depressive symptoms (but not necessarily with a diagnosis of depression) and was divided into two studies that include pre and posttreatment assessments. Study 1 was cross-sectional, based on the data about the presence of CT in the research sample and its possible association with clinical variables evaluated at baseline assessment of women with FM and depressive symptoms. It also compared the prevalence of CT in the research sample with community and clinical samples.

Study 2 was a pre and posttreatment (correlational) study with participants who had received one of two types of psychotherapy, CBT and PCT, for women with FM and depressive symptoms. This study examined the potential interaction of CT with outcomes from the end of therapy assessed six months later at a follow-up session, analyzing the evolution of the combined outcomes of these two treatment groups. It also investigated the potential impact of CT on the number of dropouts.

The parent investigation (Aguilera et al., 2022; Paz et al., 2020) that generated the data used in this investigation compared CBT and PCT interventions to find which one achieved better outcomes. The results indicated that these two interventions were equally successful (Aguilera et al., 2022), with no significant differences between them in the treatment of the research sample. Thus, the hypotheses in this present investigation were not concerned with how these two groups performed against each other, and for this reason, in Study 2 the results of the two interventions were integrated as “one” treatment outcome.

3.2. Description of the Parent Randomized Clinical Trial

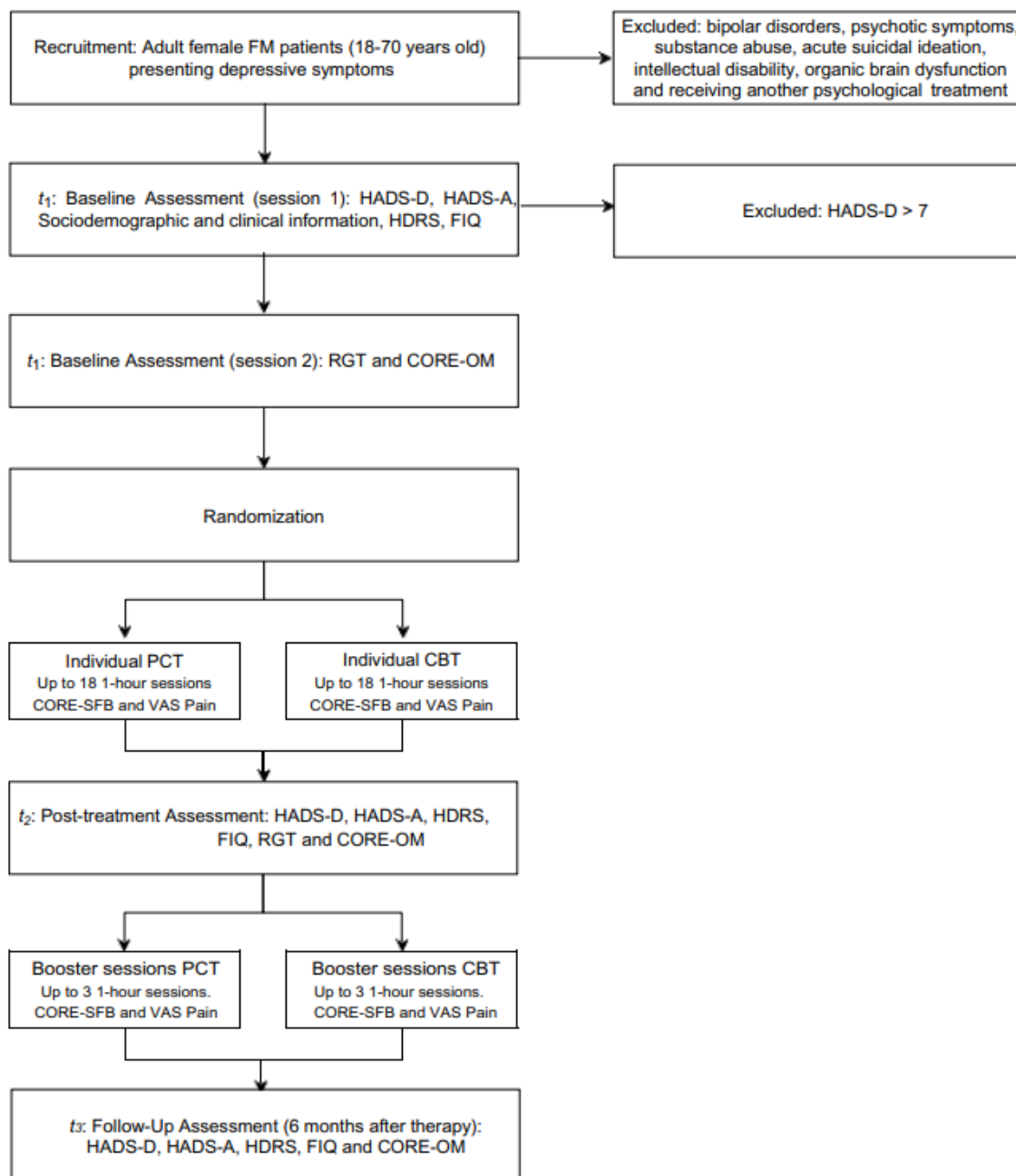
Participants were adult women with a medical diagnosis of FM and depressive symptoms confirmed by a score above seven in the depression scale of the Hospital Anxiety and Depression Scale. Participants stayed within the range of ages 18 to 70 years, with a mean age of 54.58 (SD = 8,87) in this research sample.

The initial number of participants was ideally set at $N = 110$, and the total sample number of the parent investigation ended with 106 women. However, for this investigation, two women were excluded because they did not complete the CTQ-SF instrument (Bernstein et al., 2003) in their initial assessment, which brought the final number of the present study to 104 participants. Based on inclusion criteria, participants were carefully screened and then randomly assigned to

receive either CBT or PCT as part of their treatment.

Figure 3

Assessments in the Parent-Randomized Controlled Trial



Note. Reprinted from Personal construct therapy vs. cognitive behavioral therapy in the treatment

of depression in women with fibromyalgia: study protocol for a multicenter randomized controlled trial, by C. Paz et al., 2020, *Neuropsychiatric Disease and Treatment*, 16, 301–311. Copyright © 2020 Paz et al. (CC BY-NC 3.0).

All women who agreed to participate took part in up to a total of eighteen 1-hour individual therapy sessions of either CBT or PCT. The treatment protocol included 18 weekly sessions, followed by up to three 1-hour booster sessions within 3-5 months after the end of treatment, based on need. A follow-up assessment session was scheduled after six months of completion of treatment. For a detailed description of the protocol for each therapy, see Figure 3, Figure 4, and Table 11; also, Paz et al. (2020) and Aguilera et al. (2022).

3.2.1. Inclusion and Exclusion Criteria

The inclusion criteria for Study 1 and Study 2 were: (a) be aged between 18 and 70 years; (b) have been diagnosed with FM by health professionals; (c) obtain scores higher than 7 for depression in the Hospital Anxiety and Depression Scale (HADS-D; Zigmond & Snaith, 1983).

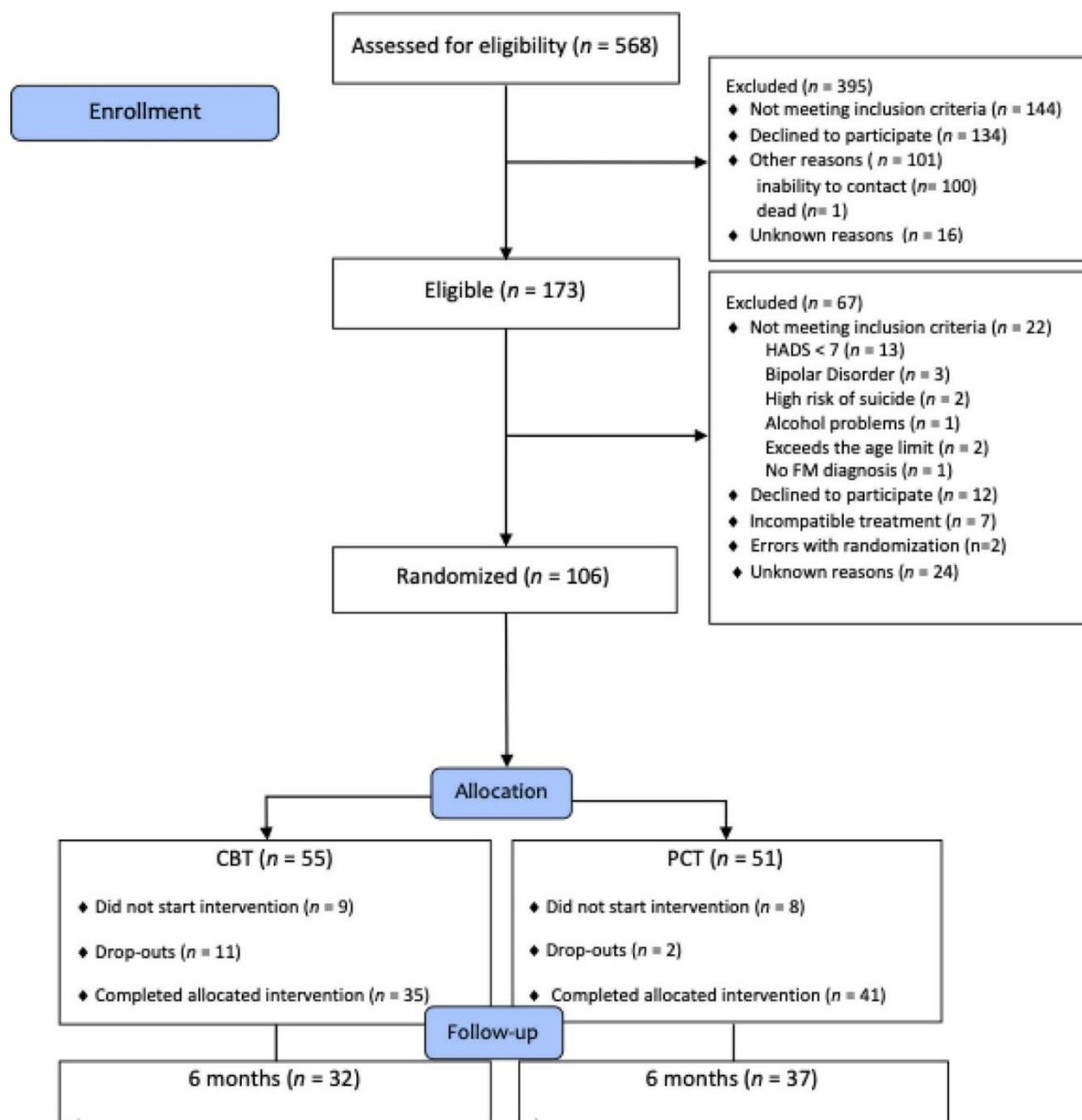
The exclusion criteria considered were the following: (a) presence of psychotic symptoms, history of manic or hypomanic episodes in the past, current substance abuse, mental retardation, organic brain dysfunction, or suicidal ideation; (b) receiving psychological therapy at the time of this investigation; (c) presence of substantial visual, auditory, or cognitive deficits; and (d) inability to communicate in Catalan or Spanish. In addition, due to an estimated prevalence ratio (in Spain and Italy) of female (21) : male (1) for the diagnosis of FM (Demori et al., 2022; Mas et al., 2008), this study used a “woman only” inclusion criterion to avoid sample imbalance and sex-related potential errors and distortions.

These criteria prevented the risk of errors associated with other multimorbidity conditions (defined as two or more medical conditions), which could bias the results. For this investigation,

all participants who completed the entire baseline assessment, their assigned type of therapy, and the posttreatment assessment were included.

Figure 4

Flow Chart of the Randomized Controlled Trial



Note. CBT (Cognitive Behavioral Therapy); PCT (Personal Construct Therapy). Reprinted from Cognitive-Behavioral and Personal Construct Therapies for Depression in Women with Fibromyalgia: A Randomized Controlled Trial, by M. Aguilera et al., 2022, *International journal*

of clinical and health psychology: IJCHP, 22(2), 100296. Copyright © 2022 by the Authors (CC BY-NC-ND 4.0).

The Flow Chart of the Randomized Controlled Trial (Figure 4) explains the screening and allocation of participants for this investigation.

From an initial referral number of 568 patients, 395 prospective participants were excluded and not evaluated; of those, 144 did not meet the inclusion criteria; 100 were not able to be contacted; 134 refused to participate in the investigation; one person had died; finally, sixteen did not show up for a variety of reasons.

The number of referrals evaluated was 173, of which 67 prospective participants were excluded for several reasons. A group of these participants did not meet the criteria: thirteen patients did not meet the cutoff score of 7 points or higher in the HADS measure for depression; three were diagnosed with bipolar disorder; two were at risk for suicide; two exceeded the age limit of 70 years; one had problematic use of alcohol at the time of intake; for one participant, the diagnosis of FM could not be confirmed. Another group had diverse reasons, twelve patients abandoned the evaluation process, seven left for incompatibility with other concurrent interventions, two were excluded due to erroneous randomization, and 24 for unknown reasons.

Following the evaluation and exclusions, participants ($N = 106$) were randomly assigned to two treatment protocols, CBT ($n = 55$) and PCT ($n = 51$); in these two groups, several participants rejected therapy when contacted after randomization (CBT, $n = 8$; PCT, $n = 9$).

An outline of each treatment protocol is shown in Table 11, offering an overview of both intervention protocols used in this project, their modules, and their respective techniques (Paz et al., 2020). A detailed description of the modules for each treatment protocol will be described in the next session.

Table 11*Summary of CBT and DFI Intervention Protocols*

Type of Treatment	Types of Modules	Modules Description	Associated Techniques
Shared CBT and PCT	Psycho-education	Information on FM and coping skills; education on the influence of depression, anxiety, muscular tension, and inactivity on FM.	Conversation in Session
	Relaxation	Training on relaxation techniques for coping with pain.	Diaphragmatic breathing and progressive muscle relaxation.
CBT	Behavioral activation	Information on the impact of behaviors on emotions and thoughts associated with depression and FM.	Monitoring of activities; planning activities, and gradual engagement in pleasant activities.
	Cognitive restructuring	Focusing on the link between thoughts, emotions, and behaviors; and emotions and physical reactions. Detecting and changing automatic thoughts and beliefs about depression and FM.	Self-monitoring; Socratic questioning method; cost-benefit analysis; generating alternatives.
PCT	Complaints focused on pain	Focusing on enhancing and nuancing "pain/without-pain" construct, prompting other constructs to explain events, and personal and physical experiences.	Education on the gate control theory of pain, externalizing pain using letters or drawings; relaxation techniques.
	Complaints focused on emotional avoidance.	Focusing on revising the construction of an existing system to include emotions as acceptable and compatible, rather than invalidating of self-identity system.	Explaining dilemmas and psychoeducation on emotions; historical revision of emotional dilemmas, hypnosis, etc.
	Complaints focused on interpersonal conflicts	Focusing on extending the construction of the meaning system to offer new courses of action in compatibility with the patient's sense of identity.	Family representation as sculptures; use of analogical resources such as metaphors; conducting family sessions.
	Complaints of ambivalence about changes	Focusing on resolving dilemmas so that desired changes do not mean threats to the sense of identity.	Guidelines provided by Feixas and Compañ (Feixas & Compañ, 2016).

Note. CBT (Cognitive Behavioral Therapy); PCT (Personal Construct Therapy). Adapted from Personal Construct Therapy vs. Cognitive Behavioral Therapy in the Treatment of Depression in Women with Fibromyalgia: Study Protocol for a Multicenter Randomized Controlled Trial, by C. Paz et al., 2020, *Neuropsychiatric Disease and Treatment*, 16, 301–311. Copyright © 2020 Paz et

al.

In the CBT group, 55 participants were to start therapy, of which nine did not show up for the first session, and 11 dropped out at various stages. In this group, 35 completed the therapy process. In the PCT group, 51 participants were to start therapy, of which eight did not show up for the first session, and two dropped out. In this group, 41 participants completed the therapy process.

In summary, the CBT group started with 46 participants, of which 35 completed treatment and 32 reached the final assessment by attending the follow-up session after six months. The PCT group began with 43 participants, of which 41 completed treatments; however, two participants had not completed the CTQ-SF initial assessment and were not included in this investigation. A total of 37 participants reached the final evaluation and attended the follow-up session after six months.

3.2.2. Study 1

This cross-sectional study addressed the specific Objectives 1.1 to 1.7 with (baseline) measures taken at the initial assessment before treatment randomization. It identified the prevalence of CT in our (total) sample and compared it with the prevalence found in similar studies. It examined the possible correlation of a history of CT with a baseline assessment of perception of pain levels, level of depressive symptoms, the number of IDs, and indexes of polarization and construction of self in patients with FM with depressive symptoms. These possible correlations were examined by comparing types and the cumulative effect of multiple types of CT with scores of both symptom assessments and cognitive conflicts.

For this investigation, from the parent study sample (before the randomization of treatment), the total number of participants was 104 after the completion of the evaluation and the

CTQ, the primary measure of this study.

3.2.3. Study 2

The second study (pre and posttreatment, correlational) addressed objectives 2.1 to 2.7 to ascertain the (potential) impact of a history of CT on treatment outcomes for both treatments, CBT and PCT, regarding the perception of pain levels, levels of functionality, and severity of depressive symptoms. These associations were examined by types of maltreatment and by the cumulative effect of multiple types of abuse and neglect.

Study 2 comprised 76 participants who completed the assigned intervention (CBT or PCT) and responded to the CTQ-SF assessment at baseline.

3.3. Instruments

Among the instruments used in the parent research project, only those described in Table 12 were used in this investigation for both studies (1 and 2):

Table 12

Outline of Research Instruments

Instrument	Abbreviations & References	Symptoms
Hospital Anxiety and Depression Scale	HADS-D; Zigmond & Snaith, 1983	Depression levels
Visual Analogue Scale	VAS; Hayes & Patterson, 1921	Pain levels
Fibromyalgia Impact Questionnaire	FIQ; Burckhardt et al., 1991	Functioning levels
Repertory Grid Technique	RGT; Kelly, 1955	Cognitive Conflicts
Childhood Trauma Questionnaire Short Form	CTQ-SF; Bernstein & Fink, 1988	Childhood Trauma levels

The HADS-D was the instrument used to decide whether the participant met this inclusion criterium (a minimum total of 7 points of depressive symptoms) and was also the assessment used to test the relevant hypotheses in Studies One and Two. The HADS-D has been a mainstream

instrument in various settings (clinical and non-clinical) for its straightforward application, accuracy, and reliability.

3.3.1. Hospital Anxiety and Depression Scale (HADS-D)

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is a 14-item self-report screening scale initially developed to identify states of anxiety and depression in non-psychiatric outpatient clinics by assessing symptoms experienced during the preceding week. It consists of a 7-item anxiety subscale and a 7-item depression subscale (HADS-D), in which each item scores on a 4-point Likert scale, “as much as I always do” [0]; “not quite so much” [1]; “definitely not so much” [2]; and “not at all” [3], which allows a maximum score of 21 on each subscale of depression or anxiety (Herrero et al., 2003). In our investigation, the depression scale, known as HADS-D, was used as a primary measure of depressive symptoms.

The HADS has shown overall good reliability and validity for clinical patients in the Spanish population (Cantero et al., 2007; Quintana et al., 2003; Terol-Cantero et al., 2015; Vallejo et al., 2012). It presented high internal consistency and concurrent validity with the Beck Depression Inventory, State-Trait Anxiety Inventory, and Short-Form Health Survey (Quintana et al., 2003). It has also shown sensitivity and specificity for identifying disorders defined by the Structured Clinical Interview for DSM-IV (SCID-I; Herrero et al., 2003); and has been successfully tested with Spanish FM patients to explore the presence of anxiety and depression (Vallejo et al., 2012). Vallejo et al. (2012) found HADS-D to be a sensitive instrument for measuring anxiety and depression levels in patients with FM.

For Cronbach's alpha measure of internal consistency, the HADS ranged between $\alpha = .83-.87$ for the depression subscale and $\alpha = .83-.85$ for the anxiety subscale (Herrero et al., 2003; Quintana et al., 2003; Vallejo et al., 2012). The test-retest reliability of the HADS presented

correlation coefficients $\geq .85$ (Quintana et al., 2003). The two subscales (depression and anxiety) were significantly correlated with each other (Pearson's coefficient $r = .65 - r = .68$, $P < .01$) in two studies with Spanish populations (Herrero et al., 2003; Vallejo et al., 2012).

However, one study (Luciano et al., 2014) examined the dimensionality and construct validity of the HADS with Spanish FM patients and found that the HADS had higher reliability in measuring a general factor of psychological distress than in measuring anxiety and depression separately. According to this finding, anxiety variance appears to be recruited by a broader construct of psychological distress in the HADS (Luciano et al., 2014).

Cronbach's alpha measure of internal consistency for the HADS anxiety subscale in our investigation was found to be $\alpha = .76$, a lower coefficient than the previous studies, possibly due to the small sample number, and the depression subscale was an $\alpha = .49$, a very low level of internal consistency, discussed in the limitations section of this dissertation.

3.3.2. Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS; Hayes & Patterson, 1921) was created to assess pain severity. It consists of a straight line (10-cm long) with the endpoints defining extreme limits such as “no pain at all” at the left end and “the worst pain it could be” at the right end of the scale. Patients were asked to record the intensity of their pain levels with a single handwritten mark placed at one point along the length of the 10-cm line representing a continuum between those two ends.

The subjective experience of pain severity was defined by the distance, measured in centimeters, between the left end, “no pain at all,” and the mark made by the patient along that line. The VAS pain cutoff points that have been recommended within the standard 0-100 mm line (10 cm line) are “no pain” (0–4 mm), “mild pain” (5-44 mm), “moderate pain” (45–74 mm) and

severe pain (75–100 mm). These points are based on the distribution of VAS pain scores in post-surgical patients (knee replacement, hysterectomy, or laparoscopic myomectomy) who described their post-operative pain intensity as none, mild, moderate, or severe (Aun et al., 1986).

3.3.3. Fibromyalgia Impact Questionnaire (FIQ)

The Fibromyalgia Impact Questionnaire (FIQ; Burckhardt et al., 1991) was created as a standard self-report instrument to measure the severity of FM symptoms in three domains, functional, overall, and symptom, which takes approximately five minutes to complete. The FIQ comprises ten questions divided into three scoring modalities. The first question of the test has 11 items (a to k) related to physical functioning, such as “were you able to climb stairs?” or “prepare meals?” each question is rated on a 4-point Likert scale. Questions 2 and 3 require marking the number of days patients felt well and the number of days they were unable to work (including housework) because of FM symptoms. The last questions are seven horizontal visual analog scales marked in increments of 10. The patient rates pain and work disabilities, fatigue, sleep quality and morning tiredness, stiffness, anxiety, and depression (Boomershine et al., 2011).

Using the FIQ as a clinical assessment instrument, researchers were able to define more detailed profiling of distinct FM subgroups: FM-Type I was classified by lower levels of anxiety, depression, and morning tiredness symptoms, and FM-Type II by elevated levels of pain, fatigue, morning tiredness, stiffness, anxiety, and depressive symptoms (Bartley et al., 2018; de Souza et al., 2009). The results of studies that profiled FM subgroups suggest that pain and stiffness are universal symptoms of the syndrome but that the psychological distress element is present only in some patients (Bartley et al., 2018).

For the Spanish adaptation of the FIQ (FIQ-S), 102 women with FM completed the protocol, which proved the questionnaire to be reliable, valid, and responsive to changes, a good

instrument to measure health status and physical functioning in Spanish-speaking FM patients (Esteve-Vives et al., 2007; Rivera & González, 2004). Test-retest correlations were between .61-.85 ($p < .0001$), and the internal consistency showed $\alpha = .82$ for all items and $\alpha = .86$ for the sub-items of physical function (Esteve-Vives & Batlle Gualda, 2006; Esteve-Vives et al., 2007; Rivera & González, 2004). In our study, the total alpha of the FIQ was $\alpha = .77$, demonstrating good internal consistency.

At the time of the development of the questionnaire, the clinical aspects of FM had just begun to be categorized, and the FIQ intended to capture the total spectrum of FM-related problems and how FM responded to therapies, informed by what was known then. Since then, it has been extensively used as an indicator of disease activity and a measure of therapeutic efficacy in research projects (Salgueiro et al., 2013).

However, since the publication of the FIQ in 1991 by Burckhardt et al., several issues became apparent, such as its arduous scoring algorithm and the absence of critical problems such as cognitive impairment, postural balance, or environmental sensitivity, issues that were addressed in its revision (FIQ-R; Bennett, 2005). The FIQ-R was developed in response to known deficiencies of the original questionnaire with feedback from patient focus groups, which helped to address the visual analog scale (VAS) that required scoring with a ruler; the need to reverse scores in one of the questions; and the burdensome conversion of the first thirteen questions to a standardized scale of 0 to 10. In addition, there were cultural issues within the domain of functional questions. This domain mirrored the lifestyle of women from affluent countries, who were assumed to have a car, a vacuum cleaner, and a washing machine. Furthermore, symptoms not described in the original questionnaire became prominent and relevant, such as cognitive

impairment, tenderness, balance, and environmental sensitivity (Pérez-Aranda, Andrés-Rodríguez, et al., 2019; Salgueiro et al., 2013).

3.3.4. Repertory Grid Technique (RGT)

The Repertory Grid Technique (RGT; Feixas & Cornejo, 1996; Fransella et al., 2004; Kelly, 1955) is a semi-structured interview that assesses interviewees' construction of "self" and "others," their self-concept and cognitive structure, detecting possible cognitive conflicts in that structure, based on the theoretical formulation of PCT (e.g., Feixas et al., 2009).

Centered on the interviewees' evaluation of "self now," significant "others," and "ideal self," the RGT is tailored to survey meaningful, emotionally charged, historically placed constructs that may be implicated in the patient's symptomatology (Faccio et al., 2012; García-Mieres et al., 2020; Winter, 2003).

The data and measurements obtained with the RGT are collected through a semi-structured interview conducted by a therapist trained in this technique; at the beginning of the interview, participants are briefed on the RGT protocol, its steps, and its objectives. The first task of the RGT is to list people who are significant in the interviewees' life, such as the mother, the father, intimate or romantic partners, friends, and so forth. This list must include the participant's "self now," the "ideal self," and someone with whom they had a problematic relationship or simply disliked.

After creating this list of significant people, participants were asked to compare similarities and dissimilarities (attributes) between them in random pairs selected by the interviewer and also to pair themselves with some of those people. Participants were informed that these characteristics should be attributes such as personality traits, behaviors, attitudes, opinions, and values, and not physical qualities. For example, "in what aspects (not physically) you and your father are alike?" or "in what aspects (not physically) is your mother different from your best friend?."

As a result of comparing similarities and differences between significant people, this part of the interview generates personal constructs that include its opposite poles; for example, the father is an “introvert” compared to the interviewee being an “extrovert.” Next, each construct obtained through this method is applied, one by one, to each element (significant people, “self now,” and “ideal self”) by using a seven-point Likert scale (1-7). As an example, on a scale of 1 to 7 points, “how does your brother (best friend, spouse, and so forth) score for introversion-extroversion?” in which 4 is the midpoint between these two opposite poles (e.g., introverted versus extroverted). In this 7-point Likert scale, scores close to 1 mean that the element fits best in the description of the left end of the pole (1-very, 2-somewhat, 3-slightly, towards the left pole), and scores close to 7 indicate more applicability of the right end of the bar (5-slightly, 6-somewhat, 7-much like, towards the right pole). These scores result in a numerical matrix that can be analyzed qualitatively and quantitatively (e.g., Faccio et al., 2012; Feixas & Cornejo, 1996; Medina, 2018; Montesano et al., 2009; Paz, 2016). Thus, this instrument allows an in-depth evaluation of the participant's self-concept and cognitive structure based on the number and diversity of constructs generated and scores given to each element for each construct in the grid. It would be impossible to make an exhaustive list of a person's elements and constructs, but by restricting the elements to a certain number of significant people (siblings, parental figures, spouses, a *persona non-grata*, “self”, and “ideal self”), limiting the identification of constructs to a minimum and maximum number; and, keeping the theme focused on interpersonal constructs, the RGT instrument provides a reasonable number of variables to measure.

Although Kelly was somewhat dismissive of traditional psychometric requirements of reliability and validity, since there is no standard form of RGT, the literature indicates relatively high test-retest reliability of grid measures and their validity, for example, in differentiating

between certain groups or predicting behavior (Fransella et al., 2004). The reliability of the RGT has been estimated with test-retest studies yielding stability scores of 71-77% for the elements and 47.7-69% for the elicited constructs. Several studies' measures or indexes derived from the RGT provided test-retest correlations ranging from .61 to .95 (Feixas & Cornejo, 1996; Feixas et al., 2010).

Several analysis methods have been developed and coupled with computer packages, including pioneer programs (Slater, 1977) that analyzed individual grids, comparison of grids, and consensus grids for groups. To include hierarchical relationships that may be represented visually, the properties of constructs and elements and their interrelationships have been measured with computer packages. These packages also provide measures of the structure of the construct system (Goffin et al., 2010).

The rating of all elements (placed in the grid columns) according to each construct (row) produces a matrix of RGT data. From this matrix of RGT data, some cognitive indexes can be obtained, such as the discrepancy between the “self” and the “ideal self”; polarized (all or nothing) or one-dimensional constructs, and the presence (and number) of cognitive conflicts (Feixas et al., 1992, 2012; Medina, 2018; Paz et al., 2020). The program used to analyze the matrix of ratings resulting from the RGT was the GRIDCOR/RECORD 5.0 (Feixas et al., 2012), respectively English/Spanish versions.

In this investigation, the RGT results were analyzed to detect the possible interaction of CT with indexes of construction of “self”, number of IDs, and index of polarization.

3.3.4.1. Implicative Dilemmas.

An ID is a cognitive conflict in which the non-desirable pole of one construct (symptom requiring change) is associated with one or more positive characteristics of the self-identity system

(in which change is not desired). In this case, a symptomatic condition that the person wishes to change is linked, within their construct system, to other personal traits in which change is undesirable and would involve a considerable threat to the person's identity.

In other words, in a congruent construct, the difference between the scores of the "self" and the "ideal self" is less than or equal to 1, indicating that both elements are near each other within the same pole of that construct; therefore, there is no desire to change. In contrast, for a discrepant construct, the scores of the "self" and the "ideal self" differs by 4-6 points, which means that they are located at opposite poles of the construct.

There are two types of personal constructs involved in an ID, one of them is congruent, and therefore the "self" and "ideal self" are on the same pole of that construct, representing an area of satisfaction with oneself. The other construct is incongruent, and the person wants to change in that regard, because the "ideal self" is at the opposite pole to the "self", expressing an area of symptom or dissatisfaction with oneself (Feixas, Montesano, Compañ, et al., 2014). However, although there is a desire for change towards the "ideal self" in the incongruent construct, this change would be in conflict with one or more congruent constructs related to the core "self". For example, a person has a congruent construct regarding being sociable ("self" and "ideal self" are in tune) and has an incongruent construct that values reading and studying (the desired pole where the "ideal self" is opposite to the "self" which is lazy, according to the person description). But achieving this goal means abandoning "being sociable", which is valued as part of one's identity. It is difficult to change because finding time to read and study would result in the invalidation of core aspects of the self as a sociable person (Feixas, Montesano, Compañ, et al., 2014).

To establish the correlation and the presence of an ID within the cognitive structure, Feixas and Saúl (2004) suggested a conservative high value, placed at $r .34$ between the desired pole of

the discrepant construct and the undesired pole of the congruent construct. This correlation is calculated with the program RECORD 5.0 (Feixas et al., 2012), which checks all the possible correlations between discrepant and congruent constructs and identifies those indicative of the presence of an ID.

The number of IDs in a given grid indicates the degree of conflict in the respondent's construct system. Because grids can vary in the number of constructs, Feixas and Saúl (2004) created an index called Percentage of Implicative Dilemmas (PID), which measures the number of IDs weighted by taking into consideration the number of constructs.

$$PID = \frac{d}{\left(\frac{n!}{2 \cdot [(n-2)!]}\right)} \times 100$$

d = number of dilemmas

n = number of constructs in the grid

PID = Percentage of Implicative Dilemmas

3.3.4.2. Construction of “Self” and “Others.”

Based on self-construction indexes, this investigation focused on the dissimilarities found between “self” and “ideal self,” “self” and “others” (others as an average), and “ideal self” and “others.” The degrees of dissimilarity between “self” and “ideal self” are assumed to reflect the participant's self-assessment (a probable measure of one's self-esteem), and between “self” and “others” demonstrates the participant's self-isolation (a possible measure of one's social identification), between “ideal self” and “others” reflects the participant's assessment of others (Dada et al., 2017; Salice, 2020). In our investigation, these dissimilarity indexes were examined for their correlation with levels of CT to determine whether they were associated.

The index of dissimilarity is given by the numeric distance between the scores for two elements compared (e.g., “self” and “ideal self”), where the greater the difference, the greater the dissimilarity. To be able to compare each pair of elements (“self” and “ideal self”; “self” and

“others”; and “ideal self” and “others”), standardized Euclidean distance (0-1) was used to make it possible to compare the degree of similarity between elements, based on the ratings given using the elicited constructs (Ortiz-Garzón, 2017; Medina, 2018; Paz, 2016).

The standardized Euclidean distance (D) is calculated using the following formula:

$$D = \frac{\sqrt{\sum_0^C (S-I)^2}}{6\sqrt{C}}$$

In this formula, “ C ” refers to the number of constructs, “ S ” to the “self,” and “ I ” to the “ideal self.” Number 6 shows the maximum value the formula can take: the maximum distance between the two elements in the Likert scale (1-7). Values close to 0 indicate a little discrepancy between the “self” and the “ideal self,” and distances close to 1 indicate that the “self” is very different from the “ideal self.”

3.3.4.3. Polarization.

This measure of the RGT assesses a person's tendency to construct themselves and “others” through dichotomous, “all or nothing” thinking, and circumstances are understood as “black or white.” In this sense, cognitive rigidity is characterized by a lack of flexibility to understand the nuances of personality and circumstances (Feixas et al., 2021). The polarization index is calculated from the RGT data matrix based on the percentage of extreme ratings (1 or 7).

Previous research has shown correlations between polarization and some mental disorders, especially for bulimia (Feixas et al., 2010) and psychotic patients (García-Mieres et al., 2020).

3.3.5. *Childhood Trauma Questionnaire Short Form (CTQ-SF)*

The CTQ-SF is the most used measure of CT globally and was commended in Spain by Hernandez et al. (2012) as the “gold standard” for the retrospective assessment of childhood abuse and neglect (Aloba et al., 2020).

The CTQ-SF (Bernstein et al., 2003) was used in this investigation as an instrument to measure the prevalence rate and severity of exposure to CM in our research sample of patients with FM with depressive symptoms, using its Spanish version (Hernandez et al., 2012). Thus, the CTQ-SF is the primary measure of this investigation, used as a referential indicator to define objectives and generate hypotheses. To test the hypotheses of the two studies, the scores of the CTQ-SF obtained at the initial interview were contrasted with the pre and posttreatment scores of other instruments related to our hypotheses.

The CTQ-SF is derived from the original CTQ (Bernstein et al., 1994), a 70-item self-administered inventory designed to supply a reliable and valid retrospective assessment of childhood abuse and neglect. Exploratory and confirmatory factor analyses of the 70 original CTQ items were conducted on seven different clinical samples that supported the reliability and validity of trauma reports obtained with the instrument, including its stability over time and discriminant and convergent validity in structured trauma interviews.

The original CTQ was tested in four samples for invariance of measurement, i.e., to find out whether its measure held the same meaning across different groups and covered the various questions related to the questionnaire. These four samples were 378 adults with drug abuse problems in New York city patients, 396 adolescent psychiatric inpatients, 625 Southwest Texas drug abusers, and 579 individuals from a normative community sample, which resulted in a combined $N = 1978$ (Bernstein et al., 2003).

Bernstein et al. (2003) reported reliability coefficients (Cronbach's alpha) for all subscales within the .61 (physical neglect) to .95 (sexual abuse) range. The coefficients for each subscale are shown in Table 13.

The structured interviews that demonstrated the stability of the original CTQ over time and

its convergent and discriminant validity were conducted with a sub-sample of 190 adolescent psychiatric patients out of a sample of 398 male and female adolescents (aged 12 to 17 years) admitted to the inpatient service of a private psychiatric hospital, to whom the CTQ was given as part of a larger test battery.

Table 13

Reliability Coefficients for CTQ-SF Subscales

Subscales of Childhood Maltreatment	Populations' coefficient α (Cronbach's alpha)			
	Adolescents	New York drug abusers	Community sample	Texas drug abusers
Emotional Abuse	.89	.84	.87	.88
Physical Abuse	.86	.81	.83	.85
Sexual Abuse	.95	.93	.92	.94
Emotional Neglect	.89	.88	.91	.85
Physical Neglect	.78	.68	.61	.68

Fifteen therapists (masters and doctoral levels) interviewed these adolescent patients to obtain abuse and neglect ratings based on all available data, including extensive contact with patients and their families, other members of the multidisciplinary treatment team, physicians, and referral agencies, access to child welfare investigations, family history with the criminal court, and history of removal of the child from the parent's home. Therapists could rely on this information obtained to exercise their clinical judgment and were kept blind to the CTQ scores obtained by those patients (Bernstein et al., 1997). Therapists were also instructed to categorize as "uncertain" any case for which they felt less than entirely sure about the patient's abuse or neglect status.

After the interviews, the CTQ factor scores were compared with the therapists' maltreatment ratings, and the relationships between the two sets of variables were highly specific,

supporting the convergent and discriminant validity of the CTQ. Furthermore, the CTQ exhibited good sensitivity to all forms of maltreatment examined, along with satisfactory or better levels of specificity when the therapists' ratings were used as validation. The researchers concluded that the internal consistency of the CTQ four rotated factors (emotional and physical abuse, sexual abuse, emotional neglect, and physical neglect) was extremely high across the entire sample ($N = 398$). In addition, compared to the therapists' ratings ($n = 190$) in a series of logistic regression analyses, the relationships between the two sets of variables were highly specific, supporting the convergent and discriminant validity of the CTQ-SF (Bernstein & Fink, 1998; Bernstein et al., 2003). Initially, the CTQ scale had four rotated factors yielded by the principal-components analysis, labeled physical and emotional abuse, emotional neglect, sexual abuse, and physical neglect (Bernstein et al., 1994), refined in five specific factors (five subscales) tested in several other studies (Bernstein et al., 2003).

The development of a brief version of the original CTQ retained twenty-five items with factor loadings greater than .50 on the intended factors it was supposed to measure and low loadings ($<.30$) on the other factors, showing significant differentiation. Based on these two criteria, the CTQ-SF was developed with five distinct factors (subscales), physical, sexual, and emotional abuse, and physical and emotional neglect (Bernstein et al., 2003).

Respecting the structure of the original questionnaire, the CTQ-SF is also a retrospective self-report inventory consisting of 28 items taken from the original 70-item CTQ, answered on a 5-point Likert scale (1 = never true, 2 = rarely true, three = sometimes true, 4 = often true, 5 = very often true). These items were divided into five rotated factors (subscales of maltreatment), with five items for each subscale and three outside those subscales to assess minimization/denial.

The items of both the original and the short version questionnaires were derived from the

definitions of each type of maltreatment, as follows (Walker et al., 1999):

- Emotional abuse was defined as “verbal aggression to a child's sense of worth or well-being or any humiliating or degrading behavior directed at a child by an adult or older person.”
- Physical abuse was defined as “bodily assaults on a child by an adult or older person that posed a risk of injury or resulted in injury.”
- Sexual abuse was defined as “sexual contact or conduct between a child under 17 and an adult or older (at least five years older than the child.”
- Emotional neglect was defined as “the failure of caregivers to meet the children's basic emotional and psychological needs, including love, belonging, care and support.”
- Physical neglect was defined as “the failure of caregivers to provide for the child's basic physical needs, including food, shelter, clothing, safety, health care, and poor parental supervision” if it puts the child's safety at risk.

These five subscales or types of maltreatment in the CTQ-SF reflect the experience of maltreatment rather than the specific behavioral descriptors of abuse or neglect behaviors (Bernstein et al., 2003). For example, item 15 states, “*I believe that I was physically abused,*” or item 18, “*I believed that someone in my family hated me,*” both items define a personal experience.

Table 14 shows the item numbers that refer to each maltreatment subscale in the short questionnaire, reflecting that numbers 2, 5, 7, 13, 19, 26, and 28 are items scored with reversed values.

Each subscale's scores range from 5 to 25, and the CTQ-SF manual (Bernstein & Fink, 1998) provides cutoff scores to classify individuals as follows: none-minimal, low-moderate, moderate-severe, and severe-extreme.

For each subscale, individuals with scores in the none-mild range were classified in the present study as negative for exposure, and subjects with scores in the moderate-severe range were classified as positive for exposure (trauma). The greater the score, the greater the severity of abuse for each subscale.

Table 14

CTQ-SF Items for Each Subscale of Maltreatment and of Minimization/Denial

Subscale of Maltreatment	Items
Emotional Abuse	3, 8, 14, 18, 25
Physical Abuse	9, 11, 12, 15, 17
Sexual Abuse	20, 21, 23, 24, 27
Emotional Neglect	(-)5, (-)7, (-)13, (-)19, (-)28
Physical Neglect	1, (-)2, 4, 6, (-)26
Minimization/Denial	10, 16, 22

Note. CTQ-SF (Childhood Trauma Questionnaire Short Form).

According to the CTQ-SF manual (Bernstein & Fink, 1998), moderate-severe cutoff scores for each subscale are emotional abuse ≥ 13 ; physical abuse ≥ 10 ; sexual abuse > 8 ; emotional neglect > 15 ; and physical neglect ≥ 10 (Table 15).

Table 15

Cutoff Scores by Bernstein and Fink (1998) for the CTQ-SF Subscales

Types of Maltreatment	Levels of Maltreatment			
	None	Low	Moderate	Severe
Emotional Abuse	8	12	15	16+
Physical Abuse	7	9	12	13+
Sexual Abuse	5	7	12	13+

Emotional Neglect	9	14	17	18+
Physical Neglect	7	9	12	13+

In contrast to Bernstein and Fink (1998), who used several samples of mixed sex to determine the cutoff values for the CTQ and CTQ-SF, Walker et al. (1999) applied cutoff values (Table 16) that separate the scores “none” and “low” from “moderate” and “severe” to determine a clinically significant history of abuse or neglect, based on a study with a female-only sample.

Table 16

Distinct Classifications of the CTQ-SF Subscales

Subscales of Maltreatment	Bernstein & Fink’s Classification (1998)				Walker et al.’s Cutoff Values (1999)
	None to minimal	Slight to moderate	Moderate to severe	Severe to extreme	
Emotional Abuse	5-8	9-12	13-15	16-25	10-25
Physical Abuse	5-7	8-9	10-12	13-25	8-25
Sexual Abuse	5	6-7	8-12	13-25	8-25
Emotion. Neglect	5-9	10-14	15-17	18-25	15-25
Physical Neglect	5-7	8-9	10-12	13-25	8-25

Note. Adapted from Assessing childhood maltreatment on the population level in Germany: Findings and methodological challenges, by H. Glaesmer, 2016, *Child and Adolescent Psychiatry and Mental Health*, 10(1), 15 (<https://doi.org/10.1186/s13034-016-0104-9>). CC BY – NC.

Using the definitions of the five types of maltreatment described above, an experienced clinical interviewer blinded to CTQ scores administered structured 2- to 3-hour interviews to 250 women ($n = 250$) of the study sample ($N = 1225$) to decide if they had a clinically significant history of abuse or neglect. Walker et al. (1999) determined scoring thresholds for each of the five

subscales based on these independent clinical assessments. The cutoff scores obtained with this method supplied very good to excellent (.85) sensitivity and specificity for each of the five subscales.

With the new cutoff values, they constructed three mutually exclusive groups, a “sexual maltreatment” group with women who scored eight or higher on the sexual abuse scale (including women who also scored above other cutoff values on the other subscales), a group of “non-sexual maltreatment” with women who scored at or above the cutoff scores for one or more of the non-sexual scales (physical abuse [8], physical neglect [8], emotional neglect [15] or emotional abuse [10]); and, finally, a group of “no maltreatment subscales” with the rest of the women scoring below the cutoff values. This latter group included women with a range of maltreatment experiences from zero to slightly below the thresholds and, therefore, does not represent a literal “no maltreatment” group but rather a group that did not score high enough to be classified as having suffered a traumatic experience.

These data were submitted to univariate and multivariate analysis of covariance with post hoc tests for normally distributed data. In addition, logistic regression was used for categorical variables to calculate the odds ratio with 95% confidence intervals (CI), adjusting for demographic differences between groups. These researchers also examined demographic variables that could be potential confounders of the association between maltreatment and health status, and health factors that could be long-term effects of maltreatment and, therefore, considered mediators. The analysis found that maltreatment was significantly correlated with an increased number of physician-coded diagnoses (excluding routine codes such as gynecologic examinations) for the 18 months before the study was completed. This increase in medical coding was due to several mental health diagnoses, such as medically unexplained pain complaints.

Finally, their study addressed the cumulative effects of various forms of maltreatment, counting the types of maltreatment that exceeded each participant's cutoff values. The resulting maltreatment summary was a score of 0 (no cutoffs exceeded) to 5 (cutoffs exceeded for all forms of abuse and neglect), which was examined using Pearson's correlations (statistical significance at $p < .05$, bilateral) for physical symptoms, functional disability, and diagnosed disorders (ICD-10 code number). They found that the number of maltreatment categories that exceeded clinical thresholds associated with the number of physical symptoms in each woman ($r = .31, p < .001$), physical disability ($r = .15, p < .001$), mental disability ($r = .21, p < .001$), health risks ($r = .21, p < .001$), and the number of physician-recorded diagnoses ($r = .12, p < .001$).

In summary, Walker et al.'s cutoff values for physical abuse and neglect include all cases from "slight to moderate" to "extreme" categories. In contrast, sexual abuse and emotional neglect have all cases from "moderate to severe" to "extreme" categories. For emotional abuse, the cutoff is in the middle of the "slight to moderate" level.

According to Walker et al. (1999), these cutoff values corroborated with clinical interviews and were able to identify women who suffered moderate to severe levels of abuse or neglect. In the case of sexual abuse, for example, women in this group likely had one or more experiences of rape as children or prolonged periods of sexual molestation by a family member that prevented them from achieving normal adult sexual function later in life. In the non-sexual group, women experienced mistreatment that included significant ongoing humiliation or cruelty on the part of parents; repeated physical abuse that led to physical injuries that required medical attention; parental inattention to physical needs for food, clothing, or shelter; and persistent emotional neglect on the part of caregivers, due to the use of drugs, personality factors or psychiatric illness (Iffland et al., 2013; Walker et al., 1999).

The original authors included a 3-item-response-bias scale known as the minimization-denial scale (MD) to decrease the risk of response bias that could undermine the validity of the CTQ (Glaesmer, 2016). Because the CTQ is a retrospective questionnaire referring to past experiences and distant events (childhood), under-reporters might respond with a bias to minimize (or deny) the extent of the CT experience. The items are: “*There was nothing I wanted to change in my family*”; “*I had the perfect childhood*”; and “*I had the best family in the world*” (Bernstein & Fink, 1998; Church et al., 2017; MacDonald et al., 2015, 2016). Bernstein and Fink (1998), the creators of the original CTQ-SF questionnaire, learn that “very often true” responses to any of the three MD items may suggest underreporting of CT. To compute the score for the MD validity scale, each item of those three items that receives a response of “5” (“very often true”) counts one point. The MD scale has a possible range of scores of either none (0) or likely (1 to 3). For example, if a respondent gives a “*very often true*” (5 points) score to the item “*I had the perfect childhood,*” this will signal that this person is minimizing family problems to a certain extent, suggesting that the whole questionnaire might have been answered within a minimized viewpoint. These items were not used in our investigation because they would not affect the total CTQ-SF scores.

Since its start, several validation studies have been conducted with the CTQ-SF, confirming its reliability and validity with diverse populations, recognizing this instrument as strong and reliable (Aloba et al., 2020; Baker & Maiorino, 2010; Bernstein et al., 2003; Cheng et al., 2018; He et al., 2019; Kongerslev et al., 2019; Petrikova et al., 2021). Lundgren et al. (2002) considered the CTQ-SF an improvement over the original questionnaire. They found high consistency and homogeneity in four of its five subscales (emotional, physical, sexual abuse, and emotional neglect) but not on the physical neglect subscale. Other studies also presented conflicting results on the CTQ-SF factor structure concerning the physical neglect scale (Gerdner & Allgulander,

2009; Grassi-Oliveira et al., 2014; Kim et al., 2011; Villano et al., 2004), which was considered problematic because it appeared to have the poorest internal consistency of all scales (Gerdner & Allgulander, 2009; Grassi-Oliveira et al., 2014). These researchers suggested that the physical neglect subscale needed revision (Lundgren et al., 2002) because the content analysis of this factor pointed to meanings other than physical neglect.

An alternative factor structure was proposed for research in clinical samples, in which items number 2 (*I knew that there was someone to take care of me and protect me*) and 26 (*There was someone to take me to the doctor if I needed it*) are loaded on the emotional neglect scale, rather than on the physical neglect scale as prescribed in the CTQ-SF manual, maintaining its five factors (Gerdner & Allgulander, 2009; Grassi-Oliveira et al., 2014; Kongerslev et al., 2019). However, Lundgren et al. (2002) proposed a four-factor model in which emotional and physical abuse would be combined as one factor (Forde et al., 2012).

This investigation used the Spanish version of the CTQ-SF, validated in a study by Hernandez et al. (2012), demonstrating good psychometric properties. The factor structure of the Spanish CTQ-SF fitted well with the original (English) five-factor model of Bernstein and Fink (1998), and the internal consistency/reliability coefficients were good to excellent for four of the five CTQ-SF subscales. Cronbach's alpha coefficients were emotional abuse at .87, physical abuse at .88, sexual abuse at .94, emotional neglect at .83, and physical neglect at .66. The physical neglect subscale showed the lowest internal consistency coefficient in the Spanish validation study (Cronbach's $\alpha = .66$), similar to the results described in other studies (Aloba et al., 2020; Baker & Maiorino, 2010; Gerdner & Allgulander, 2009; Grassi-Oliveira et al., 2014; J. He et al., 2019; Kongerslev et al., 2019).

In our investigation, Cronbach's alpha coefficients were emotional abuse at .82, physical

abuse at .82, sexual abuse at .41, emotional neglect at .81; and physical neglect at .19, which was a very low-internal consistency coefficient, even when contrasted with the low coefficients found in previous studies (Cronbach's $\alpha = .66$ in the Spanish validation study). In addition, the reliability coefficient of the sexual abuse subscale was also comparatively very low, which suggests caution regarding any results obtained in this subscale. The importance of having a test-retest of the CTQ-SF before and after treatment is addressed in the Discussion chapter.

3.4. Procedure

This research project was conducted as a multicenter randomized clinical trial. It was publicized to the professional staff at collaborating settings, mental health centers, and primary care centers in Barcelona and Badalona. Candidates with a medical diagnosis of fibromyalgia were referred by professionals who knew the characteristics of the research project.

Treatment protocols were conducted at nine mental health centers in the Barcelona area: Nou Barris Nord (*Centre Salut Mental Adults Nou Barris Nord*), Hospital de Mataró, and primary care centers such as Manso (*Centre d'Atenció Primària Manso*), Les Hortes (*Centre d'Atenció Primària Manso Les Hortes*); and five primary care centers in Badalona (*Badalona Serveis Assistencials*).

At their first scheduled contact for an initial assessment, candidates for this research project received an Informed Consent to be signed, in which they were made aware of ethical and confidentiality issues, use of data, voluntary participation, and right to discontinue at any time, general objectives, duration (in several sessions and assessments), positive prospects of receiving treatment, and other relevant information they required at this initial contact. In addition, candidates were informed that the treatment protocol was open to the inclusion of spouses and family members, as well as group format, if needed and agreed upon on a case-by-case basis, to

be discussed with their (allocated) therapist at the mental health center. The administration of the assessment battery was held by master's degree students from the *Universitat de Barcelona*, who had received prior training for the application of each instrument.

Where possible, the same evaluator who conducted the baseline assessment was assigned to assess participants posttreatment. The six-month follow-up was kept blind to the participant's assigned therapeutic protocol to prevent protocol bias.

The depression subscale of the Hospital Anxiety and Depression Scale (HADS-D) was used to determine levels of depressive symptoms (absence was an exclusion criterion) and was part of the set of instruments applied in the first of the two initial assessment sessions to obtain a baseline and relevant information for the evaluation of the prospective participant in the study. All instruments used in this investigation are described in section 3.3. and measures were retaken at the end of therapy and the follow-up session after six months, except for the CTQ-SF, which was only used at the initial assessment (baseline).

The therapists treating the participants underwent specific training in the protocols used in this investigation and were supervised by senior therapists who ensured the integrity of the clinical protocols. All sessions were recorded, and about 10 of those sessions underwent randomized selection, and two independent researchers evaluated their content to verify adherence to guidelines for each treatment protocol.

3.4.1. Treatment Protocols

This section presents a detailed description of both therapy protocols.

3.4.1.1. Cognitive Behavioral Therapy (CBT).

In this protocol, the following techniques and interventions were available for use, with

adjustments for each participant, according to the case conceptualization and agreed-on treatment plan with the participant (Paz et al., 2020):

3.4.1.1.1. Relaxation techniques.

The techniques taught were diaphragmatic breathing and progressive muscle relaxation for managing and potentially decreasing pain, with the goals of empowering participants with effective coping skills and facilitating awareness of levels of tension before it played out as pain (Hamasaki, 2020; Kwekkeboom & Gretarsdottir, 2006; Ma et al., 2017; Manzoni et al., 2008).

3.4.1.1.2. Behavioral Activation.

This component was based on psychoeducation explaining the link between inactivity, emotions, thoughts, and depression as a crescendo of behavioral patterns that affected the whole organism. From this point, new management skills and effective behavioral alternatives were introduced to enable a decrease in symptoms. To support the activation of patients toward new behaviors, behavioral records were used, such as prioritizing tasks and gradually engaging in pleasant activities (Bennett & Nelson, 2006; Sturme, 2009).

3.4.1.1.3. Cognitive Restructuring.

There are specific cognitive dissonances (or distortions), such as pain catastrophizing, fear-based functional avoidance, and maladaptive self-defeating cognitions in FM (Schütze et al., 2010). These distorted cognitions are associated with emotional and behavioral responses that lead to depressive symptoms in FM patients (Schütze et al., 2010). For this reason, participants learned about the relationship between thoughts, emotions, and behaviors in this module. The emphasis was placed on the link between emotions and bodily reactions and how this combination could affect well-being. Patients were coached to identify and modify automatic thoughts and beliefs

related to depression and FM (Bennett & Nelson, 2006).

The order and degree to which these modules were applied varied to suit each participant's needs.

3.4.1.2. Personal Construct Therapy.

This PCT protocol was designed by our research group based on previous published (Aguilera et al., 2018; Feixas & Compañ, 2016; Feixas & Saúl, 2005) and unpublished work, specifically adapted to treat fibromyalgia (Paz et al., 2020). FM and depressive disorders share several similarities, such as a negative view of “self” and “others,” sleep problems, pain, fatigue, cognitive impairment, and the presence of IDs, among other specific cognitive conflicts (Compañ et al., 2011; Feixas et al., 2013; Feixas & Compañ, 2016). For this study, four spheres of therapeutic action were created to offer flexibility to adapt to possible changes that might have occurred in the treatment development. Each of these spheres provided a specific course that was outlined with a basis on complaints that were commonly found in FM. The constructivist approach focuses on the participant's unique subjective experience; for this reason, the first two sessions of this protocol were used to explore the participants' views of their problem and the solutions they envisioned, as well as the demands or complaints they presented. All these aspects were considered to orient the course of therapeutic action (Paz et al., 2020).

3.4.1.2.1. Complaints Focusing on Pain.

Once FM patients focus on their symptoms, it becomes more challenging to see other issues that might be linked to their symptomatology, over which they can exert action and management. This component aims to look for and expand new nuances within the axis of their “with pain-without pain” construct as applied to the interpersonal world. The therapist explores different

explanations for events and the participants' personal and bodily experiences to bring forth the repertoire of constructs of the patient's system of meaning. These initial sessions included a psychoeducational part on the theory of gate control in pain (Moayedi & Davis, 2012) to understand the role of psychological processes and the need to deal with them in the therapy process. In addition, other expressive techniques might be used, such as the externalization of pain through letters or drawings (Ramey et al., 2009; Ryan et al., 2015).

3.4.1.2.2. Complaints Focusing on Emotional Avoidance.

The underlying complaint associated with this component is a desire to “stop feeling,” usually linked to experiencing negative feelings such as anger, sadness, resentment, and so forth. In such cases, the therapist shows these underlying construction processes and conceptualizes them as a self-invalidating mechanism. In this conceptualization, experiencing a negative emotion or feeling might invalidate essential aspects of the participants' self-identity; therefore, there is a refusal or avoidance (conscious or unconscious) to engage with those emotions (Paz et al., 2020). The intervention aims to normalize emotions and feelings and make them acceptable within the participant's meaning-making system, compatible with one's self-identity system.

The techniques used in revising the construction of the meaning system included explaining what IDs were (psychoeducation about emotions), a historical review of emotional dilemmas, and hypnotic suggestions, among others (Feixas & Compañ, 2016; Feixas et al., 2000).

3.4.1.2.3. Complaints Focusing on Interpersonal Conflicts.

Interpersonal conflicts can have several connections, one of which is the possibility that FM symptomatology is mediating such conflicts (Paz et al., 2020). FM patients' views about their difficulties and conflicts in the social sphere often refer to how they interpret other people's

construction processes, possibly negatively (Harter, 2001; Salla et al., 2015). In these cases, it is necessary to help the FM patient to find courses of action in the interpersonal arena that are compatible with the patient's sense of identity. In this scenario, participants are encouraged to expand their system of construction of meaning through techniques that can increase sociality. Some resources include bringing relevant family members in some sessions, depicting the family as sculptures, or using similar resources, such as metaphors (Duhl et al., 1973; Hearn & Lawrence, 1985).

3.4.1.2.4. Ambivalent Complaints about Change.

Some FM patients may feel threatened by changes, even if changes are desired, and this conflict can generate ambivalence in them. These conflicts often appear in the analysis of the data matrix resulting from the RGT in the form of IDs (Feixas et al., 2009). For a person with an ID, the movement towards the desired pole of the construct (e. g., “being independent” rather than “dependent”) implies a significant shift in the construal of the “self” concerning other constructs that are congruent with one's identity (e. g., “being independent” implies “being selfish” rather than “caring”). When the dilemma is detected, it is possible to address it without threatening the FM patient's sense of coherence, which is essential for her sense of identity (Feixas, 2016; Feixas & Compañ, 2016).

3.5. Data Analyses

The analyses of this investigation aimed to assess whether CT impacted the symptomatology of FM patients for levels of depression, pain, functionality, and cognitive conflicts, at pretreatment (Study 1) and posttreatment measures (Study 2) regardless of the intervention used to treat the sample.

The parent study collected data on CT using the CTQ-SF, the primary instrument of this present investigation. Results of the parent study (Aguilera et al, 2022) reported data on the efficacy of the interventions with no reference to CT. This investigation had new objectives and hypotheses and was novel research in its entirety that used secondary data from a parent study.

The implementation of data analyses in Study 1 progressed in the following steps:

- 1) The participants responded to the CTQ-SF questionnaire to assess the levels of CT. The cutoff used for the classification of CT was restrictive (Walker et al., 1999) to guarantee that the presence of abuse and neglect represented indisputable levels of trauma. The restrictive cutoff identified participants with moderate to severe abuse or neglect levels (Walker et al. 1999). Reverse-scored CTQ-SF items were recoded as necessary to ensure that all data was in the same format.
- 2) The number of maltreatment types that met cutoff points (for moderate to severe maltreatment) was also considered for the analysis of cumulative trauma scores for each patient, which ranged from 0 (cutoff points not met) to 5 (cutoff points met for all forms of abuse and neglect). Descriptive statistics were employed to measure the frequency of CT and to compare the prevalence of single and cumulative types of CT in the research sample with the prevalence of single and cumulative types of CT in community and clinical samples of women from other studies (Hernandez et al., 2012; Walker et al., 1999; Witt et al., 2017). For comparison between our sample and the clinical sample (Hernandez et al., 2012), an independent-sample t-test was used to analyze the performance of these two samples with the expectation that our sample would outperform the clinical sample's means or equal them.
- 3) The MedCalc statistical software (Schoonjans, 2022) was run to calculate the difference between the observed means in the sets of two independent samples, our research sample and

the clinical sample (Hernandez et al., 2012).

- 4) To evaluate the sample's levels of depression, the participants answered the HADS-D scale (Zigmond & Snaith, 1983); the VAS assessment (Hayes & Patterson, 1921) was applied to measure levels of pain; and to evaluate functionality, the participants responded to the FIQ instrument (Burckhardt et al., 1991). Lastly, the cognitive conflicts were assessed with data derived from the RGT extracted with the software RECORD 5.0 (Feixas et al., 2012).
- 5) Next, to determine the association of single and cumulative types of CT with those variables, this investigation used correlational and cross-sectional models to contrast CTQ-SF scores with scores of depressive symptoms (HADS-D), pain levels (VAS), and functionality (FIQ), and indexes of cognitive conflicts at baseline (Study 1).
- 6) Since cumulative trauma was not a continuous variable, and other variables, such as HADS-D, did not describe a normal distribution within the research sample, this investigation chose bivariate non-parametric correlation tests (Spearman's *Rho*, set p -value $<.05$, 1-tailed) to analyze the data for Hypotheses 1.2.1. to 1.7.2. These statistical analyses were performed using the IBM Statistical Package for Social Sciences (SPSS 27.0) for Windows 10.
- 7) The rationale to use bivariate analyses was to achieve a stronger discriminative power to respond to research questions that focused on the specific effect of each subscale of CT and three separate levels of cumulative CT. The literature about CT has indicated that each subscale of CT impacts the physical and mental symptomatology differently (Bierer et al., 2003; Goodwin & Stein, 2004); thus, the literature supported our decision to use bivariate analysis for the data of this investigation.
- 8) Regarding the possibility of using a different analysis, Huang (2020) suggests that grouping many variables in the MANOVA analyses would produce a weighted linear combination that

masked the specific impact of each variable. For this reason, the MANOVA analysis was not considered a good fit for understanding the relationship between treatment outcomes and each subscale of CT plus three different levels of cumulative CT.

In studies 1 and 2, the Bonferroni correction for multiple comparisons adjusted the p -value, to prevent false-positive findings (Type I error). The Bonferroni correction (Bland & Altman, 1995) is an adjustment made to “ p ” values when multiple dependent or independent statistical tests are performed simultaneously. In the Bonferroni correction, the critical P value (α) is divided by the number of comparisons made. The statistical power of the study is then calculated based on this modified P -value, which gives a more conservative result. For example, the scores of five types of CT were compared to each separate symptom measured in Study 1. The new critical “ p ” value for these comparisons would be $\alpha/5$. The statistical power of the study is then calculated based on this modified p -value, in this case, the adjusted alpha value would be $\alpha = 0.01$. Similarly, the scores of three levels of cumulative CT were tested for their relationship with each symptom measured. These three comparisons generated a new critical value of $P = \alpha/3$, equivalent to an adjusted value $\alpha = 0.01667$. However, Perneger (1998) pointed out that the Bonferroni correction for multiple comparisons can create more problems than solutions by refuting truly significant findings (type II error). The possibility of a type II error increases by ruling out a finding based on the number of other tests performed. In Gelman et al.’s words, “*the Bonferroni correction directly targets the Type 1 error problem, but it does so at the expense of Type 2 error*” (2012, p. 192). In this investigation, we applied the Bonferroni method to our findings while keeping the significance found before the correction as an indication of a sample tendency. We examined our results and tendencies in the Discussion chapter.

Summarizing, as a way to test hypotheses 1.1.1 to 1.7.2, Study 1 specifically explored: a)

the prevalence of CT compared with community samples and one clinical sample; b) baseline levels of symptomatology based on scores of the HADS-D, VAS, and FIQ instruments compared with scores of CT obtained with the CTQ-SF; c) baseline indexes of self-construction, number of IDs, and index of polarization compared to scores of CT. As a reference point for the statistical analyses, an initial one-tailed p -value $<.05$ was set for Spearman's correlations before adjusting the results with the Bonferroni correction for multiple comparisons. The statistical analyses for Study 1 are described in Table 17.

Table 17

Study One Hypotheses and Statistical Analyses

HYPOTHESES	STATISTICAL ANALYSES
Hypothesis 1.1.1: We expect that the sample of this study will have a higher prevalence rate for single or more types of CT than community samples; and an equal or higher means and SD than a comparable clinical sample.	Descriptive statistics for sample comparisons regarding their prevalences. Independent (two samples) t-test for comparison between means and SD of CT levels.
Hypothesis 1.1.2: We expect that the sample of this study will have a higher prevalence rate of cumulative CT than community samples.	Descriptive statistics for sample comparisons regarding their prevalences.
Hypothesis 1.2.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline levels of depressive symptoms.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.2.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline depressive symptoms.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.3.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline pain levels.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.3.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline pain levels.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.4.1: We expect that the sample of this study will have single or more types of CT negatively correlated with baseline levels of functionality.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.4.2: We expect that the sample of this study will have cumulative CT negatively correlated	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-

with baseline levels of functionality.	tailed).
Hypothesis 1.5.1: We expect that the sample of this study will have single or more types of CT positively correlated with high discrepancies in self-construction indexes (self-ideal, self-others, and ideal-others discrepancies) at baseline assessment.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.5.2: We expect that the sample of this study will have cumulative CT positively correlated with high discrepancies in self-construction indexes (self-ideal, self-others, and ideal-others discrepancies) at baseline assessment.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.6.1: We expect that the sample of this study will have single or more types of CT positively correlated with a high baseline number of IDs.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.6.2: We expect that the sample of this study will have cumulative CT positively correlated with a high baseline number of IDs.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.7.1: We expect that the sample of this study will have single or more types of CT positively correlated with a baseline high polarization index.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).
Hypothesis 1.7.2: We expect that the sample of this study will have cumulative CT positively correlated with a baseline high polarization index.	Bivariate, ordinal variable, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value $<.05$ (1-tailed).

The data for Study 2 originated from the (combined) outcomes of two interventions carried out in the parent investigation, a two-arm randomized controlled, superiority trial (RCT) that compared the effectiveness of individual PCT and individual CBT, for the treatment of depressive symptoms in women with FM. Aguilera et al. (2022) found that both studies were equally effective, with no significant differences in the outcomes of each treatment (page 126, section 3.1. Design). This finding (Aguilera et al., 2022) led us to combine both treatment groups in one single sample for this investigation.

The implementation of data analyses in Study 2 progressed in the following steps:

- 1) For the first part of Study 2 (hypotheses 2.1.1 to 2.5.2), a new variable was generated based on the difference between pre and posttreatment scores, to reflect the degree of positive “change”

following treatment. These indexes of change were calculated from scores of pre and posttreatment assessments for levels of depressive symptoms (HADS-D), pain (VAS), functionality (FIQ), and cognitive conflicts identified in the RGT, i.e., number of IDs, and indexes of self-construction and polarization.

- 2) Subsequently, the change index for each variable described above was compared with CTQ-SF scores obtained (using the restrictive cutoff) for single and cumulative types of CT.
- 3) Study 2 hypotheses 2.1.1 to 2.5.2 were non-parametric correlations; in this case, Spearman's *rho* (set *p*-value <.05, 1-tailed) was used to evaluate relationships involving ordinal variables and their association with CT (variables were numeric and ordinal). As previously mentioned, the Bonferroni correction was also applied in Study 2 to prevent Type 1 errors.
- 4) For Hypotheses 2.6.1. to 2.6.2., Chi-square (χ^2) statistics were applied to analyze the number of dropouts. These hypotheses investigated whether CT and patients' treatment completion were associated. The rationale for performing Chi-square tests was their usefulness for analyzing differences in categorical variables, which was the case for these hypotheses. Both variables were categorical: a history of CT implies presence vs. absence of trauma, and treatment compliance indicates participants completed or dropped out of the treatment. Statistical analyses were performed using the IBM Statistical Package for Social Sciences (SPSS 27.0) for Windows 10.

In summary, Study 2 contrasted the levels of CT (CTQ-SF scores) with the change index (calculated as the difference between pre and posttreatment assessment scores) of the HADS-D, VAS, FIQ, cognitive measures (indexes of self-construction, number of IDs, and index of polarization), and dropout rates from both interventions taken together. As a reference point for the statistical analyses, an initial one-tailed *p*-value < .05 was set for Spearman's correlations

before adjusting the results with the Bonferroni correction for multiple comparisons. The statistical analyses for Study 2 are in Table 18.

Table 18

Study Two Hypotheses and Statistical Analyses

HYPOTHESES	STATISTICAL ANALYSES
Hypothesis 2.1.1: We expect women with single or more types of CT will present a low reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.1.2: We expect the cumulative CT to be associated with a low degree of reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.2.1: We expect that women with single or more types of CT will present a low degree of reduction in pain levels at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.2.2: We expect the cumulative CT to be associated with a low degree of reduction in pain levels at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.3.1: We expect that women with single or more types of CT will present a low degree of improvement in levels of functionality at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.3.2: We expect that the cumulative CT will be associated with a low degree of improvement in levels of functionality at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.4.1: We expect that women with single or more types of CT will present a low degree of reduction in self-construction discrepancies (self-ideal, self-other, ideal-other) at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.4.2: We expect the cumulative CT to be associated with a low degree of reduction in self-construction discrepancies (self-ideal, self-other, ideal-other) at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, p -value <.05 (1-tailed).
Hypothesis 2.5.1: We expect that women with single or more types of CT will present a low degree of reduction	Calculate the difference between pre and posttreatment scores as a new variable (change).

in the number of IDs at the end of therapy (for combined PCT and CBT samples).	Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, <i>p</i> -value <.05 (1-tailed).
Hypothesis 2.5.2: We expect the cumulative CT to be associated with a low degree of reduction in the number of IDs at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, <i>p</i> -value <.05 (1-tailed).
Hypothesis 2.6.1: We expect that women with single or more types of CT will present a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, <i>p</i> -value <.05 (1-tailed).
Hypothesis 2.6.2: We expect the cumulative CT to be associated with a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).	Calculate the difference between pre and posttreatment scores as a new variable (change). Bivariate, non-parametric, Spearman's <i>Rho</i> correlation test of significance, <i>p</i> -value .05 (1-tailed).
Hypothesis 2.7.1: We expect women with single or more types of CT will be more likely to prematurely terminate their psychological treatments (for combined PCT and CBT samples) than those without a history of CT.	Dichotomous variables, categorical data, non-parametric, Chi-Square tests.
Hypothesis 2.7.2: We expect the cumulative CT to positively correlate with the number of women who prematurely drop out of their psychological treatments (for combined PCT and CBT samples).	Dichotomous variables, categorical data, non-parametric, Chi-Square tests.

3.6. Ethical Considerations

The clinical trial on which this study was based was approved by the Committee for Ethics in Research of the *Universitat de Barcelona* (IRB00003099) and by the ethical committees of the centers involved in the trial. The trial was conducted in accordance with the Declaration of Helsinki (WMA, 2013). During its development, this trial followed the principles of research practice in psychology stipulated by The Code of Ethics (Colegio Oficial de Psicólogos de Cataluña, 2018) and the recommendations of Del Rio (2005). Informed consent was requested from the participants, and only those who signed it were included in this research. The informed consent guaranteed the confidentiality of the research participants and publications about the investigation. All data are securely archived digitally under a password and encrypted code. All researchers, staff, and participants involved in data collection, custody, storage, and analyses were committed to not

using personal data for any purpose other than this trial and not assigning or disclosing it to third parties.

All staff members of this project abided by the established Organic Law 15/1999 for Personal Data Protection (del Estado, 1999) and the Royal Decree Law 1720/2007 (del Estado, 2008), which supports that Law.

Regarding the specific ethical concerns for Study 1 and Study 2, both studies received the approval of the Bioethics Committee of the *Universitat de Barcelona*. The data for the re-analysis performed in this investigation (including CT data) was generated by the randomized clinical trial conducted by our research group. For this reason, it accepted the assumptions required for the exception developed in guideline 10 found within the International Ethical Guidelines for Research Related to Health in Human Beings, prepared by the Council for International Organizations of Medical Sciences (CIOMS). Specifically, the required assumption in guideline 10 of modification of informed consent, since our research, firstly, has a high social value; secondly, it was the only way to carry it out since the data required a cross-completion and it would be practically impossible with the current pandemic situation to contact the participants again. Thirdly, this research implies a minimal risk to the participants.

Both studies were performed in accordance with the ethical standards laid out in the 1964 Declaration of Helsinki and subsequent updates (WMA, 2013).

CHAPTER 4

RESULTS

4. Results

4.1. General Observations

The presentation of the results follows the sequence of objectives and hypotheses of this investigation, separated into two studies. Study 1 focused on finding the prevalence of CT and its impact on baseline levels of perceived pain, depressive symptoms, and functionality in our research sample. In addition, it compared CT scores with levels of cognitive conflicts at baseline: the discrepancy index of self-constructions, the number of IDs, and index of polarization. Identifying the impact of CT on these dependent variables can be fundamental for developing personalized treatment protocols for this population.

Although several studies used clinical and community samples to validate the CTQ-SF screening instrument for specific languages, it was challenging to find a population with similar characteristics to our research sample to compare prevalence rates. Some were mixed sex studies (men and women), with no data separated by sex; other studies used a different cutoff value than the one used in this investigation; others did not supply raw numbers and percentages; others did not provide data on cumulative CT.

Table 19 shows the studies used in our investigation for comparison with our research sample data for cutoff points defined by Bernstein and Fink (1998) and Walker et al. (1999). Hernandez et al.'s (2012) study validated the Spanish version of the CTQ-SF used in this investigation. In addition, the sample of Hernandez et al.'s (2012) study was compared to this investigation's research sample based on means and standard deviations. There are two normative studies (Table 19), Bernstein and Fink (1998) and Walker et al. (1999), which defined the two main cutoff points used in most international studies to classify CT.

Table 19*Studies Used for Comparison of Prevalence of Childhood Trauma*

Studies	Gender	Ages	Type of population	Data	Cutoff values
Walker et al., 1999	F = (N) 1,225	18-65	General population	% of CT for all subscales and cumulative	Walker et al., 1999
Hernandez et al., 2012	F = (N) 185	18-65	Spanish Dysthymia / Personality Disorder	Means \pm SD	Bernstein & Fink, 1998
Iffland et al., 2013	M+F = (N) 2,500 F = (n) 1,328	14-90	German general population	Percentage of CT in subscales	Walker et al., 1999
Witt et al., 2017	M+F = (N) 2,510 F = (n) 1,339	14-94	German general population	Percentage of CT in subscales	Walker et al., 1999 (+ Bernstein & Fink, 1998)

Note. CT = childhood trauma; F = female; M = male; SD = standard deviation.

The other studies in Table 19 confirmed the discriminative power of the CTQ-SF within their respective national samples, using one or the other of the two normative classifications, although currently, there are more than those two main cutoff points to classify CT (Aloba et al., 2020).

Study 2 focused on the implications of a history of CT on therapy outcomes for both interventions used to treat our research sample, CBT or PCT, combining their outcomes in just one group, as there was no significant difference in the results obtained with the two treatments. Study 2 also investigated the impact of CT on treatment completion. The hypotheses of Study 2 aimed at gaining more knowledge of the effects of a history of CT on the research sample's behaviors, tendencies, and cognitive structure following therapy, to detect possible adjustments to be implemented in current treatment protocols to improve outcomes for women with FM.

4.2. Study 1 Results

In Hypothesis 1, we expected that the research sample would have a higher prevalence rate of CT compared to the general population and an equal or higher rate than other clinical populations. This assumption was subdivided into Hypotheses 1.1.1 and 1.1.2 to substantiate the difference in the prevalence of cumulative and single types of CT. These assumptions were based on literature about the prevalence of CT in clinical (physical and mental health) samples.

Hypothesis 1.1.1: We expect that the sample of this study will have a higher prevalence rate for single or more types of CT than community samples; and an equal or higher means and SD than a comparable clinical sample.

A comparison of prevalence revealed that there were higher percentages of CT in our research sample than in community samples (Iffland et al., 2013; Walker et al., 1999; Witt et al., 2017) for four out of five subscales of abuse and neglect, in both Bernstein and Fink's (1998) and Walker et al.'s (1999) threshold criteria for the classification of CT. Table 20 shows the presence and absence of CT in our sample using the cutoff values set by Bernstein and Fink (1998) for all subscales of the CTQ-SF. This threshold includes low to moderate severity levels of CT for the classification of CT.

Based on these cutoff values (Table 20), approximately 57-73% of the sample suffered none/minimal levels of abuse (emotional, physical, and sexual), and 48-70% suffered none or minimal levels of neglect (emotional or physical), with the percentage of emotional neglect surpassing all other subscales in our research sample.

Table 20

Prevalence of Childhood Trauma in the Research Sample Using Cutoff Values by Bernstein and

Fink (1998)

CTQ-SF Subscales	Absence*	Presence**
	<i>n</i> (%)	<i>n</i> (%)
Emotional Abuse	60 (58)	44 (42)
Physical Abuse	76 (73)	28 (27)
Sexual Abuse	60 (58)	44 (42)
Emotional Neglect	50 (48)	54 (52)
Physical Neglect	73 (70)	31 (30)

Note. *Absence = none/minimum for each category; **Presence = low, moderate, and severe levels for each category. CTQ-SF = Childhood Trauma Questionnaire Short Form.

The highest prevalence among all subscales was emotional neglect at 52 %, representing over half of our sample, followed by emotional and sexual abuse subscales at 42% prevalence. Lower prevalence percentages were recorded for physical neglect 30% and physical abuse 27% representing approximately a third and a fourth of our research sample, respectively. Overall, these cutoff values delivered a high incidence of abuse and neglect in the research sample.

In contrast, Table 21 shows the presence and absence of CT in our sample using cutoff values that Walker et al. (1999) established for all CTQ-SF subscales. These thresholds discard minimal and low levels of abuse and neglect to classify CT.

Table 21 displays restrictive cutoff values for all subscales, bringing the prevalence of sexual abuse to the forefront at 31%, revealing a change in viewpoint for analysis of the impact of specific types of CT in our research sample.

Table 21

Prevalence of Childhood Trauma in the Research Sample Using Cutoff Values by Walker et al.

(1999)

CTQ-SF Subscales	Absence*	Presence**
	<i>n</i> (%)	<i>n</i> (%)
Emotional Abuse	80 (77)	24 (23)
Physical Abuse	83 (80)	21 (20)
Sexual Abuse	72 (69)	32 (31)
Emotional Neglect	77 (74)	27 (26)
Physical Neglect	83 (80)	21 (20)

Note. *Absence = none, minimum and low levels for each category; **Presence = moderate and severe levels for each category. CTQ-SF = Childhood Trauma Questionnaire Short Form.

Emotional neglect moved from first place in the less restrictive cutoff value (Table 20) to second place within all subscales at 26%, almost 5% less than sexual abuse. Physical and emotional neglect percentages reached 20% at the bottom of all subscales. Emotional abuse took third place with 23%, almost half its percentage in the less restrictive cutoff values (Table 22).

Comparing the two normative cutoff values (Bernstein & Fink, 1998; Walker et al., 1999) shows the implications of accepting one or the other cutoff in our sample (Table 22).

In the less restrictive cutoff values, there is a risk of accepting levels of impact of abuse or neglect that may not be representative of traumatic experiences. In the more restrictive cutoff values, there is a risk of losing nuances of abuse and neglect that may be traumatic to more sensitive or vulnerable individuals, for instance.

Table 22

Prevalence Comparison Between Different Childhood Trauma Cutoff Values

CTQ-SF subscales	Research Sample Cutoff values by Bernstein & Fink (1998)		Research Sample Cutoff values by Walker et al. (1999)	
	Absence n (%)	Presence n (%)	Absence n (%)	Presence n (%)
Emotional Abuse	60 (58)	44 (42)	80 (77)	24 (23)
Physical Abuse	76 (73)	28 (27)	83 (80)	21 (20)
Sexual Abuse	60 (58)	44 (42)	72 (70)	32 (30)
Emotional Neglect	50 (48)	54 (52)	77 (74)	27 (26)
Physical Neglect	73 (70)	31 (30)	83 (80)	21 (20)

Note. CTQ-SF = childhood trauma questionnaire short form.

Although Witt et al. (2017) analyzed their study data based on restrictive cutoff values (Walker et al., 1999), the study supplied numbers and percentages for each subscale of CT in both threshold criteria by sex, which allowed the computation of percentages in the less restrictive cutoff values for women (Table 23). Using these less restrictive cutoff values, this research sample presents a significantly higher prevalence of CT in all subscales but for the physical neglect subscale.

The research sample shows a 30% prevalence of physical neglect, and Witt et al.'s community sample presents a 41% prevalence. The physical neglect subscale was the only subscale in which the community sample (Witt et al., 2017) showed a higher prevalence (11% more) than our research sample, the smallest difference between the two samples' subscales.

Table 23

Prevalence Comparison Between Research Sample's Childhood Trauma and Witt et al.'s (2017) Sample Cutoff Values by Bernstein and Fink (1998)

CTQ-SF Subscales	Research Sample	Female non-clinical sample N=1,339 Witt et al. (2017)
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	Absence* n (%)	Presence** n (%)	Absence* n (%)	Presence** n (%)
Emotional Abuse	60 (58)	44 (42)	1,053 (80)	271 (20)
Physical Abuse	76 (73)	28 (27)	1,165 (88)	165 (12)
Sexual Abuse	60 (58)	44 (42)	1,090 (82)	239 (18)
Emotional Neglect	50 (48)	54 (52)	809 (61)	520 (39)
Physical Neglect	73 (70)	31 (30)	789 (59)	543 (41)

Note. *Absence = none/minimum for each category; **Presence = low, moderate, and severe levels for each category. CTQ-SF = Childhood Trauma Questionnaire Short Form.

The physical neglect subscale has been reported as having internal consistency concerns, discussed in Chapter Three, section 3.3. *Instruments*. Those concerns refer to the content of the physical neglect subscale, which was highly associated with emotional neglect or abuse; and with cultural and social matters that do not imply inflicted (on purpose) neglect of a traumatic nature (Grassi-Oliveira et al., 2014), but circumstantial hardships imposed to all members of a family.

Taking this element into account, compared to Witt et al.'s (2017) community sample, the prevalence is higher in the research sample for emotional abuse (22% more); physical abuse (14% more); sexual abuse (24% more); and emotional neglect (13% more), leading to marked differences of more than 20% between the two samples concerning sexual and emotional abuse subscales.

In Table 24, another community sample (Iffland et al., 2013) is used for comparison with the research sample. However, both samples' cutoff values are shown using the cutoff values set by Walker et al. (1999). The fact that these cutoff values were established based on a female-only sample suited our investigation of similarly female-only participants diagnosed with FM with depressive symptoms.

Table 24

Prevalence Comparison Between Research Sample's Childhood Trauma and Iffland et al.'s (2013) Sample Using Cutoff Values by Walker et al. (1999)

CTQ-SF Subscales*	Research sample N = 104		Iffland et al., (2013) female sample n = 1,328	
	n	%	n	%
Emotional Abuse	24	23	145	11
Physical Abuse	21	20	152	12
Sexual Abuse	32	31	112	8
Emotional Neglect	27	26	177	13
Physical Neglect	21	20	630	48

Note. *Presence of childhood trauma = moderate and severe levels for each category. Iffland et al. (2013) N = 2,500 (female n = 1,328). CTQ-SF = Childhood Trauma Questionnaire Short Form.

The prevalence of CT in this research sample kept significantly higher percentages in four subscales of CT after restrictive criteria were used. Interestingly, the physical neglect prevalence was higher in the community sample (Iffland et al., 2013) than in our research sample, even with more restrictive cutoff values for both samples. In this case, there was a larger margin of 27% difference compared to only 11% (Table 23) between our research sample and Witt et al.'s, using the lower threshold. On all other subscales, the prevalence remained higher in our research sample. For emotional abuse, there was a 12% more prevalence rate; physical abuse, 9% more; sexual abuse, 22% more; and emotional neglect, 12% more in our research sample than in Iffland et al.'s. A comparison between Table 23 and Table 24 revealed that sexual abuse kept a high prevalence of

over 20% more in our research sample than in both community samples (using restrictive threshold criteria in Table 23 and less restrictive in Table 24).

Table 25 compares CT percentages (restrictive cutoff values) of this research sample, with Iffland et al.'s (2013) and Walker et al.'s (1999); the latter did not supply raw numbers for their sample, only percentages.

Table 25

Childhood Trauma Percentage in Female Samples Using Cutoff Values by Walker et al. (1999)

CTQ-SF Subscales	Research sample <i>N</i> = 104	Walker et al. (1999) <i>N</i> = 1,225	Iffland et al. (2013) Female <i>n</i> = 1,328
Emotional Abuse	23%	24%	11 %
Physical Abuse	20%	14%	12%
Sexual Abuse	31%	18%	8%
Emotional Neglect	26%	21%	13%
Physical Neglect	20%	12%	48%

Note. CTQ-SF = Childhood Trauma Questionnaire Short Form.

Walker et al.'s (1999) community sample was randomly drawn from English-speaking women aged 18 to 65, members of a group health cooperative in Washington State, the USA. Iffland et al.'s (2013) sample was drawn from the general German population aged 14 to 90 years (men and women), randomly selected from various areas of the country in 2010, with the help of an independent service for surveys, methods, and analyses located in Berlin, Germany (USUMA, *Unabhängiger Service für Umfragen, Methoden und Analysen*).

These studies are separated by roughly a decade and cultural differences, factors that might explain some of the prevalence differences found in these two community samples. Contrasting

our research sample with these two community samples reveals that the sexual abuse category in our research sample remains the highest difference in prevalence rates among the three samples.

The data in Table 26 indicate that the means of emotional neglect and emotional abuse were the highest levels of maltreatment reported among the 104 participants of our research sample.

Table 26

Mean and Standard Deviation for Single Childhood Trauma in the Research Sample (N = 104)

CTQ-SF Subscales	Mean	SD
Emotional Abuse	9.45	4.94
Physical Abuse	7.23	3.70
Sexual Abuse	7.48	4.15
Emotional Neglect	11.34	5.31
Physical Neglect	7.32	3.44

Note. CTQ-SF = Childhood Trauma Questionnaire Short Form; SD = standard deviation.

Table 27 presents a comparison between the mean and standard deviation of this research sample with Hernandez et al.'s (2012) clinical sample. Hernandez et al.'s (2012) sample included 185 inpatient and outpatient women, ages 18 to 65 years. This research used two studies in which one group of 44 participants met the criteria for Dysthymia, and another subsample of 141 patients responded to the CTQ-SF as part of a validation study of this instrument and its relationship to BPD. This later group of 141 patients had a more heterogeneous clinical profile; 75 patients were diagnosed with one or more personality disorders (borderline, $n = 32$; paranoid, $n = 5$; schizotypal, $n = 2$; narcissistic, $n = 1$; histrionic, $n = 10$; avoidant, $n = 9$; dependent, $n = 2$; obsessive-compulsive, $n = 9$; and unspecified, $n = 17$); 34 patients did not meet criteria for any personality

disorder but had other mental illness diagnoses (MDD or dysthymia, $n = 9$; anxiety disorder, $n = 5$; substance dependence disorder, $n = 5$; adjustment, $n = 12$; eating disorder, $n = 2$, and hypochondriasis, $n = 1$); the diagnoses for the remaining 32 patients (of the sample of 141 participants) were unknown.

Table 27 provided data to run a series of independent sample t -tests to decide whether the differences between the means of the samples were statistically significant. In this case, we hypothesized that the CTQ-SF scores of our research sample would be similar to or higher than the compared clinical sample. The hypotheses involved the assumption that values would be equal because they were clinical samples, or higher for our research sample due to the complexity of FM with depressive symptoms.

Table 27

Comparison of Mean and Standard Deviation of Single Childhood Trauma in the Research Sample ($N = 104$) and Hernandez et al.'s (2012) ($N = 185$)

CTQ-SF Subscales	Research Sample		Spanish Clinical Population (Hernandez et al., 2012)	
	Mean	SD	Mean	SD
Emotional Abuse	9.45	4.94	13.1	6.09
Physical Abuse	7.23	3.7	8.44	4.89
Sexual Abuse	7.48	4.15	9.08	5.76
Emotional Neglect	11.34	5.31	12.47	5.46
Physical Neglect	7.32	3.44	7.5	3.28

Note. CTQ-SF = Childhood Trauma Questionnaire Short Form; SD = standard deviation.

Table 28 shows the result of an independent samples *t*-test conducted to compare CT scores in all subscales.

Participants in the Hernandez et al.'s (2012) clinical sample ($M = 13.1$, $SD = 6.09$) scored significantly higher on the emotional abuse subscale than those in this research sample ($M = 9.45$, $SD = 4.94$), $t(287) = 5.221$, $p < .0001$. This does not support the hypothesis that the difference between samples would be zero or higher for this research sample. See Table 28 for the complete results of the *t*-test.

Table 28

Independent T-test for Childhood Trauma in the Research Sample (N = 104) and Hernandez et al.'s (2012) (N = 185)

	Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Difference	3.65	1.21	1.6	1.13	0.18
Standard error	0.699	0.551	0.642	0.663	0.409
95% CI	2.2740 to 5.0260	0.1246 to 2.2954	0.3361 to 2.8639	-0.1742 to 2.4342	-0.6253 to 0.9853
t-statistic	5.221	2.194	2.492	1.705	0.44
DF	287	287	287	287	287
Significance level	$p < .0001$	$p = .0290$	$p = .0133$	$p = .0892$	$p = .6603$

Note. A significance *p*-value and 95% CI of the difference is reported. CI = confidence interval; DF = degrees of freedom; *p* = probability.

For physical abuse scores between the two samples, participants from the Hernandez et al.'s (2012) sample ($M = 8.44$, $SD = 4.89$) scored significantly higher on the physical abuse subscale than those in our research sample ($M = 7.23$, $SD = 3.70$), $t(287) = 2.194$, $p = .0290$. This result does not support the hypothesis that the difference between samples would be zero or higher

for our research sample.

In continuation, regarding sexual abuse scores the Hernandez et al.'s (2012) sample ($M = 9.08$, $SD = 5.76$) scored significantly higher than those in this research sample ($M = 7.48$, $SD = 4.15$, ($M = 9.08$, $SD = 5.76$), $t(287) = 2.492$, $p = .0133$). In a similar direction to the two previous subscales (Tables 28 and 29), this does not support the hypothesis that the difference between samples would be zero or higher for this research sample.

The comparison of emotional neglect scores delivered no significant differences in scores between our research sample ($M = 11.34$, $SD = 5.31$) and Hernandez et al.'s sample ($M = 12.47$, $SD = 5.46$), $t(287) = 1.705$, $p = .0892$. This result does not support the hypothesis that the differences between the samples would be zero or higher for our sample.

Lastly, there was no significant difference in scores of physical neglect between our research sample ($M = 7.32$, $SD = 3.44$) and Hernandez et al.'s sample ($M = 7.5$, $SD = 3.28$), $t(287) = .44$, $p = .6603$. However, the difference was not equal to zero or higher for this sample, which does not support this hypothesis.

Summarizing the analyses of Hypothesis 1.1.1., the comparisons between these two clinical samples showed that Hernandez et al.'s (2012) sample had higher means and standard deviation than our research sample. The results for all five subscales shown in Table 28 did not support the acceptance of Hypothesis 1.1.1.

To test Hypothesis 1.1.2, Table 29 exhibits the prevalence of cumulative CT in the research sample according to both threshold criteria defined by Bernstein and Fink (1998) and Walker et al. (1999) and compares them to Walker et al.'s sample (1999).

Hypothesis 1.1.2: We expect that the sample of this study will have a higher prevalence

rate of cumulative CT than community samples.

Using the less restrictive criteria (Bernstein & Fink, 1998), the highest percentage of cumulative CT reflects those participants who experienced only a single type of CT (29%), followed by those who did not experience any CT (22%).

Table 29

Comparison Between the Research Sample's Cumulative Childhood Trauma and Walker et al.'s Sample (1999) Using Two Cutoffs

Number of CT Types	Research Sample (cutoff by Bernstein & Fink, 1998) <i>N</i> = 104		Research sample (cutoff by Walker et al., 1999) <i>N</i> = 104		Walker et al. (1999) <i>N</i> = 1,225	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
0	23	22	51	49	698	57
1	30	29	21	20	245	20
2	17	16	8	8	123	10
3	9	9	14	13	86	7
4	15	14	4	3.8	49	4
5	10	10	6	6	25	2

Next, 16% of this research sample experienced two types of CT, followed by 14% of participants who experienced four types of CT. Those who experienced three and five types of CT were below the 10% mark at 9% and 10%, respectively, and three types of CT were the lowest percentage.

Changing the threshold criteria to a restrictive cutoff value (Walker et al., 1999) provided an entirely different viewpoint on our research sample, with a large and highest percentage of participants without any experience of CT (49%), followed by a single type of CT for 20% of the sample.

In this restrictive criteria, the percentage of the four types of CT decreased substantially; in contrast, the three types of CT increased to 13% of the sample. Within the less restrictive criteria (Table 29), three types of CT were at 9% only. Next were those participants who experienced two types of CT (8%), five types (6%), and four types (4%), all below the 10% mark. The increased percentage of those who experienced three types of abuse might refer to the overlapping cutoff values for emotional and physical abuse and physical neglect subscales, which Walker et al. (1999) kept within the low to severe levels.

In Table 29, over half of Walker et al.'s (1999) sample had no experience of CT in childhood (57%), which is slightly higher than this research sample by an 8% margin, showing that there are more CT incidents in our research sample. Another 30% of the community sample had between one and two types of CT, which is also slightly higher than this research sample at 28% for both categories, thus, rejecting this hypothesis. This possibly indicates a lighter cumulative effect in the community sample as opposed to more intense cumulative levels of CT in our research sample. To support this idea, the sum of the percentages (23%) for categories three to five types of CT was higher in our research sample than the sum (13%) of Walker et al.'s (1999) sample by approximately 10%.

Unfortunately, other studies did not have available information about the effect of cumulative CT on their samples to compare to this research sample, or if they had, their sample did not have similar characteristics to our research sample, for example, the results of samples of mixed sex, which made it challenging to establish comparisons.

Next, Hypotheses 1.2.1 to 1.4.2 tested the impact of CT on presenting levels of depressive symptoms, pain, and functionality at baseline, based on participants' CTQ-SF scores. The justification for these hypotheses was based on literature findings about the association between

childhood adversity and adulthood dysfunctional health (mental and physical). In the case of our sample, CT was considered an adversity that could have a strong association with FM symptomatology, depressive symptoms, pain, and functionality levels.

Hypotheses 1.2.1 and 1.2.2 assumed that CT could impact our research sample, contributing to increased depressive symptoms. These hypotheses were tested by analyzing the correlation of the results of the CTQ-SF for single subscales and cumulative CT with baseline scores in the HADS-D scale of depressive symptoms.

Table 30 refers to Hypothesis 1.2.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline levels of depressive symptoms.

Table 30

Single Childhood Trauma and HADS-D Baseline Scores (N = 104)

		Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	HADS-D					
	Correlation Coefficient	-.075	.056	-.089	-.043	-.019
	Significance (1-tailed)	.224	.287	.184	.333	.424

Note. HADS-D = Hospital Anxiety and Depression Scale.

Spearman's correlations were conducted between single types of CT and HADS-D scores to test Hypothesis 1.2.1. HADS-D scores and emotional abuse ($r = -.075, p = .224$), physical abuse ($r = .056, p = .287$), sexual abuse ($r = -.089, p = .184$), emotional neglect ($r = -.043, p = .333$), and physical neglect ($r = -.019, p = .424$) showed no significant relationship. The results shown in Table 30 did not prove Hypothesis 1.2.1., i.e., a relationship between specific types of CT and levels of depressive symptoms was not established for this research sample.

Table 31 addresses whether the intensity of CT can be associated with depressive symptoms instead of specific types of CT. This is stated in Hypothesis 1.2.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline depressive symptoms.

Table 31

Cumulative Childhood Trauma and HADS Baseline Scores (N = 104)

		5 Types	3 Types	Presence/Absence	
Spearman's rho	HADS-D	Correlation Coefficient	-.057	-.048	.087
		Significance (1-tailed)	.284	.315	.191

Note. HADS-D = Hospital Anxiety and Depression Scale.

To test Hypothesis 1.2.2, Spearman's correlations were conducted between cumulative CT and HADS-D depressive symptoms scores. There was no significant relationship between HADS-D scores and a cumulative five types of CT ($r = -.057, p = .284$), a cumulative three types of CT ($r = -.048, p = .315$), or the presence/absence of CT ($r = .087, p = .191$). Results shown in Table 31 indicated that no significant relationship was found to establish that the intensity of CT impacted levels of depressive symptoms in our research sample at baseline assessment.

Hypotheses 1.3.1 and 1.3.2 assume that CT could impact perceived pain levels in this research sample, causing a heightened baseline level for pain thresholds. These hypotheses were tested by analyzing the correlation of CTQ-SF scores for single subscales and cumulative CT, with baseline scores obtained with the VAS.

Table 32 addresses the correlation for single subscales, as stated in Hypothesis 1.3.1: We expect that the sample of this study will have single or more types of CT positively correlated with baseline pain levels.

Table 32

Single Childhood Trauma and VAS Baseline Scores (N = 104)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	VAS (0-100)	Correlation Coefficient	-.097	.065	.039	.117	-.016
		Significance (1-tailed)	.164	.256	.346	.118	.437

Note. VAS = Visual Analog Scale.

The Spearman's correlations conducted between the five subscales of CT and VAS delivered no significant relationship found between these variables, VAS scores and emotional abuse ($r = -.097, p = .164$), physical abuse ($r = .065, p = .256$), or sexual abuse ($r = .039, p = .346$). Additionally, no significant relationship was found between VAS scores and emotional neglect ($r = .117, p = .118$) or physical neglect ($r = -.016, p = .437$). The findings negated Hypothesis 1.3.1. assumptions of a relationship between VAS scores and any CT in our research sample. Table 32 shows the complete correlation results.

Table 33 addresses Hypothesis 1.3.2: We expect that the sample of this study will have cumulative CT positively correlated with baseline pain levels.

To test Hypothesis 1.3.2, Spearman's correlations were conducted between cumulative CT and VAS scores.

Table 33*Cumulative Childhood Trauma and VAS Baseline Scores (N = 104)*

		5 Types	3 Types	Presence/Absence	
Spearman's rho	VAS	Correlation Coefficient	.048	.091	.149
		Significance (1-tailed)	.314	.178	.065

Note. VAS = Visual Analog Scale.

There was no significant relationship between VAS scores and a cumulative five types of CT ($r = .048, p = .314$), a cumulative three types of CT ($r = .091, p = .178$), or the presence/absence of CT ($r = .149, p = .065$). The findings do not support Hypothesis 1.3.2. or give any evidence of an influence of the intensity of CT on pain levels at baseline assessment. These results also contradicted the literature about the association of a history of CT to low thresholds for pain in adulthood. The complete correlation results are seen in Table 33.

Next, Hypotheses 1.4.1 and 1.4.2 tested whether levels of functionality in FM had a negative correlation with CT, in which the greater the CT levels, the lower the functionality levels. These hypotheses were tested by analyzing the correlation of CTQ-SF scores for single subscales and cumulative CT, with baseline scores obtained with the FIQ.

Table 34 depicts the results for Hypothesis 1.4.1: We expect that the sample of this study will have single or more types of CT negatively correlated with baseline levels of functionality.

One participant did not complete the initial FIQ assessment ($N = 103$).

Table 34*Single Childhood Trauma and FIQ Baseline Scores (N = 103)*

		Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	FIQ					
	Correlation Coefficient	-.213*	.042	-.080	.004	-.015
	Significance (1-tailed)	.015	.335	.211	.484	.440

Note. *Correlation is significant at the .05 level (1-tailed). FIQ = Fibromyalgia Impact Questionnaire.

Spearman's correlations were conducted between the five subscales of CT and FIQ, and a small-sized correlation was found between FIQ scores and emotional abuse ($r = -.213^*$, $p = .015$). After applying the Bonferroni adjustment for multiple comparisons to the alpha of this correlation ($\alpha < .05$), which gave an adjusted $\alpha < .010$, this result did not live, indicating a tendency at best rather than evidence. No other correlation was found between FIQ scores and any other subscales of CT. Results were physical abuse ($r = .042$, $p = .335$), sexual abuse ($r = -.080$, $p = .211$), emotional neglect ($r = .004$, $p = .484$), and physical neglect ($r = -.015$, $p = .440$).

Table 35 describes Hypothesis 1.4.2: We expect that the sample of this study will have cumulative CT negatively correlated with baseline levels of functionality.

Table 35*Cumulative Childhood Trauma and FIQ Baseline Scores (N = 103)*

		5 Types	3 Types	Presence/Absence	
Spearman's rho	FIQ	Correlation Coefficient	-.089	-.024	.033
		Significance (1-tailed)	.185	.405	.372

Note. FIQ = Fibromyalgia Impact Questionnaire.

After conducting Spearman's correlations between cumulative CT and FIQ scores, the findings did not support Hypothesis 1.4.2. There was no significant relationship between FIQ scores and a cumulative five types of CT ($r = -.089, p = .185$), a cumulative three types of CT ($r = -.024, p = .405$), or the presence/absence CT ($r = .033, p = .372$). Table 35 shows the complete correlation results that refuted the assumption of an impact of the intensity of CT on levels of FM functionality at baseline assessment.

The next series of hypotheses (1.5.1 to 1.7.2) concentrated on the relationship between CT and measures obtained with the RGT to assess the participants' indexes of self-construction and cognitive structure (IDs and polarization). These hypotheses were formulated based on the findings of earlier studies by the team of researchers conducting this research project (Paz et al., 2020). In previous studies, the role and involvement of polarization and IDs (cognitive conflicts) in several physical and mental health problems had been established (Aguilera et al., 2019; Dada et al., 2012; Feixas et al., 2000, 2009, 2010; Montesano et al., 2015). In addition, these authors put forward the association of FM and depressive symptoms with self-identity issues and cognitive conflicts (Compañ et al., 2011); and the impact of CT on constructivist therapy outcomes with FM participants (Aguilera et al., 2018). Outside the specific work of this team of researchers, it is firmly recognized that FM patients display several cognitive dysfunctions, conflicts, and impairments (Galvez-Sánchez et al., 2018), which confirms the demand for studies that can

advance the development of treatments for the specific needs of this population. These hypotheses were tested with Spearman's correlation tests.

Hypotheses 1.5.1 and 1.5.2 predicted that the discrepancy indexes of construction of "self" at baseline would positively correlate with CT; the greater the levels of CT, the greater the discrepancy indexes of construction of self. These hypotheses were tested by analyzing the correlation of the results of the CTQ-SF for single subscales and cumulative CT with baseline scores of the discrepancy indexes of self-construction obtained with the RGT.

Table 36 refers to Hypothesis 1.5.1: We expect that the sample of this study will have single or more types of CT positively correlated with high discrepancies in self-construction indexes ("self" and "ideal self", "self" and "others", and "ideal self" and "others" discrepancies) at baseline assessment.

Table 36

Single Childhood Trauma and Baseline Indexes of Self-construction (N = 102)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Index of Self-Ideal Self Discrepancy	Correlation Coefficient	-.058	.086	-.088	.045	.098
		Significance (1-tailed)	.282	.194	.189	.327	.162
	Index of Self-Others Discrepancy	Correlation Coefficient	-.092	.111	-.090	.030	.030
		Significance (1-tailed)	.179	.134	.184	.383	.381
	Index of Ideal Self-Others Discrepancy	Correlation Coefficient	-.011	-.094	-.084	-.104	-.039
		Significance (1-tailed)	.457	.175	.200	.149	.348

Following the performance of Spearman's correlations between single types of CT and the discrepancy indexes self-construction, the findings did not support Hypothesis 1.5.1. no significant

correlations were found between emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect and the discrepancy indexes (all p -values $> .05$).

Table 36 displays the complete correlation results, which suggested that none of the types of CT had an impact on indexes of self-construction at baseline assessment. Although CT has been associated with self-esteem and perceived social acceptance, our research sample did not validate this relationship.

Next, Hypothesis 1.5.2 (Table 37) assumes: We expect that the sample of this study will have cumulative CT positively correlated with high discrepancies in self-construction indexes (“self” and “ideal self”, “self” and “others”, and “ideal self” and “others” discrepancies) at baseline assessment.

Table 37

Cumulative Childhood Trauma and Baseline Indexes of Self-construction (N = 102)

			5 Types	3 Types	Presence/Absence
Spearman's rho	Index of Self-Ideal Self Discrepancy	Correlation Coefficient	-.006	.035	.107
		Significance (1-tailed)	.476	.363	.143
	Index of Self-Others Discrepancy	Correlation Coefficient	.003	.042	.158
		Significance (1-tailed)	.486	.337	.057
	Index of Ideal Self-Others Discrepancy	Correlation Coefficient	-.156	-.139	-.081
		Significance (1-tailed)	.058	.082	.208

Again, there were no significant correlations between cumulative CT and the discrepancy indexes of self-construction (all p -values $> .05$) after Hypothesis 1.5.2. was tested using Spearman's correlations.

This hypothesis was not supported by the findings, which indicated that the intensity of CT did not impact indexes of self-construction in our research sample at baseline, as shown in the complete correlation results in Table 37. These results were also unexpected, as the intensity of CT might be associated with chronic abuse and with a pervasive influence on one's self-concept and social adjustment.

Next, Hypotheses 1.6.1 and 1.6.2 predicted that a high number of IDs at baseline would positively correlate with CT; the greater the levels of CT, the greater the number of IDs. These hypotheses were tested by analyzing the correlation of the results of the CTQ-SF for single subscales and cumulative CT, with the number of IDs obtained with the RGT at baseline.

Table 38 addresses Hypothesis 1.6.1: We expect that the sample of this study will have single or more types of CT positively correlated with a high baseline number of IDs.

To test Hypothesis 1.6.1, Spearman's correlations were conducted between single types of CT and the number of IDs.

There was no significant relationship found between the number of IDs and emotional abuse ($r = .161, p = .053$), physical abuse ($r = .116, p = .122$), or sexual abuse ($r = .109, p = .138$).

Table 38

Single Childhood Trauma and Baseline Number of IDs (N = 102)

		Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Number of IDs (.35)	.161	.116	.109	.057	.162
	Correlation Coefficient Significance (1-tailed)	.053	.122	.138	.283	.052

Note. IDs = Implicative Dilemmas.

Additionally, there was no significant relationship found between the number of IDs and emotional neglect ($r = .057, p = .283$), or physical neglect ($r = .162, p = .052$). The findings did not support Hypothesis 1.6.1., as shown in the complete correlation results (Table 38).

Table 39 addresses Hypothesis 1.6.2: We expect that the sample of this study will have cumulative CT positively correlated with a high baseline number of IDs.

Table 39

Cumulative Childhood Trauma and Baseline Number of IDs (N = 102)

		5 Types	3 Types	Presence/Absence
Spearman's rho	Number of IDs (.35)	Correlation Coefficient .079	.003	-.052
		Significance (1-tailed) .215	.487	.301

Note. IDs = Implicative Dilemmas.

To test Hypothesis 1.6.2, Spearman's correlations were conducted between cumulative CT and the number of IDs.

There was no significant relationship between the number of IDs and a cumulative five types of CT ($r = .079, p = .215$), a cumulative three types of CT ($r = .003, p = .487$), or the presence/absence of CT ($r = -.052, p = .301$).

Hypothesis 1.6.2. was not supported by these findings, suggesting a missing element that might have shielded the impact of the intensity of CT on the number of cognitive conflicts. See Table 39 for the complete correlation results.

Hypotheses 1.7.1 and 1.7.2 predicted that a high polarization index at baseline would be positively correlated with CT; the greater the levels of CT, the greater the polarization index. These

hypotheses were tested by analyzing the correlation of the results of the CTQ-SF for single subscales and cumulative CT with the polarization index obtained with the RGT at baseline.

Table 40 addresses Hypothesis 1.7.1: We expect that the sample of this study will have single or more types of CT positively correlated with a baseline high polarization index.

Table 40

Single Childhood Trauma and Baseline Index of Polarization (N = 102)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Index of Polarization	Correlation Coefficient	-.156	-.063	-.132	-.089	-.007
		Significance (1-tailed)	.059	.266	.093	.187	.471

To test Hypothesis 1.7.1, Spearman's correlations were conducted between CT types and the polarization index.

There was no significant relationship found between the polarization index and emotional abuse ($r = -.156, p = .059$), physical abuse ($r = -.063, p = .266$), or sexual abuse ($r = -.132, p = .093$).

Additionally, there was no significant relationship found between the polarization index and emotional neglect ($r = -.089, p = .187$), or physical neglect ($r = -.007, p = .471$). The findings did not support Hypothesis 1.7.1., as shown in the complete correlation results (Table 40).

Table 41 addresses Hypothesis 1.7.2: We expect that the sample of this study will have cumulative CT positively correlated with a baseline high polarization index.

Table 41*Cumulative Childhood Trauma and Index of Polarization at Baseline (N = 102)*

			5 Types	3 Types	Presence/Absence
Spearman's rho	Index of Polarization	Correlation	-.120	-.105	-.099
		Significance (1-tailed)	.115	.148	.162

Hypothesis 1.7.2 was tested with Spearman's correlations between cumulative CT and polarization index. There was no significant relationship between polarization index and a cumulative five types of CT ($r = -.120, p = .115$), a cumulative three types of CT ($r = -.105, p = .148$), or the presence/absence of CT ($r = -.099, p = .162$).

Hypothesis 1.7.2. was not supported by these findings. Table 41 shows the complete correlation results.

All hypotheses in Study 1 were addressed, and a few findings showed a relationship between CT and some variables. Results Hypotheses 1.2.1 to 1.7.2 delivered one small size effect between emotional abuse and FIQ scores (Hypothesis 1.4.1.), indicating a tendency of the sample. Hypotheses 1.1.1 and 1.2.1 were not fully met, although some single subscales and some cumulative CT showed a higher prevalence than those of the compared samples. Chapter 5 will discuss these results in greater detail and explore the possible rationale for these unmet assumptions, including weaknesses of Study 1.

Subsequently, the results of Study 2 are presented according to the order of its hypotheses.

4.3. Study 2 Results

For the most part, the statistical analyses for Study 2 were based on comparing data from

pre and posttreatment for both sub-samples treated with CBT or PCT. Specifically, it investigated changes from baseline to posttreatment scores for symptoms assessed with HADS-D, VAS, FIQ, and the RGT (indexes of construction of self, number of IDs, and polarization) instruments. The indexes of change were obtained by subtracting the results from HADS-D, VAS, FIQ, and the RGT assessment scores posttreatment from the baseline assessment scores and generating a new change index variable in the database. Those change indexes were compared with CTQ-SF scores taken at baseline assessment, using Spearman's correlations to test hypotheses 2.1.1 to 2.6.2 of this study. It also explored the correlation of CTQ-SF baseline scores with the number of dropouts using chi-squared tests to examine hypotheses 2.7.1. and 2.7.2. The rationale for testing these hypotheses from Study 2 rests on the existing demand to discover specific triggers of illnesses (mental and physical), the urgency of assessing the adequacy of protocols to treat symptoms when they are interrelated with psychological aspects and implement changes in protocol that can better address symptoms that did not improve.

Hypotheses 2.1.1 and 2.1.2 predicted that the change index of depressive symptoms would have a negative correlation with CT; the greater the levels of CT, the lower the index of positive change. These hypotheses were tested by examining the correlation of the index of change of depressive symptoms with CTQ-SF baseline scores for single subscales and cumulative CT.

Table 42 refers to Hypothesis 2.1.1: We expect women with single or more types of CT will present a low degree of reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).

To test Hypothesis 2.1.1, Spearman's correlations were conducted between the change index of depressive symptoms and the types of CT.

Table 42

Single Childhood Trauma and Posttreatment Change Index of Depressive Symptoms (N = 74)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of Depressive Symptoms HADS-D	Correlation Coefficient	-.063	-.017	.070	-.007	-.041
		Significance (1-tailed)	.297	.442	.276	.478	.365

Note. HADS-D = Hospital Anxiety and Depression Scale.

There were no significant relationships found between the change in depressive symptoms and emotional abuse ($r = -.063, p = .297$), physical abuse ($r = -.017, p = .442$), or sexual abuse ($r = .070, p = .276$). In addition, no significant correlations were found between neglect (emotional and physical) and the change index of depressive symptoms, see Table 42 for these results. Thus, Hypothesis 2.1.1 was rejected.

Table 43 addresses Hypothesis 2.1.2: We expect the cumulative CT to be associated with a low degree of reduction in depressive symptoms at the end of therapy (for combined PCT and CBT samples).

Table 43 displays the complete correlation results.

Table 43

Cumulative Childhood Trauma and Posttreatment Change Index of Depressive Symptoms (N = 74)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of Depressive Symptoms HADS-D	Correlation Coefficient	.040	.026	.154
		Significance (1-tailed)	.367	.413	.095

Note. HADS-D = Hospital Anxiety and Depression Scale.

Spearman's correlations were conducted between the change index of depressive symptoms and cumulative CT. There were no significant relationships between the change in depressive symptoms and five types of CT ($r = .040, p = .367$), three types of CT ($r = .026, p = .413$), or presence/absence of CT ($r = .154, p = .095$). These findings did not support Hypothesis 2.1.2., which postulated a negative association between the cumulative CT and positive change in the index of depressive symptoms.

Hypotheses 2.2.1 and 2.2.2 predicted that the index of change for pain levels would have a negative correlation with CT; the greater the levels of CT, the low the index of change from baseline to posttreatment assessment scores. These hypotheses were tested by evaluating the correlation between the change index of pain levels and CTQ-SF baseline scores for single subscales and cumulative CT.

Table 44 describes the results for Hypothesis 2.2.1: We expect that women with single or more types of CT will present a low degree of reduction in pain levels at the end of therapy (for combined PCT and CBT samples).

Table 44

Single Childhood Trauma and Posttreatment Change Index of Pain Levels (N = 73)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of	Correlation Coefficient	.201*	.059	.223*	.039	.121
	Levels of Pain VAS	Significance (1-tailed)	.044	.311	.024	.373	.154

Note. *Correlation is significant at the .05 level (1-tailed). VAS = Visual Analog Scale.

Hypotheses 2.2.1. was tested with Spearman's correlations conducted between the five subscales of CT and the change index of pain levels (VAS). These tests delivered a medium- and a small-sized positive correlation between the change index of pain levels and emotional abuse ($r = .201, p = .044$) and sexual abuse ($r = .223, p = .024$). After the alpha ($\alpha < .010$) was adjusted with the Bonferroni correction for multiple comparisons, these correlations did not sustain significance. These results show a tendency of the sample data rather than evidence that a history of childhood emotional and sexual abuse is positively correlated with the change index of pain levels, i.e., participants who had a history of childhood emotional and sexual abuse showed improvement in pain levels after therapy. Hypothesis 2.2.1. predicted that there would be a negative association between these two variables. The nature of this positive correlation needs to be explored in future studies to provide a better understanding of this tendency of the FM sample with depressive symptoms. This result will be discussed in the next chapter of this dissertation.

In addition, there was no significant relationship found between the change index of pre and posttreatment scores for VAS and physical abuse ($r = .059, p = .311$), nor was any significant relationship between the change index of pain levels and emotional neglect ($r = .039, p = .373$), or

physical neglect ($r = .121, p = .154$). These findings again disproved Hypothesis 2.2.1. Table 44 shows the complete correlation results.

Table 45 delivers the results for Hypothesis 2.2.2: We expect the cumulative CT to be associated with a low degree of reduction in pain levels at the end of therapy (for combined PCT and CBT samples).

Table 45

Cumulative Childhood Trauma and Posttreatment Change Index of Pain Levels (N = 73)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of Levels of Pain VAS	Correlation Coefficient	.122	.031	-.004
		Significance (1-tailed)	.151	.396	.485

Note. VAS = Visual Analog Scale.

There were no significant relationships between VAS scores and a cumulative five types of CT ($r = .122, p = .151$), a cumulative three types of CT ($r = .031, p = .396$), or the presence/absence of CT ($r = -.004, p = .485$). The results of Spearman's correlations tests conducted between cumulative CT and change index of pain levels delivered no support for Hypothesis 2.2.2., as shown in Table 45.

Hypotheses 2.3.1 and 2.3.2 predicted that the index of change for functionality levels would positively correlate with CT; the greater the levels of CT, the greater the change index of negative functionality levels, indicating an increase in symptoms. These hypotheses were tested by examining the correlation between the change index of functionality levels and CTQ-SF baseline

scores for single subscales of CT and the cumulative CT.

Table 46 presents the results for Hypothesis 2.3.1: We expect that women with single or more types of CT will present a low degree of improvement in levels of functionality at the end of therapy (for combined PCT and CBT samples).

Table 46

Single Childhood Trauma and Posttreatment Change Index of Functionality Levels (N = 71)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of Levels of Functionality	Correlation Coefficient	-.053	-.132	.096	-.013	.039
	FIQ	Significance (1-tailed)	.329	.137	.213	.457	.373

Note. FIQ = Fibromyalgia Impact Questionnaire.

Spearman's correlations tests were conducted between the five subscales of CT and the change index of levels of functionality (FIQ) to investigate any correlations.

The complete correlation results in Table 46 delivered no significant relationship between change index of functionality levels (FIQ scores). Results for emotional abuse ($r = -.053, p = .329$), physical abuse ($r = -.132, p = .137$), or sexual abuse ($r = .096, p = .213$) were not statistically significant, nor was any relationship found between change index of FIQ scores and emotional neglect ($r = -.013, p = .457$), or physical neglect ($r = .039, p = .373$). Thus, the results of Spearman's correlations tests conducted between the five subscales of CT and the change index of levels of functionality (FIQ) did not support Hypothesis 2.3.1.

Table 47 displays the results for Hypothesis 2.3.2: We expect that the cumulative CT will be associated with a low degree of improvement in levels of functionality at the end of therapy

(for combined PCT and CBT samples).

Table 47

Cumulative Childhood Trauma and Posttreatment Change Index of Functionality Levels (N = 71)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of Levels of Functionality FIQ	Correlation Coefficient	-.035	-.026	-.070
		Significance (1-tailed)	.384	.415	.281

Note. FIQ = Fibromyalgia Impact Questionnaire

To test Hypothesis 2.3.2, Spearman's correlations were conducted between cumulative CT and FIQ scores. No significant relationship was found between FIQ scores and a cumulative five types of CT ($r = -.035$, $p = .384$), a cumulative three types of CT ($r = -.026$, $p = .415$), or the presence/absence of CT ($r = -.070$, $p = .281$). These findings disproved Hypothesis 2.3.2. See Table 47 for the complete correlation results.

Next, Hypotheses 2.4.1 and 2.4.2 predicted that the change index of self-construction discrepancies would negatively correlate with CT; the greater the levels of CT, the lower the improvement at discharge from assessment scores at baseline. These hypotheses were tested by analyzing the correlation between the change index of self-construction discrepancies and the CTQ-SF baseline scores for single subscales and cumulative CT.

Table 48 addresses the results for Hypothesis 2.4.1: We expect that women with single or more types of CT will present a low degree of reduction in self-construction discrepancies ("self"

and “ideal self,” “self” and “others,” “ideal self” and “others”) at the end of therapy (for combined PCT and CBT samples).

Table 48

Single Childhood Trauma and Posttreatment Change Indexes of Self-construction (N = 71)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of Self-Ideal Self Discrepancy	Correlation Coefficient	-.217*	.016	-.039	.075	.076
		Significance (1-tailed)	.034	.449	.373	.266	.265
	Change Index of Self-Others Discrepancy	Correlation Coefficient	-.188	.018	.027	.110	.084
		Significance (1-tailed)	.059	.440	.411	.180	.244
	Change Index of Ideal Self-Others Discrepancy	Correlation Coefficient	-.150	-.138	-.167	-.274*	-.080
		Significance (1-tailed)	.106	.125	.082	.010	.253

Note. *Correlation is significant at the .05 level (1-tailed).

Spearman’s correlation tests (Table 48) conducted between single types of CT and self-construction indexes delivered a medium and a small-sized negative correlation between the change index of the “self” and “ideal self” discrepancy and subscale of emotional abuse ($r = -.217$, $p = .034$) and between change index of the “ideal self” and “others” discrepancy and subscale of emotional neglect ($r = -.274$, $p = .010$). When we applied the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons, these results did not sustain statistical significance. Rather than evidence, these results should be considered indicators of a tendency of the sample data. These results are discussed in the next section of this dissertation, considering them conservatively.

No other significant correlations were found between single subscales of abuse and neglect and change index of self-construction discrepancies (all p -values $> .05$).

Table 49 presents the results for Hypothesis 2.4.2: We expect the cumulative CT to be associated with a low degree of reduction in self- construction discrepancies (“self” and “ideal self,” “self” and “others,” “ideal self” and “others”) at the end of therapy (for combined PCT and CBT samples).

Table 49

Cumulative Childhood Trauma and Posttreatment Change Indexes of Self-construction (N = 71)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of Self- Ideal Self Discrepancy	Correlation Coefficient Significance (1-tailed)	.077	.158	.153
	Change Index of Self-Others Discrepancy	Correlation Coefficient Significance (1-tailed)	.262	.095	.102
	Change Index of Self-Others Discrepancy	Correlation Coefficient Significance (1-tailed)	.083	.141	.109
	Change Index of Ideal Self- Others Discrepancy	Correlation Coefficient Significance (1-tailed)	.245	.120	.183
	Change Index of Ideal Self- Others Discrepancy	Correlation Coefficient Significance (1-tailed)	-.296**	-.297**	-.218*
	Change Index of Ideal Self- Others Discrepancy	Correlation Coefficient Significance (1-tailed)	.006	.006	.034

Note. **Correlation is significant at the .01 level (1-tailed). *Correlation is significant at the .05 level (1-tailed).

Spearman's correlations were conducted between the change indexes of self-construction and cumulative CT (Table 49).

There was a medium-sized correlation ($p < .05$) between the change index of “ideal self” and “others” and the presence/absence of CT ($r = -.218, p = .034$); however, when the alpha was adjusted with the Bonferroni correction (adjusted $\alpha < .0166$) for multiple comparisons, this result did not live. Rather than evidence, this result should be considered indicative of a tendency of the sample data.

There were two statistically significant (negative) correlations ($p < .010$) between the change index of discrepancy of the “ideal self” and “others” and five ($r = -.296, p = .006$) and three ($r = -.297, p = .006$) types of CT. These two findings remained statistically significant after applying the Bonferroni correction (adjusted $\alpha < .0166$) for multiple comparisons. These findings confirm Hypothesis 2.4.2 and will be discussed in the next chapter. No other change index of self-construction compared with cumulative CT delivered any results.

The next Hypotheses, 2.5.1 and 2.5.2, predicted that the change index of the number of IDs would have a negative correlation with CT; the greater the levels of CT, the low the index of change from assessment scores at baseline and discharge. These hypotheses were tested by analyzing the correlation of the change index of the number of IDs and CTQ-SF baseline scores for single subscales and cumulative CT.

Table 50 displays the results for Hypothesis 2.5.1: We expect that women with single or more types of CT will present a low degree of reduction in the number of IDs at the end of therapy (for combined PCT and CBT samples).

Table 50

Single Childhood Trauma and Posttreatment Change Index of Number of IDs (N = 71)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of Number of IDs	Correlation Coefficient	.069	.114	-.010	.221*	.413**
		Significance (1-tailed)	.282	.171	.466	.032	<.001

Note. **Correlation is significant at the .01 level (1-tailed). *Correlation is significant at the .05 level (1-tailed). IDs = Implicative Dilemmas.

Spearman's correlation tests conducted between the change index of the number of IDs and the types of CT delivered a statistically significant (positive) correlation between the change index of the number of IDs and physical neglect ($r = .413, p < .001$), indicating that a history of childhood physical neglect was related to a decrease in the number of IDs. This finding remained statistically significant after the alpha was adjusted with the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons.

In addition, emotional neglect had a medium sized (positive) correlation with the change index of the number of IDs ($r = .221, p = .032$); however, after the alpha was adjusted with the Bonferroni correction (adjusted $\alpha < .0166$) for multiple comparisons, this result did not live. Rather than evidence, this result should be considered indicative of a tendency of the sample data. These results rejected Hypothesis 2.5.1., which predicted that there would be a negative association between these variables. This result will be discussed in the next chapter of this dissertation.

Table 51 refers to the results for Hypothesis 2.5.2: We expect the cumulative CT to be associated with a low degree of reduction in the number of IDs at the end of therapy (for combined

PCT and CBT samples).

Table 51

Cumulative Childhood Trauma and Posttreatment Change Index of Number of IDs (N = 71)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of	Correlation Coefficient	.125	.079	-.056
	Number of IDs	Significance (1-tailed)	.149	.255	.322

Note. IDs = Implicative Dilemmas.

The results of the Spearman's correlation (Table 51) conducted between cumulative CT and the number of IDs delivered no significant relationships between the number of IDs and having suffered five types of CT ($r = .125$, $p = .149$), three types of CT ($r = .079$, $p = .255$), or the presence/absence of CT ($r = -.056$, $p = .322$). Based on these findings, Hypothesis 2.5.2. was disproved.

Table 52 refers to the results for Hypothesis 2.6.1: We expect that women with single or more types of CT will present a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).

Table 52

Single Childhood Trauma and Posttreatment Change Index of Polarization (N = 71)

			Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect
Spearman's rho	Change Index of	Correlation Coefficient	-.150	-.079	-.147	-.078	-.059
	Polarization	Significance (1-tailed)	.106	.256	.111	.259	.313

The complete correlation results shown in Table 52 delivered no significant relationship between the change index of polarization and emotional abuse ($r = -.150, p = .106$), physical abuse ($r = -.079, p = .256$), or sexual abuse ($r = -.147, p = .111$), nor was any significant relationship found between change index of polarization and emotional neglect ($r = -.078, p = .259$), or physical neglect ($r = -.059, p = .313$). Thus, the results of Spearman's correlation tests conducted between the five subscales of CT and the change index of polarization did not support Hypothesis 2.6.1.

Table 53 refers to the findings for Hypothesis 2.6.2: We expect the cumulative CT to be associated with a low degree of reduction in the polarization index at the end of therapy (for combined PCT and CBT samples).

Table 53

Cumulative Types of Childhood Trauma and Posttreatment Change Index of Polarization (N = 71)

			5 Types	3 Types	Presence/ Absence
Spearman's rho	Change Index of Polarization	Correlation Coefficient	-.148	-.122	-.128
		Significance (1-tailed)	.108	.155	.144

To test Hypothesis 2.6.2, Spearman's correlations were conducted between cumulative CT and change index of polarization.

No significant relationship was found between a cumulative five types of CT and change index of polarization ($r = -.148, p = .108$), a cumulative three types of CT ($r = -.122, p = .155$), or the presence/absence of CT ($r = -.128, p = .144$). These findings disproved Hypothesis 2.6.2; refer to Table 53 for the complete correlation results.

The last hypotheses of Study 2, Hypothesis 2.7.1 and 2.7.2, predicted that there would be a relationship between the number of participants who abandoned the treatment and CT. These hypotheses were tested using chi-squared tests to analyze the relationship between the number of dropouts and CTQ-SF baseline scores for single subscales of CT and the cumulative CT. The specific rationale for these hypotheses was that a history of CT could add emotional vulnerability and consequently make it more challenging to continue therapy, as sad memories, unresolved pain, and sorrow could reappear. Alternatively, therapy could be seen as an opportunity to address these same problems by those participants who felt psychologically ready to face them. However, as described below, none of the results achieved statistical significance.

Tables 54 and 55 refer to Hypothesis 2.7.1: We expect women with single or more types of CT will be more likely to prematurely terminate their psychological treatments (for combined PCT and CBT samples) than those without a history of CT.

Table 54

Cross Tabulation of Number of Dropouts (N = 89)

CT Subscales		Dropped Out				Total	
		Yes		No		<i>n</i>	%
		<i>n</i>	%	<i>n</i>	%		
Emotional abuse	No	10	77	61	80	71	80
	Yes	3	23	15	20	18	20
Physical abuse	No	10	77	60	79	70	79
	Yes	3	23	16	21	19	21
Sexual abuse	No	9	69	52	68	61	68.5
	Yes	4	30	24	32	28	31.5
Emotional neglect	No	8	61.5	55	72	63	71
	Yes	5	38.5	21	28	26	29
Physical neglect	No	10	77	59	78	69	77.5
	Yes	3	23	17	22	20	22.5

Table 54 represents the cross-tabulation of patients, who discontinued treatment at any point, and each subscale of CT.

Table 55 shows the results of the Chi-square test to ascertain whether any of the subscales of CT affected the ability to continue therapy. The chi-squared was conducted between all subscales of CT and the number of participants who dropped out of treatment.

Table 55

Chi-Square Tests of Childhood Trauma and Dropouts Relationship (N = 89)

		Value	DF	Asymptotic Significance (2-sided)	Exact Significance (1-sided)
Emotional abuse	Pearson Chi-Square	.077 ^a	1	.782	.391
The minimum expected count is 2.63.					
Physical abuse	Pearson Chi-Square	.027 ^a	1	.869	.435
The minimum expected count is 2.78.					
Sexual abuse	Pearson Chi-Square	.003 ^a	1	.954	.477
The minimum expected count is 4.09.					
Emotional neglect	Pearson Chi-Square	.630 ^a	1	.427	.214
The minimum expected count is 3.80.					
Physical neglect	Pearson Chi-Square	.003 ^a	1	.955	.478
The minimum expected count is 2.92.					

Note. DF = degree of freedom.

The results of the chi-squared tests shown in Table 55 for all the subscales of CT refuted Hypothesis 2.7.1. The results were insignificant, indicating that emotional abuse and dropout were unrelated, $\chi^2(1) = .077$, $p = .782$ (2-sided), and $p = .391$ (1-sided).

For physical abuse and dropout, the chi-squared test showed these variables were unrelated, $\chi^2(1) = .027, p = .869$ (2-sided) and $p = .435$ (1-sided). Similarly, the chi-squared test results were insignificant for sexual abuse and dropout, $\chi^2(1) = .003, p = .954$ (2-sided), and $p = .477$ (1-sided), which demonstrated no relationship between these variables.

For emotional neglect and dropout choices, the chi-squared tests showed no evidence of a relationship, $\chi^2(1) = .630, p = .427$ (2-sided) and $p = .214$ (1-sided); and lastly, the chi-squared test results were insignificant for physical neglect and dropout, $\chi^2(1) = .003, p = .955$ (2-sided) and $p = .478$ (1-sided).

Next, Table 56 and Table 57 refer to the last hypothesis of Study 2, Hypothesis 2.7.2: We expect the cumulative CT to positively correlate with the number of women who prematurely drop out of their psychological treatments (for combined PCT and CBT samples).

Table 56

Cross Tabulation of Cumulative Types of Childhood Trauma and Dropouts (N = 89)

		Dropped Out				Total	
		Yes		No		n	%
		n	%	n	%		
	0	7	54	37	49	44	49
	1	1	8	17	22	18	20
Cumulative effect of Maltreatment Types	2	0	0	4	5	4	5
	3	3	23	10	13	13	15
	4	2	15	2	3	4	5
	5	0	0	6	8	6	6

Table 57

Chi-square Tests of Cumulative Types of Childhood Trauma and Dropouts Relationship (N = 89)

		Value	DF	Asymptotic Significance (2-sided)	Exact Significance (1-sided)
Five Types	Pearson Chi-Square	7.718 ^a	5	0.173	0.087
The minimum expected count is .58.					
Three Types	Pearson Chi-Square	1.573 ^a	2	0.455	0.227
The minimum expected count is 2.63.a					
Presence/Absence	Pearson Chi-Square	.118 ^a	1	0.731	0.365
The minimum expected count is 6.43.					

Note. DF = degree of freedom.

The results of the chi-squared test conducted between the cumulative CT and the number of participants who dropped out of treatment were insignificant, implying that cumulative types of CT and dropout were not related to one another, $\chi^2(5) = 7.718$, $p = .173$ (2-sided) and $p = .087$ (1-sided). With these results, Hypothesis 2.7.2. was disproved.

This investigation has been successful in carefully observing this research sample, defining the dependent variables to be surveyed, and including prior research as a foundation for these current studies, despite just a few findings. Chapter 5 discusses these findings and tendencies, the strengths and weaknesses of both studies, and points to new directions for future research.

CHAPTER 5

DISCUSSION

5. Discussion

This section presents the strengths and weaknesses of this research, and the contributions to be derived from the results, to enhance future treatment of patients with FM and depressive symptoms compounded with a history of CT.

5.1. Key Findings

The impact of CT throughout developmental stages into adulthood is presently determined by using instruments designed to assess the five dimensions of childhood maltreatment: emotional, physical, and sexual abuse; and physical and emotional neglect. Among these instruments, the CTQ-SF (Bernstein & Fink, 1998) has been validated and used in many studies globally, commended for its simplicity and reliability (Farooq & Yousaf, 2016; Hernandez et al., 2012; Y.-R. Lee, 2010; Lundgren et al., 2002, 2002; Villano et al., 2004; Yroni et al., 2021), which justified the application of its Spanish version (Hernandez et al., 2012) in this research.

Regarding the reliability of CTQ-SF in this investigation, the subscales of sexual abuse and physical neglect delivered a low Cronbach's alpha, respectively $\alpha = .41$ and $\alpha = .19$, therefore warranting caution in evaluating those subscales. Some items of the subscale of physical neglect have been proposed as belonging to the subscale of emotional neglect (Aloba et al., 2020; Grassi-Oliveira et al., 2014). Some researchers have found that those subscales tend to vary, particularly regarding emotional (Xiang et al., 2021) and physical neglect (Hagborg et al., 2022). For future research, it would be relevant to test-retest the CTQ-SF before and after treatment to ascertain the validity of its subscales.

To separate child maltreatment that might be partially offset by resilience factors (Afifi & MacMillan, 2011; Camardese et al., 2012; Masten, 2018) from maltreatment that can lead to CT, this investigation applied a more rigorous approach to scoring, adopting the more restrictive

threshold values established by Walker et al. (1999) to determine the occurrence of CT. For comparison purposes, the prevalence of CT in our research sample was also estimated with lower threshold values (Bernstein & Fink, 1998).

Higher thresholds discriminate more accurately the levels of maltreatment that may cause psychological trauma or damage due to its intensity, frequency, and period of duration, ensuring that the CTQ-SF assessment powerfully establishes CT. According to Walker et al. (1999), these higher thresholds effectively identified incidents of moderate to severe abuse or neglect, such as one or more experiences of child rape or prolonged periods of sexual molestation by a family member that caused sexual dysfunction in adulthood; significant experiences of humiliation or cruelty on the part of the parents; recurrent physical abuse that led to injuries requiring medical care; frequent lack of food, clothing or shelter, or continued emotional neglect and abandonment by caregivers due to drugs, personality factors, or psychiatric illness. Thus, the more restrictive threshold favored a cautious approach to decrease the chances of getting false positive CT results.

Within these parameters, this investigation revealed that our research sample had considerably higher percentages in at least four maltreatment dimensions for both threshold criteria (higher and lower cutoff values) than community samples. Hypothesis 1.1.1. also expected the research sample to have an equal or higher means and standard deviation of CT than a comparable clinical sample in at least one single type of CT. This result was not found in comparing rates between our research sample and the clinical sample of Hernandez et al. (2012), although values were close, as discussed below. Therefore, Hypothesis 1.1.1. was rejected. In addition, Hypothesis 1.1.2. expected the research sample to have a higher percentage of cumulative CT, which showed higher percentage rates for the sum of categories three to five of cumulative CT, but not in categories three and five separately.

These findings for Hypotheses 1.1.1 and 1.1.2, with marginal differences in some subscales of the CTQ-SF, may have been due to a significantly smaller research sample than the samples used for comparison. Also, none of the clinical sample clusters studied in Hernandez et al. (2012) presented with FM (a physical illness as opposed to mental illness), and may refer to clinical samples with higher association to CT. The findings in our research sample may be indicative of a tendency that would likely be strengthened by a larger sample, particularly the tendency toward greater cumulative CT effects (three types or more).

The prevalence of physical neglect in this research sample did not surpass the prevalence of two community samples (both threshold criteria represented). Perhaps this result implies that social and economic issues might have played a role disguising physical neglect as “unfortunate circumstances of life.” From a child’s perspective, parental neglect may have been understood as acceptable due to social and economic factors, such as being tired, impatient or unwilling to care for a child due to long working hours. Neglect could have been characterized as scarcity and lack of resources to provide physical goodies for a family and not perceived as parental neglect *per se*. Cultural issues may contribute to beliefs about children's autonomy or ability to help their younger siblings from an early age to free their parents to earn a living; or it may impose a view that parents deserve unquestionable loyalty, even when scarcity in the home comes from gambling, drinking and other problems. However, while the prevalence rate of physical neglect was not substantial in this research sample, it did appear to interfere with the change index of the number of IDs, as will be discussed later in this section.

In addition, there is a sensitive issue attributed to this specific factor. This subscale is considered a controversial factor of the CTQ-SF, which provided the lowest reliability coefficient in the Spanish validation study (Cronbach’s $\alpha = .66$), and the lowest specificity and sensitivity

indexes among the five subscales of the CTQ-SF in several other studies (Aloba et al., 2020; Grassi-Oliveira et al., 2014). In our study, the subscale of physical neglect had an even weaker reliability coefficient, with a Cronbach's alpha coefficient of .19. Unfortunately, an in-depth exploration of this issue is beyond the scope of this investigation. Therefore, using caution in judgment, this subscale may not provide a fair assessment of physical neglect for the research sample compared with non-clinical samples due to its reliability issues within this sample data.

Most importantly, the CTQ-SF sexual abuse subscale showed approximately double or triple prevalence rates (depending on the threshold criterium applied) in our research sample compared to community samples. Interestingly, while the rates of maltreatment in all other subscales receded when restrictive threshold values were applied to the research sample, the percentage of sexual abuse maintained a high percentage and an even higher difference in rates compared to community samples.

Jackson (2020) related that sexual abuse is associated with localized physical pain and emotional abuse with diffuse pain. However, he also found that emotional, physical, and sexual abuse and physical neglect in women were associated with generic pain. Thus, the high prevalence in the research sample is relevant and consistent with the literature findings and with one finding of our investigation, related to Hypothesis 2.2.1.

Furthermore, for Hypothesis 1.1.1, the research sample had lower means than the clinical sample (Hernandez et al., 2012) in three of five subscales and was close in two subscales. This result was contrary to the prediction of a sample difference value close to 0 (zero) and the findings of the literature (Aguilera et al., 2018; Lynch, 2016; Springer, 2009), which have shown that CT exacerbates symptoms in clinical samples. Particularly for the subscale of emotional abuse, the two samples performed quite differently. Hernandez et al.'s (2012) sample came from two studies

with 185 inpatient and outpatient women: one study with participants diagnosed with dysthymia, another with three subsamples with distinct diagnoses, personality disorders, depression, dysthymia, anxiety, and other disorders, for the purposes of adapting a Spanish version of the CTQ-SF, described in more details in the 4.2. Study 1 Results section. The difference in sample profiles and size (sample was larger by about 80%) might have played a role in these results because Hernandez et al.'s (2012) sample had diversified clinical symptoms that did not include any participant with FM. Similarly, physical and sexual abuse showed less incidence in our research sample.

Emotional and physical neglect were remarkably similar in the two samples, although not equal (zero difference). The comparison with Hernandez et al.'s (2012) sample emphasized the subscale of emotional neglect, which had the highest mean in our research sample and the second highest in Hernandez et al.'s. These results corroborate some support for the similarity between these two samples, but this hypothesis was rejected because the incidence of CT in our research sample was not equal or higher than Hernandez et al.'s (2012) sample.

The following hypotheses (from 1.2.1 to 1.7.2) of Study 1 were cross-sectional analyses, in which the variables depressive symptoms, perceived pain, functionality levels, indexes of self-construction discrepancies, and number of IDs, and polarization index were contrasted with a history of CT and the intensity of CT. Only one of these hypotheses delivered a small sized negative correlation between emotional abuse and functionality levels, Hypothesis 1.4.1, discussed later in this section. Study 2 produced nine correlations that will be discussed along with Study 1 corresponding hypotheses. These correlations (studies 1 and 2) were mostly indicative of tendencies, rather than an evidence, because of the lack of statistical significance once the alpha adjustment was performed with the Bonferroni correction for multiple comparisons.

One possible explanation for this lack of correlation is psychological resilience in the face of a history of CT (Kızılkurt et al., 2021). A critical aspect of resilience is the context in which the stressor occurred (Li et al., 2011), e.g., whether there were protective factors surrounding a stressful event or shortly after, such as psychotherapy. Another example is that an attuned caretaker or a supportive extended family (even if a parent is involved in the history of CT) could facilitate adaptation and development following a CT event or make the stress tolerable (Forkey & Szilagy, 2014). Despite this lack of substantial evidence, there is a need for future research to clarify how CT relates to chronic pain and other symptomatology found in women with FM, as indicated by the extensive literature of this dissertation, to include an exploration of protective factors between a history of CT and levels of symptomatology.

Another possible explanation is the tendency to externalize or internalize CT because an inability to regulate and process emotions mobilized by abuse and neglect might be the basis of those behaviors. The tendency to externalize or internalize relates differently to the manifestation of physical and mental symptoms in clinical samples (Bevilacqua et al., 2021; Göbel et al., 2016; Heleniak et al., 2016; Muniz et al., 2019). Prior studies focused on the association of externalizing and internalizing with specific types of CT, e.g., physical and sexual abuse and externalizing behaviors in boys but not girls (Lewis et al., 2016; Loeber & Burke, 2011). Pereda et al. (2009) found that some of the first psychological problems displayed by sexually abused children were related to internalizing anxiety, depression, low self-esteem, guilt, and stigmatization, in about half of the victims who experienced PTSD symptoms frequently. One conjecture for this relationship between internalizing emotions and chronic pain is that alexithymia may be the precursor of the physical symptoms. Particularly if the CT occurred in early childhood, children would not be able to identify, name, regulate, and process painful emotions, thus, leading to a path of somatization

of unrecognized emotions (Lumley et al., 2011).

Starting with Hypotheses 1.2.1 and 1.2.2, the assumption that CT could be a causative or correlated variable in increased levels of depressive symptoms was not confirmed for this research sample, contrary to the findings of current literature about often encountered analogous associations (Bayram & Erol, 2014; Karas et al., 2017; Lynch, 2016; Vranceanu et al., 2007). Moreover, Hypotheses 2.1.1 and 2.1.2 of Study 2, which addressed the relationship between the presence of CT and change in depressive symptoms after therapy, did not deliver correlations with any of the CTQ-SF scales for single types and cumulative CT.

One crucial suggestion made in previous studies was to address the three psychological factors measured in the CTQ-SF separately as independent studies, i.e., emotional abuse and neglect, physical abuse and neglect, and sexual abuse – a type of investigation that has reportedly been lacking (Li et al., 2020).

Next, the lack of confirmatory findings for Hypotheses 1.3.1 and 1.3.2 of Study 1 was also unexpected. Although these hypotheses were well based on extensive literature (Imbierowicz & Egle, 2003; Kascakova et al., 2020; Kiesel, 2018; Nicol et al., 2016; Nicolson et al., 2010), a correlation between pain levels and a history of CT was not confirmed in our research sample. In addition, this absence of correlation at baseline levels contradicts the close relationship between physical and emotional (CT-related) pain, as explained in Chapter 1, section 1.2.2 Neurobiological Impact (Di Tella et al., 2017; Galvez-Sánchez et al., 2018; Kiesel, 2018; MacDonald et al., 2021). However, surprisingly, Hypothesis 2.2.1 in Study 2 delivered two positive correlations between the change index of pain levels and two single types of CT (emotional and sexual abuse), revealing an association between these variables that only emerged once treatment took place. When we applied the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons, these results were

insignificant. Rather than evidence, these results should be considered indicative of a tendency of the sample data, indicating that participants with a history of childhood emotional or sexual abuse showed improvement in pain levels after therapy.

A pilot study by Aguilera et al. (2018) researched 20 women who suffered from FM, of which 13 participants had a history of maltreatment in childhood, adulthood, or both. Those 13 women with a history of maltreatment had higher indexes of pain and lower indexes of functionality at baseline. After treatment, which did not directly address the history of maltreatment, 12 women with a history of CT who completed treatment showed better outcomes than women with FM and no history of CT regarding pain and functionality. The research by Aguilera et al. (2018) concurred with other research findings on this association between CT and pain and functionality levels (Filippon et al., 2013). Aguilera et al.'s sample included adult abuse and neglect of traumatic levels, which points to this possible angle of association between FM pain and trauma (adulthood abuse).

Childhood sexual abuse is strongly associated with the manifestation of chronic pain, FM (Alexander et al., 1998; Boisset-Pioro et al., 1995; Ciccone et al., 2005; Finestone et al., 2000), and also FM with depression or depression alone, along with other disorders (Chaplin et al., 2021; Freshwater et al., 2001; Hailes et al., 2019; Levitan et al., 1999; Musliner & Singer, 2014; Springer et al., 2003; Steine et al., 2017).

Among the five categories of CT, classified according to Walker et al.'s (1999) restrictive cutoff values for the CTQ-SF, sexual abuse scored the highest prevalence (30.7 %) in our research sample. The fact that participants with a history of sexual abuse showed an improvement in pain levels (lowered pain levels) suggests that therapy helped those participants to find better coping strategies to address some "painful issues" that could potentially be linked to past sexual abuse,

even if those issues were not discussed directly (Linton et al., 1996; Sachs-Ericsson et al., 2007; Walsh et al., 2010). This finding is congruent with the results obtained in the last hypotheses of Study 2 (Hypotheses 2.7.1 and 2.7.2), which delivered no correlations for a history of CT and abandonment of therapy (drop out), i.e., abandonment of treatment was not related to residual negative feelings about CT that could trigger avoidance of therapy. In addition, psychotherapy may have helped decrease negative feelings about past sexual abuse – research found that just speaking directly about it has a therapeutic effect (Aguilera et al., 2018; Walsh et al., 2010) – even when the issue is not a target of treatment.

In Aguilera et al.'s (2018) sample, the trauma assessment was done with clinical interviews, which differed from this research sample, assessed with the CTQ-SF; perhaps another point to consider in future studies would be a combination of these two forms of assessment, i.e., clinical interviews and CTQ-SF, to confirm levels of trauma and clear reliability issues.

Next, Hypotheses 1.4.1 and 1.4.2 of Study 1 assumed that participants with a history of CT would present with lower levels of functionality at baseline. As a measure of global functional deterioration involving social, psychological, and physical realms, low scores in the FIQ were expected to correlate to both single types and cumulative CT (Aguilera et al., 2018; Filippon et al., 2013). There was a small-sized negative correlation ($\alpha = .015$) between baseline levels of functionality (FIQ) and emotional abuse, suggesting that the higher the rate of emotional abuse, the lower the levels of functionality. When the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons was applied, this result was not sustained. In conjunction with results found for a few hypotheses of Study II related to the subscales of emotional abuse and neglect, it reinforces the tendency of an impact of the subscales of emotional abuse and neglect in our research sample. There were no findings for the corresponding assumptions in Study 2, Hypotheses

2.3.1 and 2.3.2, which expected a correlation between the change index of functionality levels at discharge and the history of CT in the research sample, despite the presence of a tendency in the corresponding Hypotheses 1.4.1 of Study 1.

This tendency of FM samples to have poorer levels of functionality at baseline related to a history of CT appeared in a small study by Aguilera et al. (2018) as an improved outcome following therapy. In that study, women with FM and a history of CT or adult trauma showed better outcomes than women with FM and no history of CT regarding functionality (Aguilera et al., 2018), a finding matched by previous research findings by Filippon et al. (2013).

The following hypotheses in Study 1 refer to the association between the scores of the RGT at baseline and CT. There were no significant findings for Hypotheses 1.5.1 and 1.5.2, which studied the correlation of indexes of self-construction discrepancies at baseline and the presence of CT for single types and cumulative CT. However, the corresponding hypotheses in Study 2 (Hypotheses 2.4.1 and 2.4.2), which addressed change indexes of the self-construction discrepancies following therapy, indicated a few tendencies of the sample data.

Hypothesis 2.4.1 delivered a medium-sized negative correlation between the change index of “self” and “ideal self” and the subscale of emotional abuse ($\alpha = .034$) and a small-sized correlation between the change index of “ideal self” and “others” and emotional neglect ($\alpha = .010$). These negative correlations indicate that participants with a history of emotional abuse and neglect showed less change in reducing their critical view of “self” (“ideal self” as distant from “self”), “others” (“ideal self” conflicts with perception of “others”). Although these correlations did not survive the application of the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons, emotional neglect was very close to sustaining significance. In addition, Hypothesis 2.4.2 also showed two negative correlations (a medium-sized and a significant correlation)

between the change index of discrepancy between the “ideal self” and “others” and five and three types of cumulative CT, and one type and absence of CT rendered a medium-sized correlation that did not survive the Bonferroni correction (adjusted alpha < .0166) for multiple comparisons. The combination of these two subscales, emotional abuse, and neglect, has been researched as separate maltreatment categories to determine their specific impact (Mwakanyamale & Yizhen, 2019; Spertus et al., 2003). Thus, it is relevant to discuss them in more depth because a similar correlation was found for the change index of the number of IDs and the emotional neglect subscale.

First, it is necessary to distinguish the difference between these two subscales clearly. While emotional abuse is a parent's act, emotional neglect is a parent's failure to act.

Emotional abuse refers to psychological maltreatment and non-physical aggression directed at a child by an adult, such as verbal abuse of a child's sense of worth or well-being, or acting in a way that humiliates, degrades, intimidates, ridicules, or threatens (Berber Çelik & Odacı, 2020; Mwakanyamale & Yizhen, 2019; Spertus et al., 2003). These behaviors can also be directed towards the child's affections, such as physical aggression towards the child's pet or outright punitive separation from the pet, or towards the child's friends, such as a lack of respect, ridiculing, and belittling when speaking of them. Mwakanyamale and Yizhen (2019) stated that childhood emotional abuse leads to loyalty to parents because of the fear of being punished if they report the abuse. Alternatively, they may assimilate abuse as part of everyday life, in which case they take emotional abuse as information about who they are from people who have power over them. For this reason, there is little ability to become aware that they have suffered a severe form of childhood trauma. Thus, there is a substantial impact on self-worth, self-esteem, self-love, and appreciation of one's qualities, which negatively affects self-conception and self-perception.

Self-worth and self-esteem are formative aspects of one's identity, reflecting the

relationship with oneself and others (and events), respectively. Self-worth represents the more global and stable inner feeling and thoughts, regardless of external circumstances, of being good enough, worthy of others' love and acceptance, and social belonging (Crocker et al., 2006; Liu & Huang, 2018; Pelham & Swann, 1989). Self-esteem represents the more fluctuating self-appraisal based on external circumstances, achievements, losses, and relationships with others, in which much negative cognitive distortions or misinterpretations can occur (Crocker et al., 2006; Liu & Huang, 2018; Pelham & Swann, 1989). Both emotional abuse and neglect can create a void in self-worth, leaving the individual vulnerable in their self-esteem.

Emotional neglect arises as a result of a parent's inability to respond adequately to a child's emotional needs or the absence of an emotionally nurturing environment, in which case, parents may fail to act because of an inability to perceive, attend to, or respond to a child's feelings (Mwakanyamale & Yizhen, 2019). Since this is an (act of) omission, it is not easily visible, noticeable, or memorable (Mwakanyamale & Yizhen, 2019).

As emotions were not validated in childhood, it will be difficult for the adult to identify and understand their own emotions (alexithymia) and those of others. With the denial of a part of themselves, there can be a feeling of disconnection, dissatisfaction, emptiness, being different from others, or that something is wrong, but they don't know what is wrong (Mwakanyamale & Yizhen, 2019).

Both emotional abuse and neglect increase behavioral problems such as aggression, smoking, alcohol use, and suicide, and cause low self-esteem, depression, and personality disorders in adulthood (Berber Çelik & Odacı, 2020; Spertus et al., 2003). These two categories of maltreatment might generate patterns of adult self-care (self-parenting) similar to what was received from parents. The strong impact of CT on adult affective and behavioral responses has

led to growing evidence that it also affects parenting practices, perpetuating cycles of intergenerational patterns of CT or symptomatology and vulnerability to mental illness (Esteves et al., 2017; Greene et al., 2020; Renner & Boel-Studt, 2017).

Spertus et al. (2003) researched the possible impact of childhood emotional abuse and neglect in a primary care setting in a sample of highly educated women in an urban professional community. Using the CTQ-SF to identify the impact of these two subscales (after controlling for the effects of other types of abuse), they found that emotional abuse and neglect predicted anxiety, depression, physical symptoms, and lifelong trauma exposure. However, they did not establish a causative factor. They concluded that emotional abuse and neglect are subtle forms of trauma and are potent predictors of adulthood's emotional functioning. In addition, their study found that emotional abuse and neglect were significantly correlated with the number of doctor visits, a direct impact of childhood emotional experiences on adult health. This increase in healthcare utilization could be directly linked to anxiety (lack of emotional regulation and processing), a high manifestation of physical symptoms, and a low threshold for symptoms, possibly due to difficulty identifying emotions (alexithymia). They pointed out that although emotional abuse and neglect did not meet the criteria for PTSD, these experiences predicted PTSD symptoms in their sample.

Due to the importance of emotional abuse and neglect in mental health, one suggestion for future research is to incorporate a scale that can determine the levels of emotional awareness and expression of its participants. This will inform how emotional competence interacts with emotional abuse and neglect and symptomatology (physical and mental) in clinical FM samples (Aust et al., 2013; Brown et al., 2018; Di Tella et al., 2017; Kopera et al., 2020; Pedrosa Gil et al., 2008; Zdankiewicz-Ścigała & Ścigała, 2020). Several scales are designed to measure levels of alexithymia (e.g., Leising et al., 2009), the inability to recognize and express emotions, helping to

identify those participants who are less competent to communicate emotional distress and more vulnerable to manifest physical and mental symptomatology.

In addition, emotional abuse and neglect have been studied as possible influences in “self-organization disturbances,” an expression that refers to a cluster of behaviors found in complex posttraumatic stress disorder (Eidhof et al., 2019). Self-organization disturbances negatively affect the behavioral ability to regulate emotions leading to affect dysregulation, negative self-concept, and disruptions or conflicts in relationships. In a study that focused on shedding light on the relationship between emotional abuse and neglect, and depression, Li et al. (2020) stated that CM should not be considered a singular concept when studying its effect on depression. In this review, researchers detected five intervening variables connected explicitly to depression and emotional abuse: early maladaptive schemas, cognitive-personality variables, affect dysregulation, interpersonal styles, and stressful adverse events.

The concept of disturbances in self-organization describes dysfunctional core self-constructions. These dysfunctional core self-constructions might have been built on an environment that did not facilitate emotional regulation for the developing child and did not provide or was perceived as not providing for the child’s need for emotional validation, nurturance, and support. In other words, the abused or neglected child’s self-constructions were built on maladaptive schemas, and negative interpretations and narratives about their self-worth.

Previous research showed that patients with depression had a greater discrepancy between the “self” and “ideal self,” i.e., an index of self-construction that revealed a discontentment with the “self,” and more cognitive rigidity than the general population (Feixas et al., 2021). Another study with a sample of women with FM demonstrated that this sample presented a greater distance between the “self” and the “ideal self” (Compañ et al., 2011). Furthermore, they also presented

with a greater perception of social isolation (discrepancy between “self” and “others”), and higher number of IDs than the control sample (Compañ et al., 2011). In Aguilera et al.'s studies, among women with FM and a history of maltreatment (Aguilera et al., 2018) and women with FM and depression (Aguilera et al., 2019), there were similar findings in terms of the discrepancy between “self” and “ideal self,” cognitive rigidity and higher number of IDs. Other studies with varied clinical populations also found comparable results, including negative evaluation of others and a higher number of IDs (Feixas, Montesano, Erazo-Caicedo, et al., 2014; Montesano et al., 2015). Freshwater et al. (2001) found a greater discrepancy between “self” and “ideal self” between female survivors of sexual abuse and non-abused women. Survivors also had higher levels of depression, perceived distress, and low self-esteem (Freshwater et al., 2001).

CT is always interpersonal, inflicted on the child by an adult in a position of trust or caregiving. These interpersonal issues may have continued in adulthood based on a negative view of the adults in their environment (Garon-Bissonnette et al., 2022; Hodges et al., 2013). Therefore, trust in others may not come swiftly for the CT victim in adulthood.

In particular, cumulative CT has been associated in trauma literature with symptom complexity, which refers to the simultaneous presence of different symptoms in the same affected individual (Garon-Bissonnette et al., 2022; Hodges et al., 2013). Cumulative CT may generate a perceived sense of unworthiness in maltreated children, which can carry to adulthood. They may feel unworthy of others' respect, affection, and care; in this scenario, the “ideal self” would belong to a very different social group, quite far from “others” in this person's environment. Alternatively or concomitantly, the CT victim may perceive “others” as unreliable, unworthy of trust, uncaring, and aggressive, in which case, “others” are not close to the victim's “self” or “ideal self.” Thus, the statistically significant correlations of five and three types of cumulative CT with “ideal self”

and “others” might indicate that the sample has unresolved trust and safety issues from childhood exposure to interpersonal trauma, which prevented these participants from achieving positive therapeutic outcomes in this area.

Study 1 Hypotheses 1.6.1 and 1.6.2, which studied the possible association between CT and the number of IDs at baseline, delivered no significant correlation between these two variables. However, remarkably, Study 2 Hypotheses 2.5.1 and 2.5.2, which examined the association between single types of CT and the change index of the number of IDs at discharge, delivered two positive correlations (a medium sized and a statistically significant correlation), rejecting Hypothesis 2.5.1 that predicted a negative correlation between those variables. There was a positive correlation ($\alpha = .032$) between the CTQ-SF subscale of emotional abuse and the change index of the number of IDs. This correlation indicated a tendency of this sample data, rather than evidence, because when the Bonferroni correction (adjusted $\alpha < .010$) for multiple comparisons was applied, it was not sustained. Furthermore, there was a positive correlation ($\alpha < .001$) between the CTQ-SF subscale of physical neglect and the change index of the number of IDs. This correlation was sustained after the Bonferroni correction (adjusted $\alpha < .010$) was applied. In our sample, those with higher levels of physical neglect experienced a higher reduction in the number of IDs.

Previous research has identified a significant prevalence in the number of IDs in clinical samples (Feixas et al., 2009; Montesano et al., 2015), a type of cognitive conflict in which the symptom is associated with positive characteristics of the person's identity, which may hinder positive therapy outcomes (Feixas et al., 2010; Rouco et al., 2019).

The research presented a percentage of 29.8% of physical neglect within the less stringent cutoff values (Bernstein & Fink, 1998), and 20.1% within the more stringent cutoff values (Walker

et al., 1999). The percentage of physical neglect in the research sample was lower than in non-clinical community samples contrasted in Study 1. Thus, physical neglect was not the highest percentage for maltreatment types in this sample, yet it delivered a statistically significant correlation with IDs. As discussed in the section Instruments, under 3.3.5. Childhood Trauma Questionnaire Short Form (CTQ-SF), the subscale Physical Neglect of this questionnaire, has been consistently reported as problematic in several studies due to the low reliability, including this investigation (low Cronbach's alpha $\alpha = .19$). This low reliability has been attributed to some of its items confounding with emotional neglect; thus, results linked to this scale warrant caution, and may be considered as a sub-aspect of emotional neglect.

This significant correlation suggests that there might be IDs originating from a childhood experience of physical neglect that led to cognitive conflict associated with symptoms that participants needed to change to feel better. Those dilemmas might have been embedded in the participants' core identity, causing a dysfunctional ambiguity with core constructs associated with a positive view of themselves (Feixas, Montesano, Erazo-Caicedo, et al., 2014). One explanation for this claim is that some of these IDs, which might be associated with physical neglect, may have created cognitive conflicts involving loyalty to parents or caregivers, even in the face of the maltreatment they suffered. These cognitive conflicts are associated with poor parental supervision that puts the child at risk, and a lack of care for the child's basic physical needs, including food, shelter, clothing, safety, and health care that is inflicted and not due to poverty.

Alternatively, the narratives created to understand the physical neglect suffered might have been considered incompatible with one's views about an axis such as trust-distrust, love-rejection, trauma-security, and isolation-emotional intimacy, among others. Such unresolved IDs may have prevented participants from grieving about the past or coming to terms with it; thus, becoming part

of the symptomatology of FM with depressive symptoms. A decrease in the number of IDs following therapy indicates that conflicts related to the experience of childhood neglect changed, perhaps were resolved, becoming less threatening to participants' positive sense of identity and dissolving enmeshment with core constructs of self.

Back to Study 1, Hypotheses 1.7.1 and 1.7.2, which studied the possible association between CT and index of polarization at baseline, delivered no significant correlation between these two variables. Similarly, Study 2, where Hypotheses 2.6.1 and 2.6.2 examined the association between CT and the change index of polarization after the end of therapy, did not deliver any statistically significant correlation between cumulative CT and the change index of polarization. The results rejected these hypotheses and did not corroborate the findings of previous studies.

Polarization as a cognitive characteristic often appears in patients with depression, corresponding to the dichotomous thinking identified by Beck et al. (1979), polarized thinking that resists modification and revision (Neimeyer, 1985). In terms of Kelly's (1955) theory, these patients have a way of constructing their perception of themselves and others in extremes of good or bad, black or white, all or nothing, without the flexibility to allow differentiations that accommodate the individuality of each person (Feixas et al., 2021). This cognitive difficulty affects executive functioning and metacognitive processes, distorting the sense of self and significant others (García-Mieres, Usall, et al., 2020).

A possible explanation for these results is that a history of CT might have brought flexibility that allowed for the acceptance of caregivers as people with behavioral and emotional complexities who could express a range of affective behaviors and maltreatment at the same time. In this view, the need to accept parental figures (or caregivers) prevailed to survive as a child. This acceptance may have decreased polarization related to CT, despite the presence of depressive

symptoms.

The last hypotheses of Study 2 (Hypotheses 2.7.1 and 2.7.2) delivered no correlations between a history of CT and abandonment of therapy (dropout). The specific rationale for these hypotheses was that a history of CT could add emotional vulnerability and consequently make it more challenging to continue therapy, as sad memories, unresolved pain, and sorrow could reappear. Alternatively, therapy could be seen as an opportunity to address these same problems by those participants who felt psychologically ready to face them. However, none of the results achieved statistical significance.

The lack of correlations between abandonment and CT signifies ineffective coping mechanisms or residual emotions resulting from childhood maltreatment, such as shame, avoidance, self-blaming, denial, dissociation, and withdrawal/distancing (Tipsword et al., 2022), did not prevent participants from following through with protocol. However, negative correlations between the change index of discrepancy of “ideal self” and “others” and both emotional abuse and cumulative CT may have prevented participants from fully benefiting from therapy and achieving better outcomes.

5.2. Limitations and Implications for Future Research

It is relevant to reflect on the limitations of this investigation to control and minimize them in future developments. Some aspects worthy of mentioning are:

- There was no group control for this investigation, and the comparison with such a group could strengthen the results of Study 1, particularly regarding the prevalence of CT.
- In terms of reliability, the final number of the sample was small to warrant unambiguous conclusions. Although the number of the research sample was significant in suggesting directions, it is recommended that the sample be larger in future studies.

- The CTQ-SF, the main instrument of both studies, relies on retrospective self-reports, the validity of which is subject to recall and response biases, such as appraisals of what constitutes maltreatment that might still be based on a distorted view of “right and wrong” inherited from the childhood environment. In addition, several studies have found remarkable variations in the percentage of documented survivors of childhood sexual abuse who remembered the abuse as adults (Goodman et al., 2003). Therefore, recollecting past abuse is subject to omissions and errors, implying that measurements taken with retrospective instruments will likely underreport CT.
- The CTQ-SF data used for this investigation did not compute the three questions of this instrument that screen minimization of maltreatment due to statistical logistics and limitations. This information could have improved the ability to discern those participants who failed to report CT by minimizing it.
- In addition, regarding the CTQ-SF, there was an extremely low Cronbach’s alpha index of internal consistency for two subscales, sexual abuse $\alpha = .41$ and physical neglect $\alpha = .19$, which need to be investigated in future studies, perhaps with a test-retest before and after treatment.
- An exceptionally low Cronbach’s alpha index was also found in the HADS-D depression subscale ($\alpha = .49$), which would require further investigation to determine its causes. It may have compromised the ability to assess depression in the research sample.
- The instrument FIQ used in this investigation has an upgraded version, the FIQ-R, which resolved some cultural issues of the original FIQ related to functionality questions. This domain was based on the lifestyle of affluent countries, thus ignoring aspects of the daily functioning of people with fewer financial resources (the questionnaire assumes that respondents have a car, a vacuum cleaner, and a washing machine). However, most importantly, the revised version

of the FIQ, the FIQ-R (Bennett, 2005), included symptoms that were not described in the original questionnaire, such as cognitive impairment, tenderness, balance, and environmental sensitivity. The FIQ-R was developed in response to known deficiencies of the original questionnaire with feedback from patient focus groups. This fine-tuned revision could improve the characterization of functionality (Pérez-Aranda, Andrés-Rodríguez, et al., 2019). However, the original FIQ used in this study is still a reliable and valid instrument. Its essential properties are considered adequate to measure what it is proposed to measure, i.e., the general functioning of FM patients within a week period.

- There was no exploration of potential confounding variables (such as marital status, education, socioeconomic status, or resilience). Variables such as marital status and education have significantly influenced health outcomes because support from a spouse and increased education have a positive protective effect (Artiga & Hinton, 2019; Robles et al., 2014). These variables may, therefore, be potential confounding factors in the association between maltreatment and health status.
- Concerning the effects of CT on the outcome of the therapies studied, we did not focus on the follow-up assessment, and we are aware of the importance of taking into consideration not only the changes achieved after therapy but the maintenance over time. However, doing so would have consumed more time (e.g., the RGT was not administered at follow-up), and the sample size would have been reduced in these comparisons (some patients did not show up for the follow-up assessment).
- Two potential confounders should be considered, medication for depression and medication for pain, because all measures may be affected by secondary effects of both psychotropic and pain medications. These two potential confounders might exert a significant impact on

camouflaging unresolved issues (e.g., CT) by controlling symptomatology. Medication may also temper with results of psychological treatments, despite its usefulness and support for the overall improvement of a patient's symptoms (Johnston et al., 2014; Preskorn & Werder, 2006; Quinn et al., 2016). In addition, medication may negatively impact the results of the psychological treatment because, despite the potential benefits of each pain medication, the combination of a wide range of drugs can lead to several adverse side effects, including nausea, dizziness, headaches, constipation, and weakness, which can compromise functionality, disability, and mood (Jamison et al., 2017; Martel et al., 2015). Thus, to ascertain how medication impacts FM patients, medication may need to be addressed as a variable in future studies.

- The two studies of this investigation did not consider the incidence of different FM profiles (or subgroups) in our sample to compare their results and decide the most appropriate treatment strategies for each subgroup. The classification of distinct FM-subgroups is necessary to evaluate the best treatment strategies, as research evidence supports the proposition that FM patients are a heterogeneous population, both in terms of intensity of physiological symptomatology and neuropsychiatric profile (Calandre et al., 2011; Gaynor et al., 2021; Pérez-Aranda, Andrés-Rodríguez, et al., 2019; Yim et al., 2017). FM appears to be better understood if addressed by distinct groups of patients who present with an emphasis on subgroups of symptoms instead of all symptoms, as well as with varied intensity of presenting symptoms for different subgroups (Lukkahatai et al., 2016). More recently, four subgroups of FM patients were identified based on clinically measurable variables - pain, physical involvement, psychological function, and social support (Yim et al., 2017). These subgroups had different clinical symptoms and medication profiles but also variations in the intensity of

presenting symptoms, suggesting that FM can be better treated with a more comprehensive assessment of each patient's symptoms (de Souza et al., 2009; Hoskin et al., 2018; Vincent et al., 2014). Given the prevalence of CT in FM patients, it would be essential to investigate whether a history of CT has any differential impact on specific FM profiles or whether any profile has a higher incidence of CT than others (Braun et al., 2020; Hadlandsmyth et al., 2020).

- Because CT is implicated in a wide range of psychiatric diagnoses, some of the items in the exclusion criteria of this investigation might have left out a high number of FM participants who had a history of manic or hypomanic episodes in the past, current substance abuse, and those who were receiving psychological therapy at the time of screening for this investigation. CT is strongly associated with substance abuse, dissociative symptoms, bipolar disorder, and personality disorders, but also FM is related to various psychiatric comorbidity, including some of those that were part of the exclusion criteria (Buswell et al., 2021; Gündüz et al., 2018; Hudson et al., 1992; Karas et al., 2017; Keyes et al., 2012; Kleykamp et al., 2021; Lang et al., 2020; Marshall et al., 2018; McKay et al., 2021; Oshri et al., 2015; Quenneville et al., 2020; Torgerson et al., 2018; Wilson et al., 2021). The inclusion criterium of having depressive symptoms may also have filtered those who suffered CT but did not present with depressive symptoms at the time of screening.
- Finally, one common critique of cognitive therapies (CBT and PCT) is that these therapies do not address the patient's emotional experience to promote emotional regulation, resilience, and greater emotional tolerance windows (Setiyowati, 2017). Although, since the 1990s, more traditional cognitive therapies have incorporated cognitive-emotional schemas of self-and-relationships (Mahoney & Granvold, 2005), cognitive therapies still tend to see the mind or the cognitive system as a central factor in the cascade of psychological events. This top-down

view of psychological problems has been a concern regarding the treatment of children and the elderly due to their age-related cognitive limitations and the treatment of persons with less cognitive skills (e.g., less cognitive complexity). Because of the intricate link between physical pain and emotional issues, such as decreased awareness of emotional pain or other emotional states in general (Aaron et al., 2019; Aust et al., 2013; Di Tella et al., 2017; Maes & Sabbe, 2014; Montoro et al., 2016), it would be justified to explore measures of emotional mastery and contrast them with other variables to propose specific modules of treatment to be added to cognitive therapies (Greenberg, 2008; Renna et al., 2017; Sarter et al., 2021). The emotional distress involved in CT may require a specific measure of emotional mastery (i.e., levels of alexithymia) to be analyzed alongside levels of depressive symptoms, pain, functionality, and RGT results to determine the need for a specific therapeutic component such as an “emotion regulation” or “emotion-focused coping strategies” module relevant to the experience of CT (Braun et al., 2020; Heleniak et al., 2016; Loman & Gunnar, 2010; Lynch, 2016; Price & Hooven, 2018; Schore & Schore, 2008).

In summary, the most prominent limitations that can be addressed in future research are as follows:

- 1) Some variables emerged in the literature as significant in the study of FM, CT, and associated depressive symptoms. One of them is the control of potential confounding variables such as marital status, education, socioeconomic status, resilience, medication for pain, and medication for psychiatric problems.
- 2) A potential skewing element in our investigation regarding the prevalence and intensity of CT in our sample referred to the exclusion criteria defined for the parent investigation. For future research on the relationship of CT and FM with depressive symptoms, it would be necessary

to include participants with comorbidity with psychological disorders associated with CT, such as dissociative disorders and substance abuse, because these participants might inform more accurately the prevalence of CT in FM.

- 3) Furthermore, FM patients are presently understood as a heterogeneous population, with varied degrees of intensity of physiological symptomatology and neuropsychiatric profile. Thus, it would be relevant to classify distinct FM subgroups to evaluate their relationship with CT. At the beginning of this investigation, the literature on subtypes of FM patients had not reached a consensus about how many times and what features differentiate each type. Thus, future research might benefit from a structured classification of different types of FM to ascertain how each type is impacted by CT.
- 4) Because of the inseparable relationship between emotional abuse (and neglect) and tendencies to alexithymia, and patterns of externalization and internalization, the inclusion of these measures could amplify the scope of understanding of FM samples with depressive symptoms and a history of CT (Göbel et al., 2016). Again, because this investigation used secondary data, this limitation should be overcome in future research that is primarily about CT's impact on FM symptomatology.

Based on these limitations and the results of this investigation, several features can be implemented in future research to help establish more robust relationships between a history of CT and women with FM with depressive symptoms, to improve therapy outcomes:

- From the results of previous research (Aguilera et al., 2018; Knefel et al., 2015; Wingenfeld et al., 2011) and those of this investigation, it would be essential to determine the combined effect of CT and adult trauma in patients with FM, and the differential impact of each separately. One way of looking at the development of generalized chronic pain is to explore its association with

trauma, whether childhood or adulthood trauma. This perspective may explore these variables as causative or implicated in this disorder, which requires a deeper analysis in future studies (Bevilacqua et al., 2021; Fuller-Thomson et al., 2016; Kelly-Irving et al., 2013).

- Larger research samples could offer the power to confirm (or not) tendencies hinted at in these two studies, which was one of the limitations of our investigation.
- Identify possible confounders related to the demographics of the samples, such as education, economic status, marital status, age, psychosocial support, and levels of resilience.
- In addition, investigate specific associations or tendencies to alexithymia, externalize, and internalize in FM samples with depressive symptoms and a history of CT (Göbel et al., 2016).
- Use of the RGT perhaps adapted for participants with a history of CT to generate personal constructs that work on CT related axis such as “trust vs. mistrust,” “caring vs. uncaring,” “gentle vs. forceful,” “suffering vs. happiness,” “wellbeing vs. illness,” and other relevant poles of opposites. This way, it will be possible to address cognitive conflicts directly related to CT and women with FM.
- Future studies may focus on comparing clinical samples of women with FM, one with CT; another with adult maltreatment trauma; a third sample without such histories to ascertain their similarities and differences (D’Aoust et al., 2017; Defrin et al., 2017; Morasco et al., 2013; Peres et al., 2009; Scioli-Salter et al., 2015); and a fourth investigating a history of CT with added adult trauma (Wingenfeld et al., 2011). Ciccone et al. (2005) found that sexual and physical abuse were reported equally often by women in the FM and control groups; however, women who reported rape were 3.1 times more likely to have FM than women who did not report the rape (Ciccone et al., 2005).

CONCLUSION

6. Conclusion

To improve treatment protocols and outcomes and contribute to the collective academic knowledge on the complex presentation of FM, this investigation aimed at identifying the relationship between CT and symptomatology in a sample of women with FM and depressive symptoms.

This line of research arose from the results of a previous study by Aguilera et al. (2018), which showed the influence of CT on the therapeutic outcomes of patients with FM regarding their levels of depressive symptoms, pain, and functionality. Both investigations were supported by previous research findings that confirmed a significant prevalence of CT in women with FM when compared to the general population. In addition, CT has been implicated in high-risk or latent vulnerability for manifesting psychopathologies in general and physical illnesses, particularly chronic pain. For these reasons, this investigation meticulously addressed both physical and psychological symptomatology in connection with the presence of CT in our sample of FM women.

Below we will briefly present the main conclusions based on the results described in detail in the previous section.

- 1) The comparison between the prevalence of CT in our sample and community samples, showed that our sample presented a higher number and greater levels of severity for all types of abuse and neglect incidents. In this analysis of prevalence, sexual abuse and emotional neglect made up the highest number of traumatic experiences in the research sample. These results confirmed findings of the literature that implicate sexual abuse with both, generalized pain and pelvic pain – perhaps the type or extent of sexual abuse will condition the kind of pain – a point to be investigated further. Perhaps sexual abuse that involved incidents of rape or genital contact,

whether repeated or single incidence, might lead to the manifestation of pelvic pain, while other forms of sexual abuse might result in generalized pain. This invites an investigation of the nature of the sexual abuse involved in each symptomatology.

- 2) In terms of mean and standard deviation, emotional abuse showed the highest mean in our research sample, representing a higher level of intensity than sexual abuse. This result also confirms a more recent finding in the literature that points specifically to the impact of emotional abuse on physical and mental health, particularly, in generalized pain. In our research sample, despite not being the highest number of incidents, emotional abuse was the highest intensity of abuse experienced. The results related to the prevalence of sexual abuse and the intensity of emotional abuse in our research sample, invite investigators to reflect on the nature of the resilience of women with FM who had a history of CT. In our sample, low levels of intensity of sexual abuse impacted this population, whilst emotional abuse appeared to be related to high-intensity levels.
- 3) We also compared the mean(s) of all types of abuse and neglect in our research sample with a diverse clinical sample of women (Hernandez et al., 2012). In this comparison, our sample did not surpass or equally match the means for all types of abuse and neglect of that clinical sample. The closest means between these two samples were incidents of neglect (physical and emotional). This result did not confirm our expectation that our sample would have an equal or higher mean of abuse and neglect when compared to other clinical samples. This may be explained by the diverse clinical diagnoses between the two samples – none of the sub-samples of Hernandez et al. (2012) had a diagnosis of FM. CT might interact with other variables, for example, age, personality, genetics, and resilience, to mention a few, to form a relationship with different clinical symptoms and diagnoses. Unfortunately, there were no other compatible

clinical samples of women with FM that offered the possibility of comparing the prevalence of CT. Despite not confirming our hypothesis, this result is relevant for future research because it shows that no clinical sample is affected similarly by types of CT and their intensity, accentuating relevant differential clinical vulnerabilities.

- 4) In the research sample, 49% reported two or more types of CT, a higher rate than the rate of cumulative CT in community samples. Although this percentage decreased significantly with the application of a more restrictive criterion to define the presence of abuse and neglect, the rate in our sample remained higher than the rate reported in community samples. This result encourages the inclusion of CT evaluation as a necessary component of assessment protocols for FM patients, warranting treatment approaches that address the history of CT in this population.
- 5) Regarding pretreatment findings, the analysis of the impact of CT on symptoms at baseline measures delivered only one negative small-sized correlation associated with the impact of emotional abuse on the levels of functionality, Although this correlation did not survive the Bonferroni correction, this trend should be taken in consideration for further studies, particularly if we add to this trend the finding that emotional neglect and emotional abuse showed the highest mean of maltreatment reported among the 104 participants of our research sample. Consistent with our findings, emotional abuse has gained much attention in clinical research and is considered the most pervasive childhood trauma in terms of one's global development, along with emotional neglect.
- 6) The fact that several hypotheses about the relationship between baseline symptom levels and CT (Study 1) were not confirmed informs us about the characteristics of our sample. As an investigation based on secondary data from a superiority RCT, set to identify whether CT could

have interfered with the treatment outcomes of the two interventions used in the parent study, CBT and PCT, our findings clarified this relationship and paved the way for further investigations. Other variables may have competed with CT across our sample and impacted the pretreatment presentation of symptoms. This lack of findings may refer to other variables that needed to be considered for our sample, such as other childhood adversities, poverty, losses, disabilities in the family, or adult trauma (physical or psychological), such as physical accidents, rape, domestic violence, among other events. Testing CT as a variable was an important step toward understanding the complexity of FM.

- 7) Regarding the formulation of our hypotheses in Study 1, i.e., our expectations of finding a pretreatment relationship between symptom levels and CT, they were based on supporting evidence from the literature. The absence of significant findings invites us to reflect on the replicability of original studies, which often frustrates researchers. Original studies in psychology that produced 97% statistically significant findings resulted in only 36% replicable significant findings (p-value less than 0.05) in later studies (Open Science Collaboration, 2015). The authors of the project (Open Science Collaboration, 2015) pointed out three possible explanations for the low replicability, which we may consider for our investigation: 1) the original results were a false positive; 2) the replicated results were a false negative; and 3) both studies were correct, but unknown differences in experimental conditions or methodologies may have caused problems.
- 8) Regarding posttreatment findings, emotional and sexual abuse subscales delivered a relationship with changes in pain levels. Emotional and sexual abuse showed an association with less perception of pain at the end of the therapeutic process. The positive tendency of the sample data regarding improved pain levels in participants with a history of emotional or

sexual abuse might be pointing to a therapeutic effect that created healthier internal resources to handle the history of emotional and sexual abuse. Those who suffered emotional or sexual abuse might have felt safe enough to engage in therapy despite their specific CT vulnerabilities and the sufferance derived from their FM. This finding is validated by previous research that has identified that simply disclosing abuse during psychotherapy improves somatic and psychological symptoms, proving the usefulness of disclosing past abuse in FM management (Häuser et al., 2011). In another study (Aguilera et al., 2018), patients with trauma (CT and adult trauma) had more improvement in their levels of pain and functionality without addressing the problem in therapy. Additionally, these findings also highlight the fact that both types of abuse were prominent in our sample, sexual abuse was the highest incidence and emotional abuse was the highest intensity experienced in our sample. Although there was no association between pain levels and those two types of abuse in the pretreatment measures, the correlations that emerged after treatment suggest an existing connection between those types of CT and the experience of pain in women with FM.

- 9) Regarding the construction of the self, results indicated that emotional abuse was related to a smaller change in the index of the discrepancy between the “self” and the “ideal self”, as well as a smaller change in the discrepancy between the “ideal self” and “others”. Again, emotional abuse appears to be involved in resistant (to change) negative self-concept and distance from others. These aspects of the construction of self may be explored in future research in association with the concept of belonging. Identification with others may be the basic building block of a well-developed sense of belonging within a social support system and less discrepancy between “self” and “ideal self” may be the basis of the development of self-acceptance, self-worth, and self-esteem. These negative correlations found in the change index

of self-construction discrepancy confirm the importance of a healthy level of identification between the “self” and “ideal self”, and “ideal self” and “others” as resilience factors (in the case of lower discrepancies) and barriers to treatment success (in the case of high discrepancies).

- 10) Similarly to the previous item, regarding the impact of cumulative trauma, the results indicated that the greater the number of traumas experienced the lesser the change in the discrepancy between the “ideal self” and “others”. While emotional abuse in our sample had the highest score for the intensity of abuse and correlated to this same discrepancy index (between “ideal self” and “others”), the cumulative effect of multiple types of abuse exerted a similar intensity effect on this index. The intensity of CT, whether cumulative or excessive in one type, appears to shape the expectation (“ideal self”) for relational (“others”) engagements, in which a flexible balance between distance and closeness would be desirable. These results confirm the value of using the RGT to identify personal constructs related to self-constructions, as a powerful tool to recognize thought processes and cognitive conflicts that shape one’s core identity (self-constructions) and provide a tailored direction for treatment.
- 11) Finally, regarding the impact of CT on change indexes of cognitive conflict, there were two positive correlations between (emotional and physical) neglect and the index of change in the number of IDs, with only physical neglect bearing statistical significance. These results inform that physical neglect had an impact on core identity constructs, which during the treatment released its connection with symptoms (number of IDs). Future research could clarify the mechanisms that associate childhood neglect with improvement in cognitive conflict outcomes but not with cognitive conflict measures at baseline.

It is important to emphasize that all tendencies of this research sample should be considered

relevant, despite not achieving significance once the Bonferroni corrections were applied, in order to avoid a Type 2 error. Moreover, foundational studies, such as Walker et al.'s research (1999), did not report the use of statistical corrections for multiple variables and seem to have relied on an alpha of $<.05$.

In sum, our investigation was instrumental in pointing out several tendencies of the sample that reflect the findings of the broader literature on the relationship between CT and FM that encourage further research. In addition, this investigation was relevant in two major aspects, the revision of foundational and contemporary research on pain, CT, FM, and the CSDT perspective on childhood self-capacities in constructivist theory; and the surveying of the limitations of this investigation to strengthen future research. The findings and the rejected assumptions contributed, respectively, to validate the RGT instrument to assess specific interpersonal and cognitive aspects implicated in the complex psychosomatic nature of the symptomology of FM and to identify how future research can enhance treatment protocols.

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Annexes

Annex 1 Hospital Anxiety and Depression Scale (HADS)

Nombre del paciente : Fecha de nacimiento :/...../.....

Primer nombre : Fecha de examen :/...../.....

Escala Hospitalaria de Ansiedad y Depresión (HAD)

Esta prueba está dirigida a determinar cómo te has sentido en la última semana a pesar de que las preguntas están formuladas en presente.

Debes elegir entre una de cuatro posibilidades con respecto a la pregunta realizada, rodeando con un círculo la respuesta elegida.

	A	Me siento tenso o nervioso
	0	Nunca
	1	A veces
	2	Muchas veces
	3	Todos los días
	D	Todavía disfruto con lo que antes me gustaba:
	0	Como siempre
	1	No lo bastante
	2	Sólo un poco
	3	Nada
	A	Tengo una sensación de miedo, como si algo horrible me fuera a suceder
	0	Nada
	1	Un poco, pero me preocupa
	2	Sí, pero no es muy fuerte
	3	Definitivamente, y es muy fuerte
	D	Puedo reirme y ver el lado divertido de las cosas
	0	Al igual que siempre lo hice
	1	No tanto ahora
	2	Casi nunca
	3	Nunca
	A	Tengo mi mente llena de preocupaciones
	0	Sólo en ocasiones
	1	A veces, aunque no muy a menudo
	2	Con bastante frecuencia
	3	La mayoría de las veces
	D	Me siento alegre
	0	Casi siempre
	1	A veces
	2	No muy a menudo
	3	Nunca
	A	Puedo estar sentado tranquilamente y sentirme relajado
	0	Siempre
	1	Por lo general
	2	No muy a menudo
	3	Nunca

D		Me siento como si cada día estuviera más lento
0		Nunca
1		A veces
2		Muy a menudo
3		Por lo general en todo momento
	A	Tengo una sensación extraña, como de “aleteo” en el estómago
	0	Nunca
	1	En ciertas ocasiones
	2	Con bastante frecuencia
	3	Muy a menudo
D		He perdido interés por mi aspecto personal
0		Me preocupo al igual que siempre
1		Podría tener un poco más cuidado
2		No me preocupo tanto como debiera
3		Totalmente
	A	Me siento inquieto, como si no pudiera parar de moverme
	0	Nada
	1	No mucho
	2	Bastante
	3	Mucho
D		Me siento optimista respecto al futuro
0		Igual que siempre
1		Menos de lo que acostumbraba
2		Mucho menos de lo que acostumbraba
3		Nada
	A	Me asaltan sentimientos repentinos de pánico
	0	Nada
	1	No muy a menudo
	2	Bastante a menudo
	3	Muy frecuentemente
D		Me divierto con un buen libro, la radio o un programa de televisión
0		A menudo
1		A veces
2		No muy a menudo
3		Rara vez
		< Totales

INTERPRETACIÓN:

Subescala ansiedad: sumar el resultado de las respuestas a las 7 preguntas impares (0-21)

Subescala depresión: sumar el resultado de las respuestas a las 7 preguntas pares (0-21)

Puntuaciones: Inferior o igual a 7 = no caso

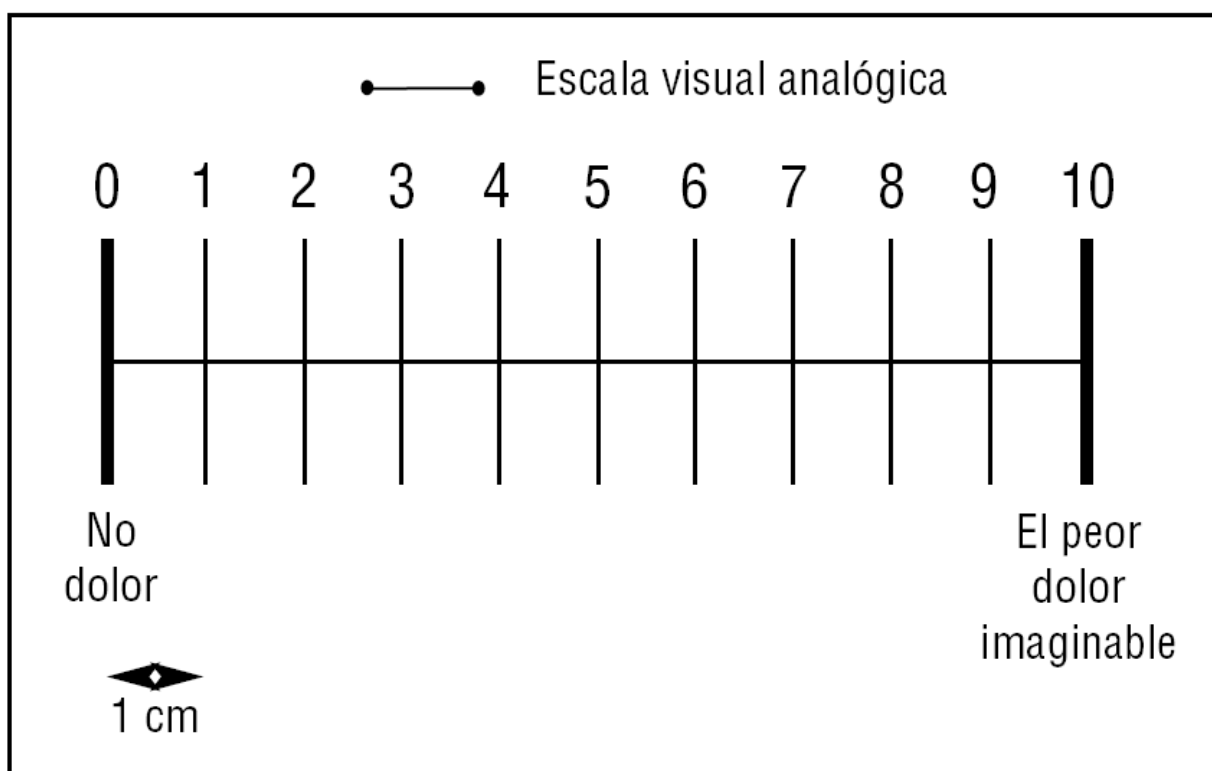
8-10 = caso dudoso

Igual o superior a 11 = caso

Annex 2 Visual Analog Scale (EVA)

Escala visual analógica (EVA)

Escala visual analógica del dolor (EVA) permite medir la intensidad del dolor que describe el paciente con la máxima reproducibilidad entre los observadores. Consiste en una línea horizontal de 10 centímetros, en cuyos extremos se encuentran las expresiones extremas de un síntoma. En el izquierdo se ubica la ausencia o menor intensidad y en el derecho la mayor intensidad. Se pide al paciente que marque en la línea el punto que indique la intensidad y se mide con una regla milimetrada. La intensidad se expresa en centímetros o milímetros.



La valoración será:

1. dolor leve si el paciente puntúa el dolor como menor de 3.
2. dolor moderado si la valoración se sitúa entre 4 y 7.
3. dolor severo si la valoración es igual o superior a 8.

Annex 3 Fibromyalgia Impact Questionnaire (FIQ) Versión en Español

Fibromyalgia Impact Questionnaire (FIQ) Versión en español

INSTRUCCIONES: En las preguntas que van de la **a** a la **i**, por favor rodee con un círculo el número que mejor describa cómo se encontró en general durante la última semana. Si no tiene costumbre de realizar alguna de las siguientes actividades, tache la pregunta.

1. Ha sido usted capaz de:

	Siempre	La mayoría de las veces	En ocasiones	Nunca
a. Hacer la compra	0	1	2	3
b. Hacer la colada con lavadora	0	1	2	3
c. Preparar la comida	0	1	2	3
d. Lavar los platos y los cacharros de la cocina a mano	0	1	2	3
e. Pasar la fregona, la mopa o la aspiradora	0	1	2	3
f. Hacer las camas	0	1	2	3
g. Caminar varias manzanas	0	1	2	3
h. Visitar a amigos / parientes	0	1	2	3
i. Utilizar transporte público	0	1	2	3

2. ¿Cuántos días de la última semana se sintió bien?

0 1 2 3 4 5 6 7

3. ¿Cuántos días de la última semana faltó usted al trabajo por causa de su fibromialgia? (Si no trabaja usted fuera de casa, deje esta pregunta en blanco)

0 1 2 3 4 5

(En las siguientes preguntas, ponga una marca como esta | en el punto de la línea que mejor indique cómo se sintió en general durante la última semana)

4. Cuando fue a trabajar, ¿cuánta dificultad le causaron el dolor u otros síntomas de su fibromialgia en el desempeño de su trabajo?

Sin Mucha
problema dificultad

5. ¿Cómo ha sido de fuerte el dolor?

Sin Dolor
dolor muy fuerte

6. ¿Cómo se ha encontrado de cansada?

Nada Muy
cansada cansada

7. ¿Cómo se ha sentido al levantarse por las mañanas?

Bien Muy cansada

8. ¿Cómo se ha notado de rígida o agarrotada?

Nada Muy
rígida rígida

9. ¿Cómo se ha notado de nerviosa, tensa o angustiada?

Nada Muy
nerviosa nerviosa

10. ¿Cómo se ha sentido de deprimida o triste?

Nada Muy
Deprimida deprimida

Fibromyalgia Impact Questionnaire (FIQ) Versión en español

INSTRUCCIONES: En las preguntas que van de la **a** a la **i**, por favor rodee con un círculo el número que mejor describa cómo se encontró en general durante la última semana. Si no tiene costumbre de realizar alguna de las siguientes actividades, tache la pregunta.

1. Ha sido usted capaz de:

	Siempre	La mayoría de las veces	En ocasiones	Nunca
a. Hacer la compra	0	1	2	3
b. Hacer la colada con lavadora	0	1	2	3
c. Preparar la comida	0	1	2	3
d. Lavar los platos y los cacharros de la cocina a mano	0	1	2	3
e. Pasar la fregona, la mopa o la aspiradora	0	1	2	3
f. Hacer las camas	0	1	2	3
g. Caminar varias manzanas	0	1	2	3
h. Visitar a amigos / parientes	0	1	2	3
i. Utilizar transporte público	0	1	2	3

2. ¿Cuántos días de la última semana se sintió bien?

0 1 2 3 4 5 6 7

3. ¿Cuántos días de la última semana faltó usted al trabajo por causa de su fibromialgia? (Si no trabaja usted fuera de casa, deje esta pregunta en blanco)

0 1 2 3 4 5

(En las siguientes preguntas, ponga una marca como esta | en el punto de la línea que mejor indique cómo se sintió en general durante la última semana)

4. Cuando fue a trabajar, ¿cuánta dificultad le causaron el dolor u otros síntomas de su fibromialgia en el desempeño de su trabajo?

Sin Mucha
problema dificultad

5. ¿Cómo ha sido de fuerte el dolor?

Sin Dolor
dolor muy fuerte

6. ¿Cómo se ha encontrado de cansada?

Nada Muy
cansada cansada

7. ¿Cómo se ha sentido al levantarse por las mañanas?

Bien Muy cansada

8. ¿Cómo se ha notado de rígida o agarrotada?

Nada Muy
rígida rígida

9. ¿Cómo se ha notado de nerviosa, tensa o angustiada?

Nada Muy
nerviosa nerviosa

10. ¿Cómo se ha sentido de deprimida o triste?

Nada Muy
Deprimida deprimida

Annex 5 Childhood Trauma Questionnaire Short Form (CTQ-SF)

CTQ-SF

Este cuestionario pregunta sobre experiencias que usted puede haber vivido durante su infancia y/o adolescencia. A pesar de ser preguntas muy personales, por favor intente contestarlas con total sinceridad. En cada pregunta ponga un círculo en la opción que mejor describa como se siente. Si desea cambiar su respuesta, ponga una X sobre el círculo, y vuelva a poner un círculo en la nueva respuesta.

Ejemplo de respuesta correcta:

Respuesta original: ha sido “Nunca”

Nunca	Raramente	A veces	A menudo	Muy a menudo
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Cambio de respuesta: Ahora la respuesta correcta es “Raramente”

Nunca	Raramente	A veces	A menudo	Muy a menudo
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Es muy importante destacar la **absoluta confidencialidad** de toda la información que usted nos confía. Estos datos serán utilizados de forma **totalmente anónima** a través del número que se le ha asignado. Nadie, bajo nuestra responsabilidad, tiene acceso a esta información.

Le pedimos la máxima **sinceridad** a la hora de contestar estas preguntas. La veracidad de esta información permitirá que obtengamos datos válidos que permitan progresar en el conocimiento y tratamiento de esta enfermedad devastadora.

	A lo largo de mi infancia y/o adolescencia:	Nunca	Rara mente	A veces	A menudo	Muy a menudo
1	Me faltaba comida.	•	•	•	•	•
2	Sabía que había alguien que cuidaba de mí y me protegía.	•	•	•	•	•
3	Personas de mi familia me decían cosas como "estúpido", "vago" o "feo".	•	•	•	•	•
4	Mis padres estaban demasiado bebidos o "colocados" como para cuidar familia.	•	•	•	•	•
5	Había alguien en mi familia que me ayudó a sentirme importante o especial.	•	•	•	•	•
6	Tuve que llevar ropa sucia.	•	•	•	•	•
7	Me sentí querido/a.	•	•	•	•	•
8	Pensé que mis padres deseaban que yo no hubiese nacido.	•	•	•	•	•
9	Alguien de mi familia me pegó tan fuerte que tuve que ir al médico o al hospital.	•	•	•	•	•
10	No había nada que quisiera cambiar de mi familia.	•	•	•	•	•
11	Personas de mi familia me pegaron tan fuerte que me hicieron morados o marcas.	•	•	•	•	•
12	Me castigaban con un cinturón, una tabla, una cuerda, o algún otro objeto duro.	•	•	•	•	•
13	Las personas de mi familia se preocupaban unas de las otras.	•	•	•	•	•
14	Personas de mi familia me insultaban o me herían.	•	•	•	•	•
15	Creo que me maltrataron físicamente.	•	•	•	•	•
15	Tuve una infancia perfecta.	•	•	•	•	•
17	Me pegaron o golpearon tan fuerte que se dio cuenta alguien (como un maestro, vecino o médico).	•	•	•	•	•
18	Sentía que alguien de mi familia me odiaba.	•	•	•	•	•
19	Las personas de mi familia se sentían próximas unas con las otras.	•	•	•	•	•
20	Alguien intentó tocarme de una forma sexual o intentó que yo le tocara.	•	•	•	•	•
21	Alguien me amenazó con hacerme daño decir mentiras sobre mí si no hacía alguna actividad sexual con él/ella.	•	•	•	•	•
22	Tuve la mejor familia del mundo.	•	•	•	•	•
23	Alguien intentó que hiciera actos sexuales o que presenciara actos sexuales.	•	•	•	•	•
24	Alguien abusó de mí.	•	•	•	•	•
25	Creo que fui maltratado emocionalmente.	•	•	•	•	•
26	Había alguien para llevarme al médico cuando lo necesitaba.	•	•	•	•	•
27	Creo que abusaron de mí sexualmente.	•	•	•	•	•