2023

A REPLICATION STUDY OF THE FACTOR STRUCTURE OF THE ATTITUDES AND BELIEFS SCALE-2: A MEASURE OF IRRATIONAL AND RATIONAL BELIEFS

Mahdiya Fazel

A REPLICATION STUDY OF THE FACTOR STRUCTURE OF THE ATTITUDES AND BELIEFS SCALE-2: A MEASURE OF IRRATIONAL AND RATIONAL BELIEFS

A dissertation submitted in partial fulfillment
of the requirements for the degree of

DOCTOR OF PSYCHOLOGY

to the faculty of the

DEPARTMENT OF PSYCHOLOGY

of

ST. JOHN'S COLLEGE OF LIBERAL ARTS AND SCIENCES

at

ST. JOHN'S UNIVERSITY
New York
by
Mahdiya Fazel

Date Submitted 3/21/2023

Date Approved 3/21/2023

Mahdiya Fazel

Raymond DiGiuseppe

ABSTRACT

A REPLICATION STUDY OF THE FACTOR STRUCTURE OF THE ATTITUDES AND BELIEFS SCALE-2: A MEASURE OF IRRATIONAL AND RATIONAL BELIEFS

Mahdiya Fazel

Rational Emotive Behavior Therapy (REBT) states that irrational beliefs (IBs) are the core elements that lead to emotional and behavior-related disruptions. IBs are manifested through beliefs people have about how people should, must, or ought to be or act (Sacks, 2004). An example of an irrational belief (IB), is when one must be successful at all things in life, and the possibility of failing in even one is a disaster. On the other hand, rational beliefs (RB) allow people to accept negative situations without viewing them in extremes (Dryden et al., 2010). An example of rational beliefs (RBs) generally is when a person accepts that they are not perfect at everything at hand and that is okay. These IBs and RBs represent a person's fundamental distortions and mental struggles.

The Attitudes and Beliefs Scales-2 (ABS-2) measures Ellis' irrational and rational beliefs and is often used to test Rational Emotive Behavior Therapy (REBT) claims. The ABS-2 includes three dimensions : (1) cognitive processes, (2) in either their irrational versus rational form, and (3) the life context in which the beliefs originate. DiGiuseppe et al. (2020) tested different models that could account for the structure of the ABS-2. They found support for an eight-factor model. These included four irrational processes of demandingness, frustration intolerance, awfulizing, and self-condemnation, and four corresponding rational factors of non-demanding preferences, frustration tolerance,

realistic negative evaluations, and self-acceptance. This study attempted to replicate the complicated factor structure of the ABS-2 in a new sample.

We used the *lavaan* structural equation modeling program to perform a confirmatory factor analysis. Since the data was multivariate and normally distributed, we used Diagonally Weighted Least Squares estimation procedures to identify which model had the best fit. The sample consisted of 986 participants from various sources, including outpatient psychotherapy clients assessed at intake, college students, and a sample of adults collected through social media. The results of the study supported our hypothesis that the eight-factor model had the best fit. In addition, the implications for REBT theory and practice were discussed.

ACKNOWLEDGEMENTS

There are many people I must thank who helped me achieve this important milestone. The first is my mentor Dr. DiGiuseppe who collaborated and supported me through this entire process. This would not have been possible without him. Thank you for listening to me and teaching me. I would also like to thank my committee members Dr. Chaplin and Dr. Sotelo-Dynega for their valuable feedback and insight.

I would also like to thank my father who never gave up on me and always pushed me to strive for excellence. This is for you. Thank you papa for believing in me and motivating me with kindness and grace. Mom – thank you for all the food, coffee, and endless love that you have given me. For always coming when I needed you most. My best friend, Sabiha Kassam has been my rock. She has been my biggest cheerleader and has always been someone who has never given up on me, even when I did not believe in myself. To my little sister, Sayyeda, who filled my life with endless laugher and joy, thank you. To my brother, Ali, who was always there when I needed a listening ear – thank you for supporting me.

My older sister, Mahjabeen. Thank you for motivating me and believing in me. For supporting me, and helping me gain the courage to move to a completely new state to pursue my dreams. To my three-year-old niece, Zahra. Your laughter and energy helped me at my lowest and gave me the strength to push through the pandemic and continue to work. Thank you. To Bhabhi and Daddy, thank you for always praying for me and taking out Sadaqa for me. I would not be here without you.

Lastly, I would like to thank Ian, my supervisor and friend, who was always there to read over my dissertation and provide me with endless words of encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Literature Review

The History of REBT and the Definitions of Rational and Irrational Beliefs

Throughout their life, most humans experience thoughts that can be considered irrational. They will ruminate over situations they cannot tolerate and engage in behaviors considered maladaptive. REBT theory, while seemingly new, can be dated back to concepts used by ancient philosophers. Ancient Greek and Roman philosophers like Aristotle and Epictetus have also suggested that a person's thoughts can cause emotional disturbances (Ellis et al., 2010; Robertson, 2010).

Early-nineteenth-century psychologists like Janet and Thorndike also emphasized the impact of how people created irrational beliefs via self-disturbance, which could be challenged and replaced by healthier rational beliefs. However, these therapists and their ideas were overshadowed by the arrival of Freud and the creation of psychoanalysis (Ellis et al., 2010). In the 1950s, Ellis began to practice Rational-Emotive Behavior therapy (REBT), which was considered one of the pioneering forms of Cognitive-Behavior therapy (Dryden et al., 2010).

REBT is a mode of psychotherapy that integrates cognitive, emotional, and behavioral techniques. It is based on the ABC model, which states that an activating event (A) is mediated by a person's rational (flexible) or irrational (rigid) beliefs (B) which then can cause emotional, behavioral, and cognitive consequences (C) (Buschmann et al., 2018).

Irrational beliefs that lead to disturbance are rigid beliefs that people have about themselves, others, and the world around them that are a part of their own rigid, demanding core schemas that lead to extreme beliefs, which can create a distorted sense

of reality (Buschmann et al., 2018). As such, REBT views "cognitive rigidity as the root cause of emotional and psychological disturbance" (DiGiuseppe et al., 2014). REBT also emphasizes the difference between creating rational beliefs (RBs) that lead to expressions of healthy negative emotions (i.e., sorrow and regret) when people are unable to attain something and the creation of irrational beliefs (IBs) that lead to unhealthy negative emotions (i.e., anxiety, rage, and depression) when people do not get what they "needed" or if they have to engage in something they "couldn't stand" (Ellis et al., 2010).

In addition, REBT also distinguishes between three levels of cognitions. The first level cognitions are surface cognitions that are easily accessed and can be related to automatic thoughts. Second-level cognitions are evaluative cognitions that focus on how the person evaluates first-level cognition and their ability to cope and tolerate the information they have received. The third level of cognition involves central imperative demands, which are the schematic representations of how people want the world to be (Buschmann et al., 2018). These demands tend to be rigid in nature, and when people receive information that does not align with their personal beliefs or schemas, they become emotionally aroused, which then causes them significant distress. When faced with this discrepancy, people tend to engage in irrational beliefs to decrease their state of arousal (DiGiuseppe et al., 2014). Irrational beliefs focus on the second and third levels of cognition. REBT helps clients change the second and third level cognition but usually does not target the first level of change in therapy because the theory states that these are likely to change when the level two and three cognition change.

The definition and identification of irrational beliefs have evolved over the years. Initially, Ellis identified eleven different types of irrational beliefs. However, these

beliefs had no structural or categorical order. However, Ellis' revised theory consolidated these thirteen beliefs into four broad categories: demandingness, awfulizing, frustration intolerance, and self/other condemnation. These four irrational beliefs have corresponding rational beliefs as well. Thus REBT focuses on eight different types of beliefs. It is important to note that according to REBT theory, demandingness is a primary irrational belief, which then leads to second-level irrational beliefs which are awfulizing (AWF), frustration intolerance (FI), and global evaluation of worth for self/others/world (SD) (Buschmann et al., 2018).

The definitions of each of the IBs appear below:

1. *Demandingness is an unrealistic and absolute expectation of events or individuals being the way a person desires them to be.*
2. *Awfulizing is an exaggeration of the negative consequences of a situation to an extreme degree so that an unfortunate occurrence becomes "terrible."*
3. *Frustration Intolerance (FI) stems from demands for ease and comfort and reflects an intolerance of discomfort.*
4. *Global evaluations of human worth, either of the self or others, imply that human beings can be rated and that some people are worthless or at least less valuable than others* (DiGiuseppe et al., 2014).

According to REBT, the four distinct rational beliefs that people can hold are preference beliefs, realistic evaluations of badness (REB) beliefs, frustration tolerance (FT), and self-acceptance beliefs. The definitions of each of the four RBs are found below:

1. *Preference beliefs are flexible beliefs about how one would like things to be.*

2. *Realistic evaluations of badness (REB) beliefs are non-extreme evaluations regarding the consequences of undesirable life events.*
3. *Frustration Tolerance (FT) is the realistic evaluation of one's capacity to withstand adverse life events.*
4. *Self-acceptance beliefs acknowledge the fallibility of oneself and the recognition that the self is too complex to be globally rated* (Hyland et al., 2017).

In addition, Ellis also stated that people could have irrational beliefs about various situations. This included affiliation: the need for the approval of others; achievement: the need to be successful academically or occupationally; and comfort: the need for comfort (DiGiuseppe et al. 2018).

Creation of a reliable self-measure to assess for IBs and RBs

Because REBT postulates that rational and irrational beliefs represent the core cognitive constructs that are associated with distortions of reality, well-validated self-report measures must exist that can effectively measure these constructs. Over the years, more than 50 scales have been created to assess irrational beliefs (David et al., 2019). Some of the earlier scales that were used were the Irrational Beliefs Test-IBT and the Rational Behavior Inventory-RBI, which were based on the list of 11 irrational beliefs that were initially defined by Ellis rather than the core irrational processes that represent current REBT theory (Lindner et al., 1999). Many of the existing irrational belief scales have some major flaws. Some assess IBs in only one specific contest, such as food intake. Others have failed to provide research on their psychometric properties, such as support for their factor structure. Most of these scales only assess irrational beliefs and do not assess rational beliefs. Therefore, they cannot be used to test REBT theory adequately

(Lindner et al., 1999). Most measures that are used to measure REBT constructs have not been able to assess all the relevant beliefs that the theory has proposed (Terjesen et al., 2009). While REBT focuses on both disputing irrational beliefs and increasing rational beliefs, most instruments heavily focus on the assessments of IBs and do not place significant emphasis on RBs (DiGiuseppe et al., 2018).

A review of 14 measures of irrational beliefs completed by Terjesen et al. (2009) indicated that most analyzed scales had poor psychometric properties. First, even though various changes have occurred in the theory of REBT, many scales continue to assess for the original eleven categories of IBs and not the four cognitive processes. In addition, out of the scales that assessed the four IB cognitive processes, most failed to include any rationally worded items. Secondly, most scales had poor validity. When looking at the content of the scales, many of the measures of irrational belief also included items that contained beliefs or cognitions that were not considered irrational beliefs but were considered inferences or automatic thoughts. In addition, not only did some of these scales look at beliefs, but they also included items that assessed emotional distress and behavioral consequences.

Bothe Terjesen et al. (2009) and David et al. (2019) reported that the ABS-2 had the most appropriate structure and, therefore, the most likelihood of supporting REBT theory.

The Creation of the Attitudes and Beliefs Scale-2 (ABS-2)

The original Attitudes and Belief Scale (ABS) was created by Campbell (1985) and Burgess (1986, 1990) to assess both irrational and rational beliefs for each of the four core cognitive processes. They developed individual scales for Demandingness,

Awfulizing, Frustration Intolerance, and Self-Downing. In addition, they also identified three domains that people could have IBs that included achievement (success and failure), affiliation (approval and rejection), and comfort and discomfort. In addition, when creating items for the scale, Burgess also included specific content items (i.e., "I need to be liked and respected by people at work") and general content items (i.e., "It is awful if people reject me"). While most scales had an equal number of rationally and irrationally worded items, the Demandingness scale used preference statements as rational items. For example, a rational preference item could be "I want to do well on my test," whereas the corresponding Demandingness irrational item was, "I must do well on my test." Although the theory was that people who endorsed the demandingness items would also endorse the preference items when the scale was administered, the rational/preference items could not create a distinct difference between the rational and irrational beliefs for the Demandingness scale (DiGiuseppe et al., 2018).

The Attitudes and Belief Scale-2 (ABS-2; DiGiuseppe et al., 1989) was originally created in the late 80s and was modeled after the original Attitudes and Belief scale (Burgess, 1986; 1990). It corrected for most of the errors that were found in other irrational belief scales as it includes both IBs and RBs, and the items do not assess for constructs that are not a part of REBT. In addition, the items in the scale do not reflect any behavioral or emotional content and are purely based on belief.

The ABS-2 is a self-report measure comprising 72 items that fit into a 4 x 3 x 2 matrix, similar to the factors that were a part of the original ABS. In addition, the scale also used items that were specific to to the individual and based on importance (i.e., “I would like to be liked by people who are important to me”) rather than generalized

statements (i.e., “I would like to be liked by people”) (DiGiuseppe et al., 2018). It contained items that represented both rational and irrational beliefs and made sure to include rational items that were complex sentences and directly related and contrasted each of the four core cognitive processes. In addition, when creating the rationally worded items, the statements were the exact opposite of their counterpart. For example, an irrationally worded item that looked at Demandingness and Achievement would be, "I must be successful at things that I believe are important, and I will not accept anything less than success." In contrast, the corresponding rationally worded preference achievement item would be "I want to do well at important tasks, but I realize that I don't have to do well at these important tasks just because I want to." (DiGiuseppe et al., 2018).

Research Support for the ABS-2

Over the years, various researchers have tested the validity and reliability of the ABS-2 with varying results. Studies have indicated that the ABS-2 can reliably predict disturbed emotions. In a study conducted by Opris and Macavei (2007), the ABS-2 had high correlations and could effectively identify clients with emotional distress. The study conducted by Sava (2009) indicated a significant correlation between individuals with low levels of emotional stability (high neuroticism) and various irrational cognitive processes on the ABS-2. In addition, they also found that individuals who had lower levels of agreeableness on the Five Factor Model of Personality had the highest level of irrational beliefs. Macavei (2005) found that when comparing participants from clinical and non-clinical groups, clients with higher levels of depression scored significantly more irrationally on the ABS-2. Podina et al. (2015) also found a strong correlation between

the ABS-2 and depression. In addition, they found that when a person endorsed higher levels of self-compassion skills, it impacted the relationship between depression and high levels of irrational beliefs (DiGiuseppe et al. 2018). More recently, a study conducted by Tecuta et al. (2021) looked at irrational beliefs and their impact on eating disorders. The researchers used the ABS-2 to measure IBs and found that patients with eating disorders more strongly endorsed irrational beliefs.

DiGiuseppe et al. (2018) examined the psychometric properties of the ABS-2 using clinical and non-clinical samples. The results suggest that the ABS-2 has adequate internal consistency at various levels. In addition, all the subscale scores had significant correlations with measures of emotional disturbance, such as the Beck Depression Inventory, the General Psychological Well-Being Scale, the Goldberg General Health Questionnaire, and Spielberger's Trait Anxiety Scale. Scales with irrationally worded items had significantly higher correlations with measures of psychological disturbance when compared to rationally worded scales. In addition, there was a significant difference between the scores of the clinical and non-clinical populations, and rationally worded items had a more consistent pattern of discrimination between the two groups. They also correlated the ABS-2 with the Millon Multiaxial Clinical Inventory-III (Millon, 1989). The results indicated that there were large, significant correlations with various personality disorder scales (i.e., Avoidance, Passive-Aggressive, Self-defeating, Schizotypal, and Borderline) and certain measures of psychopathology (i.e., Anxiety, Dysthymia, Alcohol Dependence, Major Depression and Thought Disorders). Although small, the ABS-2 also attained significant correlations with measures of Trait Anger and

scales on the MCMI that included Substance Abuse, Antisocial PD, and Aggressive-Sadistic PD.

Although various studies have shown that the ABS-2 has good reliability and good construct validity, one of the significant weaknesses of the ABS-2 is that the dimensional model of the scale has not been supported by exploratory factor analysis (EFA) or confirmatory factor analysis (CFA). In 2007, Fülöp conducted a CFA of the Romanian version of the ABS-2. The researcher compared five different models that could represent the structure of the ABS-2 using the LISREL Framework. Out of the five models that were assessed, Fülöp (2007) found that Model 4, which was a two-factor model that was derived from rational and irrational factors, and Model 5, which was a second-order model that loaded on four higher-order factors, had the best fit; however, the fit indices were lower than the usually accepted guidelines.

Hyland, Shevlin, Adamson, & Boduszek (2014) analyzed the psychometric properties of the ABS-2 using Confirmatory Factor Analysis (CFA) and found that the ABS-2 has poor factorial validity. They found that the models with the best fit were the same as those with the best fit, as did Fülöp (2007). However, once again, the fit indices were below the level of acceptability (.95), as reported by statisticians (Schreiber et al., 2006). These findings question the factor structure of the ABS-2. Hyland et al. (2014) believe this lack of fit results because each item contains wording to reflect a cognitive process and a content area. They refer to this as the cognitive process factors being "contaminated" by contextual factors. They also noted that all correlations between the four processes were high, making it difficult to have clear factors.

The researchers then attempted to overcome the limitations of the ABS-2 by creating a 24-item abbreviated version (ABS-AV) with high construct validity. The scale yielded five models. However, only one model, which was the eight-factor model in which three items load onto each of the rational and irrational belief processes, was found to best represent the data. Overall, the abbreviated scale possessed satisfactory factorial validity and internal reliability (Cronbach's alpha); however, due to the population that was targeted, it is unsure whether the results of the study could be generalized to a broader population (Hyland et al., 2014). In addition, while the eight-factor model had the best fit out of all the other models that were analyzed, the fit indices were below the acceptable cutoff that would demonstrate adequate model fit.

That being said, Buschmann et al. (2018) found that when using the abbreviated version of the ABS-2 (ABS-AV) there was a significant correlation between high levels of irrational beliefs and depression. In addition, they also found that when a person endorsed high levels of irrational beliefs, it was correlated with higher levels of anxious thought patterns and affect.

More recently, DiGiuseppe et al. (2020) conducted a CFA on several models that could better explain the structure of the ABS-2. They used a different estimation method than the one used by Fülöp (2007) or Hyland et al. (2014). Rather than use Maximum Likelihood (ML) or Maximum Likelihood Robust (MLR) estimation procedures, the authors used the Diagonally Weighted Least Squares (DWLS: Mindrila, 2010) estimation procedure, also known as Weighted Least Square Parameter Estimates using a Diagonal Weighted Matrix- WLSMV- in Mplus (Muthen & Muthen, 2017), which is designed for categorical data. The ABS-2 uses a Likert format which represents an ordinal categorical

system. While previous researchers have frequently used the ML or MLR estimation procedure when conducting CFA, several studies have indicated that DWSL and WLSMV estimations are more accurate and produce less biased results when estimating the factor loading and have more accurate statistical outputs for data that is not continuous and is multivariate non-normal (Mindrila, 2010). DiGiuseppe et al. (2020) tested 11 models, some of which were one-dimensional, where each item loaded on only one factor. Other models were two-dimensional bifactor models – that is, each item loaded on both a cognitive process factor and a content/context factor. Other models were general Bifactor models – each item loaded on one factor representing a cognitive process and a general factor. Such general bifactor models account for the high correlation among the factor or items, which allows for the models to have a better fit.

When DiGiuseppe et al. (2020) initially used the MLR estimation, many of the models had fit indices below 0.80, while a few models had fit indices around 0.85. Additionally, ten of the models that used all 72 items failed to converge, which prevented the authors from being able to determine if the models that presented only irrationally worded items or rationally worded items had a better fit when compared to the ones that had all the items.

Subsequently, the lavaan Structure Equation Modeling Program (Rossel, 2012) was used to analyze the data using DWLS estimation procedures since the data was identified as multivariate non-normal. While several models could be considered to have excellent fit, Model 8ABG, which has eight factors representing four irrational cognitive processes and four rational cognitive processes with all items loading on one general factor, had the best fit and had an excellent fit on all the fit indices and a $\chi^2/df = 2.01$. In

this model, items loaded on one of the four irrational cognitive process factors of demandingness, awfulizing, frustration intolerance, or self-condemnation, or one of the rational cognitive process factors of non-demanding preferences, realistic negative evaluations, frustration tolerance, or self-acceptance. In addition, all of the items are loaded on a general factor. This model had eight factors that are designed to assess factors for the cognitive processes that split into irrational and rational dimensions. As such, the results of their study indicate that there are four irrational cognitive processes that have corresponding rational beliefs, which supports the REBT theory.

Because the results that DiGiuseppe et al. (2020) found were different from those reported by Fülöp (2007) and by Hyland et al. (2014), the validity of the factor structure could remain in doubt. These three CFA studies differed in the CFA estimation procedures used, the country of the sample, and the sample size. There a replication of the CFA appears warranted to determine if the results reported by DiGiuseppe et al. (2020) can be replicated. As such, this study will use the *lavaan* Structure Equation Modeling Program (Rossel, 2012) to replicate their study to determine if similar results can be obtained.

Hypotheses

It is hypothesized that the best fitting item on the ABS-2 will be a model where items will load on one of the four irrational cognitive process factors of demandingness, awfulizing, frustration intolerance, or self-condemnation, or one of the rational cognitive process factors of non-demanding preferences, realistic negative evaluations, frustration tolerance, or self-acceptance. In addition, all of the items will load on a general factor.

Table 1.
Model Names with a Description of Each Model.

Models	Model Description
Model 1A	All 72 items load on one factor
Model 2A	A 2-factor model representing irrationality vs. rationality using all items loading on their respective irrationality and rationality factor.
Model 3A	A 4- Factor Model with 3 specific factors based on the domains - achievement, affiliation, and comfort for all 72 items with each item loading on its respective content factor.
Model 4A	A 4-factor model with each factor representing one of the 4 cognitive domains for all 72 items collapsed across the irrationality and rationality dimension with each item loading on its respective cognitive process
Model 5A	An 8-factor model using all 72 items with each factor representing one of the 4 Rational and 4 Irrational Cognitive processes
Model 6R	A 3- Factor Model using only the 36 rational items with each item loading on its respective content factor.
Model 7I	A 3- Factor Model using only the 36 irrational items with each item loading on its respective content factor.
Model 8ABG	An 8-factor model using all 72 items with each factor representing one of the 4 irrational cognitive processes or one of the 4 rational cognitive processes & all items loading on 1 general factor
Higher-order Models that Include Specific Factors and Higher-order Factor(s)	
Model 9AH1	An 8-factor model using all 72 items with each factor representing one of the 4 irrational cognitive processes or one of the 4 rational cognitive processes with these 8 factors all loading onto 1 higher-order factor
Model 10AH2	An 8-factor model using all 72 items with each factor representing one of the 4 irrational cognitive processes or one of the 4 rational cognitive processes with the 4 factors representing irrational cognitive processes loading onto 1 higher-order factor of irrationality and the 4 factors representing rational cognitive processes loading onto 1 higher-order factor of rationality

Note: An “A” in the model name means that it included all items. An “I” on the Model name means it included only Irrational items. An “R” in the model name means included only Rational items. A “BG” in the model name means that it was a bifactor model with items loading on a specific factor and all items loading on one general factor. A “BC” in the item name means that it was a bifactor model with items loading on both a cognitive process factor and a content factor. An “H” in the model name means that it was a higher-order model.

Method

Participants

This study had two samples. The first sample had 766 participants. The nonclinical sample was recruited from university undergraduates from a parochial, urban campus in the North region of the US and from a sample collected from social media posts and consisted of 333 (43.5%) participants. The clinical sample was collected from an outpatient psychotherapy clinic in New York City, where participants were enrolled in treatment. This sample had 433 (56.5%) participants. The first sample had 304 females (39.7%) and 456 males (59.5%); six participants did not indicate their gender. 63.4% were Caucasian, 11.5% were African American, 10.3% were Asian, 5% were Hispanic, and 4% identified as "Other." Additionally, 31 participants did not indicate their nationality. The age ranged from 18 to 86 with a mean of 30.9% (SD= 13.2); 17 participants did not indicate their age. 307 (40.1%) participants from the non-clinical sample were not in treatment, 24 (3.1%) were currently in treatment and two (0.3%) did not respond.

In addition, a separate sample of college students and non-clinical adults was collected using various social platforms (i.e., Facebook, Instagram, Snapchat). While there were originally 327 participants, 107 of them were removed from the analysis due to lack of completion. As such, this group contained 220 participants. There were 140 females 63.6%), 77 males (35%), and three participants did not indicate their gender. Approximately half of the respondents were Asian (49.1%), 24.5% were White, 7.3% were African American, 8% were Native American, 2.7% were Hawaiian, 11.4% stated "Other," and three participants did not indicate their nationality. The age ranged from 18

to 82 with a mean of 33.2% (SD= 12.5), and three participants did not indicate their age. Participants were also asked if they were currently receiving psychotherapy, and 70.5% indicated that they were not. Additionally, 3 (1.4%) participants reported not finishing high school, 30 (13.6%) participants were high school graduates, 42 (19.1%) participants reported having some college experience, 39 (17.7%) participants reported completing a 2-year degree, 58 (26.4) indicated completing a 4-year degree, 30 (13.6%) indicated completing a professional degree, 12 (5.5%) indicated having a doctoral degree, and 6 (2.7%) participants stated "other." Overall, 986 participants completed the ABS-2.

Instruments

Attitudes and Beliefs Scale-2 (ABS-2). The ABS-2 is a 72-item Likert scale that includes items for each of Ellis' irrational beliefs categories: Demandingness*, Awfulizing, Frustration Intolerance,* and *Self-Condemnation* and their rational alternatives of *Non-demanding preference, Realistic Negative Evaluations, Frustration Tolerance, and Self-Acceptance.* Each of these eight cognitive processes has items in the content areas of *Achievement, Affiliation,* and *Comfort.* This creates 24 cells with three items in each cell (Table 1).

Procedures

The clinical sample all completed the ABS-2 by paper and pencil when they arrived for their first session. This scale was among several that they completed as part of the intake process.

The non-clinical sample was recruited from an on-campus subject pool recruitment software package called SONA. Those recruited on social media received a

brief invitation to participate in the research with a link to the Qualtrics panel survey.

This provided them with a link to the survey that was delivered on Qualtrics.

Table 2.
A Facet Model of Irrational and Rational Processes, Belief Processes, and Belief Content Used to Construct the ABS–2. Supplemental Material: The individual items of the ABS-2 with each item embedded in the cell to which it belongs.

		Irrational Belief Processes			
		Demandingness	**Frustration Intolerance (FI)**	**Awfulizing**	**Self-Ratings**
Belief Content	**Affiliation**	Demanding about Affiliation	FI about Affiliation	Awfulizing about Affiliation	Self- condemning about Affiliation
	Achievement	Demanding about Achievement	FI about Achievement	Awfulizing about Achievement	Self- condemning about Achievement
	Comfort	Demanding about Comfort	FI about Comfort	Awfulizing about Comfort	Self-condemning about Comfort

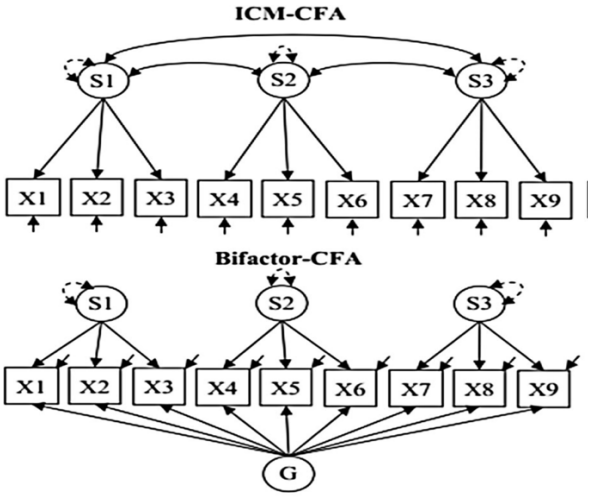
		Rational Belief Processes			
		Non- Demanding Preferenc	**Frustration Tolerance**	**Realistic non-Awfulizing Evaluations**	**Self-Acceptance**
Belief Content	**Affiliation**	Non-Demanding Preference about Affiliation	FT about Affiliation	Realistic Negative Evaluation about Affiliation	Self-Acceptance about Affiliation
	Achievement	Non-Demanding Preference about Achievement	FT about Achievement	Realistic Negative Evaluation about Achievement	Self-Acceptance About achievement
	Comfort	Non-Demanding Preference about Comfort	FT about Comfort	Realistic Negative Evaluation about Comfort	Self-Acceptance about Comfort

Results

Confirmatory Factor Analysis

Because the ABS-2 includes items that differ across three dimensions, it is possible that the best-fitting model could include factors that would be relevant to the irrational-rational beliefs dimension, the four cognitive process dimensions, the context dimension, or some combination of these. While I tested several models mentioned by DiGiuseppe et al. (2020) in their CFA, additional models were also tested. Unlike the previous study conducted, many of the models were not bifactor models and did not load on a general factor. A bifactor model is usually based on the assumption that items in a construct load on both a subscale and a general factor (Boateng et al., 2018). This allows researchers to identify if there are any distortions when the subscales are fitted into the overall scale and allows for a total score. However, I chose to conduct an independent cluster model of CFA (ICM-CFA) to identify whether the different domains of the ABS-2 could be scored separately.

Figure 1.
Representations of the Independent Cluster Model-CFA model and the Bifactor-CFA model.



(Adapted from Portoghese et al., 2020)

The first model that was run was 1A, where all items loaded on one factor. This was conducted to identify if all the items are correlated and to also create a baseline for the other models. Models 2A to 7I looked at the factor structures across one of the three dimensions of the ABS-2. I ran these models to identify whether they could be used as separate constructs to allow for individual subscale scores. Model 2A was a 2-factor model that separated the scale into 36 rational and 36 irrational items. Model 3A was a 3-factor model that separated all the items into the three content domains that consist of affiliation, achievement, and comfort. Model 4A was a 4-factor model that separated the items based on the four cognitive domains that include demandingness, frustration intolerance, awfulizing, and self-ratings while combining the rational and irrational items for each domain. Model 5A was an eight-factor model that separated the four rational and irrational cognitive processes. Model 6R was a 3-factor model that had the 36 rational items load on their respective content factors, and Model 7I was a 3-factor model that had the 36 irrational items load on their respective content factors of achievement, affiliation, and comfort.

Model 8ABG was the only bifactor model that was tested. This model was an eight-factor model that used all 72 items, with each factor representing either one of the four rational or irrational cognitive processes, and had all items load on a general factor.

In addition, I also tested two higher-order models. Unlike bifactor models, higher-order models have both a minimum of one superordinate factor, as well as several subordinate factors in which certain sub-groups of items load. These higher-order models consider the combined variance between subordinate factors. Additionally, each subordinate factor is considered independently, mediating its relationship with the

superordinate factor and the dependent variables. Furthermore, this model assumes no direct relationship between the superordinate factor and the dependent variables (Dunn et al., 2020). Higher-order models are appropriate for this analysis because they explore whether overall and subscale scores are both meaningful based on adequate correlations between subordinate and higher-order factors (Dunn et al., 2020).

Model 9AHI was an eight-factor model representing four irrational cognitive processes & four rational cognitive processes, with each of these 8 factors loading on one higher-order factor. Additionally, Model 10AH2 was also an eight-factor model representing four irrational cognitive processes & four rational cognitive processes; however, the four irrational factors loaded onto one higher-order factor of irrationality, and the four rational factors loaded onto one higher-order factor of rationality.

Analyses were conducted via the R *lavaan* Structural Equation Modeling program (Rosseel, 2012) on the JASP software platform (Goss-Sampson, 2018; JASP, 2018) using the DWLS estimation. In addition, I also conducted a readability test of the ABS-2 questionnaire using the Flesch-Kincaid formula (1976). The overall scale had a 6th-grade reading level, whereas the rationally worded items had a 7th-grade reading level.

The DWLS yielded several fit indices, which include the Chi-Square (χ^2) value, the degrees of freedom, the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMS), the Bentler-Bonett Normed Fit Index (NFI), the Cumulative Fit Index (CFI), the Tucker-Lewis Index (TLI), Bollen's Relative Fit Index (RFI), and the Bollen's Incremental Fit Index (IFI). The DWLS estimation on *lavaan* does not provide either the Akaike Information Criteria or the Bayesian Information Criteria. As such, the next best indicator of relative fit, the χ^2/df index, is

reported. Additionally, the differences in the fit indices were examined to determine which models had the best fit. We considered a model as having an adequate fit if the χ^2/df was between 2 and 5, due to the number of items and the complexity of the models for the ABS-2. Allowing the χ^2/df value to be acceptable if they were as high as 5 would allow for better results. Additionally, if the NFI, the CFI, the TLI, RFI, or IFI were under .95, the model was considered not a good fit.

Table 3 presents the results for the 8-factor model, which was tested using *lavaan* with the DWLS estimation procedure. Model 1A represents all items loading on one factor. This Model did not converge, suggesting that the data did not fit the model. Model 2A represented a two-factor model of Irrationality and Rationality. The χ^2/df *for this model was* 18.57 and was rejected. Model 3A represents three factors, one factor for each of the three content areas of Achievement, Affiliation, and Comfort. All of the items in each respectful content are loaded on that factor. Here the χ^2/df had a value of 40.16 and was rejected. Model 4A represents the four cognitive domains of the ABS-2 and had a χ^2/df of 39.68. Model 5A represents the eight cognitive processes and had a χ^2/df of 16.3. As such, the models were considered underfitted due to significant residual variance. In addition, fit indices on the *NFI, CFI, TLI, RFI*, and *IFI* for these four models were below 0.95, and the RMSEA and SRMR scores were greater than 0.08; thus, these models were rejected on this criterion as well.

I separated the items into a set of irrational items and a set of rational items and performed separate CFAs for them. Model 6R represents three factors using only the rational items and the factors representing the content areas of Achievement, Affiliation, and Comfort. This model yielded a χ^2/df of 13.85. Model 7I represents three factors of

content using only the irrational items and had a χ^2/df of 11.21. However, the fit indices for both models were between .95 and .99, suggesting a good fit. Both models have some support from the traditional fit indices but not from the χ^2/df. In addition, while the RMSEA and SRMR for model6R was greater than 0.08, the SRMR score for model 7I was .078, which suggests adequate fit.

Model 8ABG had a good fit on all the fit indices and a $\chi^2/df = 4.26$. Additionally, the RMSEA value was 0.058, and the SRMR value was .052. In this model, items load on one of the four irrational cognitive process factors of DEM, AWF, FI, or SC, or one of the rational cognitive process factors of NDP, RNE, FT, or SA in addition to loading on one general factor. This finding supports the hypothesis that it is better to consider each of the four cognitive processes separates in their irrational and rational forms. Amongst the Bifactor-general factor models, we believe model 8ABG has the best fit.

Model 9 represents the 8-factor model, where the 8 cognitive processes load on one higher-order factor, and Model 10 represents four irrational cognitive processes and four rational cognitive processes, where the four irrational factors load onto one higher-order factor of irrationality. The four rational factors load onto one higher-order factor of rationality. The χ^2/df for both these models were over 5, the RMSEA and SRMR were over 0.08, and the fit indices on the *NFI, CFI, TLI, RFI*, and *IFI* were below 0.95. As such, both models were rejected.

We also calculated internal consistency for the scales from model 8ABG, using Cronbach's α, Mcdonald's Omega (ω), and Guttman's Lambda-2 (λ^2). Table 4 presents scores for the eight subscales. These measures of internal consistency are adequate for

using the ABS-2 to measure these eight scales. As we suspected, these latent factors are similar to each other.

Discussion

The ABS-2 is a complex instrument that includes items across three different domains. These distinctions make it difficult for CFA to yield acceptable fit indices. Out of all the models that were tested, Model 8ABG had the best-fit indices where all the items loaded on one of the four irrational cognitive process factors of *DEM, AWF, FI,* or *SC*, or one of the rational cognitive process factors of *NDP, RNE, FT,* or *SA* while also loading on one general factor. This finding was similar to what was researched by Hyland et al. (2014) and DiGiuseppe et al. (2020). The results of this study confirm our primary hypothesis that an 8-factor model with rational and irrational cognitive processes while loading on one general factor would be the best-fitting model. These results support what has been suggested in the REBT literature, indicating that there are four types of irrational beliefs, each with a corresponding rational belief.

We also tested models representing the three different dimensions that make up the ABS-2, which include irrationality versus rationality, the three content domains, and the eight cognitive processes. Unlike what was found by DiGiuseppe et al. (2020), most of the models did not yield any statistical significance. For example, Model 1A, which had all items loaded on one factor, did not converge, and both higher-order models had poor fit indices. However, while χ^2/df for Model 6R (3 factors using only the rational items) and 7I (3 factors using only the irrational items) did not indicate a good fit, traditional fit indices for both these models were statistically significant.

This is the fourth study that has used CFA to confirm the structure of the ABS-2. Even though this study used the same analysis that was used by DiGiuseppe et al. (2020), the results of this study shared more similarities to that conducted by Hyland et al.

(2014), who used Mplus with MLR estimation and Fülöp (2007) who used LISREL (8.72 version). In both of these studies, the fit indices for the models ranged from 0.74 to 0.83, which is well below the cutoff values of 0.90 and 0.95, usually considered acceptable for CFA models (Byrne, 2012). While some of the models that we tested did have good traditional fit indices, the χ^2/df for most of the models was over 5, suggesting that the models did not fit well.

One significant difference between the study conducted by DiGiuseppe et al. (2020) and the current study was the sample size. In the study that was conducted by DiGiuseppe et al. (2020), there were 1593 participants, whereas this study had 986 participants. The ABS-2 is a complicated model with 72 items and eight factors which would require a larger participant pool for accurate fit results. According to Byrne (2012), more parameters require a bigger sample size to ensure good fit. As such, the difference may account for why many of the models did not have adequate fit.

However, our findings could be useful in terms of designing future versions of the ABS-2 or other REBT-related measures. Our best-fitting model, 8ABG had factors that contained on IBs or RBs items that all loaded on one general factor. This would suggest that creating separate subscales that measure IBs and RBs would be more accurate. There could be several reasons for this. Firstly, IBs and RBs have distinct functions in REBT theory. According to REBT, irrational beliefs (IBs) lead to negative, disturbed, and maladaptive emotions, whereas rational beliefs (RBs) lead to more non-disturbed and adaptive emotions (Ellis & DiGiuseppe 1993; Ellis 1994).

The clinical implication would suggest that reducing a client's irrational beliefs may not automatically increase their rational beliefs and that increasing their rational

beliefs may not decrease their irrational beliefs. As such, therapists may require working on both RB's and IBs simultaneously to be more effective. In addition, while there have been numerous studies that look at the impact of irrational beliefs, by separating the scales, researchers may be able to get better insights into how rational beliefs can impact people.

Secondly, rationally worded items are longer and require a more advanced reading level since they are the opposite of the irrationally worded item they are meant to negate. According to DuBay (2007), even though most people can comfortably read at the 7th-grade level, important information should be written at a 5th-grade level to make it easier to understand. Interestingly, when administering the scale, various participants indicated that the scale was difficult to comprehend, which made it difficult to complete accurately. This may be an important fact to consider since writing styles can also impact comprehension (DuBay, 2007). While they did not indicate which items were difficult, based on the reading levels that were analyzed, one can assume that it was the rationally worded items. As such, an implication for practice would be rewording some of the rational items to make them easier to understand.

Additionally, a study conducted by Tetine et al. (2003) on patient literacy using the Beck Depression Inventory (BDI) indicated that even though the scale is at a 5th /6th-grade reading level, participants with higher literacy rates were unable to paraphrase the questions accurately. While the study did not indicate whether the participants were diagnosed, this may have some implications on how mental health may impact comprehension. As such, suggestions for future research may include looking at mental health diagnoses and their impact on comprehension of the ABS-2.

Thirdly, by using two separate scales for rational and irrational beliefs, individuals may be able to more accurately complete the scale without feeling overwhelmed by the number of items. A suggestion for future research would be to use the data we currently have to complete a CFA on the 24-item abbreviated version (ABS-2-AV) that was created by Hyland et al. (2014) and the ABS-SF that was created by DiGiuseppe et al. (2021).

An additional finding was that the content factors (*affiliation, achievement, and comfort*) had great traditional fit indices for both models, even though they had poor χ^2/df values. This would suggest that they are not nuisance variables but rather give some insight into separate thought processes that can be measured for additional information. These models did not load on a general factor. Therefore, these results could support the creation of six distinct scales: a separate irrational and rational scale for affiliation, achievement, and comfort. By separating the scales, we can identify content-based rational and irrational beliefs, which can be used to identify patterns of thoughts more accurately. This could be clinically relevant as the results of these scales could help therapists create more individualized interventions for clients. To this effect, some researchers have created scales to measure specific concerns. Hyland et al. (2015) created a trauma-related IB scale (TRIBs) with eight items used to measure traumatic experiences and found a strong link between trauma-specific irrational thoughts and PTSD symptoms. Montgomery et al. (2007) also created an 8-item scale to assess IBs regarding exams (Exam Beliefs Scale-EBS). Their results also indicated a strong link between irrational beliefs and exam-related stress. These studies suggest that creating specific content-based

scales for various disorders (i.e., anger, social anxiety, substance abuse, depression) may be helpful.

Overall, the ABS-2 has strong CFA support. The best model that was identified is the 8-factor model, which has four rational and irrational cognitive processes that all load on a general factor. In addition, it also shows support for the creation of content-based scales.

Table 3.

Analyses for All Models. Chi-Square Test of Model Fit, Degrees of Freedom, Ratio of χ2 to degrees of freedom, (χ2 /df), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Bentler-Bonett Normed Fit Index (NFI), Comparative Fit Index (CFI), Tucker-Lewis Fit Index (TLI), Bollen's Relative Fit Index (RFI), and Bollen's Incremental Fit Index (IFI) for all Models Tested Using lavaan with Diagonally Weighted Least Squares Estimation

Models	χ^2	*df*	χ^2/df	**Parameters**	**RMSEA**	**SRMR**	**NFI**	**CFI**	**TLI**	**RFI**	**IFI**
One Dimensional Models											
Model 1A: All items on 1 factor	Model did not converge										
Model 2A: 2 Factors representing irrationality vs. rationality	46107.2	2483	18.57	361	.134	.119	.919	.923	.921	.916	.923
Model 3A: 3 Factors representing the 3 content domains using all items	99640.5	2481	40.16	363	.199	.180	.825	.828	.823	.819	.828
Model 4A: Factors representing 4 cognitive domains	98333.9	2478	39.68	366	.198	.179	.827	.831	.825	.822	.831
Model 5A: 8 Factors representing the 8 cognitive processes factors using all items	40048.6	2456	16.3	388	.125	.113	.93	.934	.931	.927	.934
Model 6R: 3 Factors using only the rational items.	8186.79	591	13.85	183	.114	.087	.951	.954	.951	.95	.954
Model 7I: 3 Factors using only the irrational items.	6627.9	591	11.21	183	.102	.078	.981	.982	.981	.979	.98
Model Eight Factor											

Model 8ABG: 8 Factors representing 4 irrational cognitive processes & 4 rational cognitive processes, & all items loading on 1 general factor	10127 .10	2376	4.26	468	.058	.052	.982	.986	.985	.981	.986
Higher Order Models that Include Specific Factors and Higher-order Factor(s)											
Model 9AH1: 8 Factors representing 4 irrational cognitive processes & 4 rational cognitive processes, & each of these 8 factors loading on 1 higher-order factor	85036 .00	2476	34.34	368	.184	.165	.85	.855	.845	.846	.854
Model 10AH2: 8 Factors representing 4 irrational cognitive processes & 4 rational cognitive processes, the 4 Irrational factors loading onto 1 higher-order factor of Irrationality, and the 4 Rational factors loading onto 1 higher-order factor	43239 .36	2475	17.47	369	.129	.116	.924	.928	.926	.921	.928

of Rationality											

Note: An "A" in the model's name means it included all items. An "I" on the Model name means it included only Irrational items. An "R" in the model's name means included only Rational items. A "BG" in the model's name means that it was a bifactor model with items loading on a specific factor and all items loading on one general factor. A "BC" in the item name means that it was a bifactor model with items loading on both a cognitive process factor and a content factor. An "H" in the model's name that it was a higher-order model.
X2= Chi-Square Test of Model Fit; RMSEA = Root Mean Square Error of Approximation; CFI = Cumulative Fit Index; TLI = Tucker- Lewis Index; SRMR = Standardized Root Mean Square Residual; Bentler-Bonett Normed Fit Index (NFI); Bollen's Relative Fit Index (RFI); Bollen's Incremental Fit Index (IFI), N = 986.

Table 4.
Cronbach's Alpha and Dilon-Goldstein's *rho* For Scales Based on Latent Variables**.**

Scales Based on Latent Factors	**Cronbach's alpha**	**McDonald's omega**	**Guttman's Lambda 2**
(I) Demandingness	0.813	0.815	0.819
(R) Non-Demanding Preferences	0.817	0.819	0.821
(I) Frustration Intolerance	0.898	0.898	0.899
(R) Frustration Tolerance	0.842	0.846	0.848
(I) Awfulizing	0.873	0.874	0.877
(R) Realistic Negative Evaluations	0.842	0.843	0.844
(I) Self-Condemnation	0.916	0.918	0.919
(R) Self-Acceptance	0.833	0.839	0.840

References

Bernard, M. (1998). Validation of the general attitude and belief scale. *Journal of Rational-Emotive and Cognitive-Behavior Therapy, 16*(3), 183-196. https://doi.org/10.1023/A:1024911014579.

Boateng, G.O., Neilands, T.B., Frongillo, E.A., Melgar-Quiñonez, H.R., & Young, S.L. (2018) Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. *Front Public Health*, 11(6) 149. https://doi.org/10.3389/fpubh.2018.00149.

Buschmann, T., Horn, R., Blankenship, V., Garcia, Y., & Bohan, K. (2018). The relationship between Automatic Thoughts and Irrational Beliefs predicting anxiety and depression. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 36*(2), 137-162. https://doi.org/10.1007/s10942-017-0278-y.

Byrne, B. M. (2012). Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming (2nd ed.). New York: Routledge.

Collard, J., & O'Kelly, M. (2011). Rational emotive behaviour therapy: A positive perspective. *Journal of Rational - Emotive & Cognitive - Behavior Therapy, 29*(4), 248-256. https://doi.org/10.1007/s10942-011-0146-0.

Cutz, G.S., Rathus, J., Vidair, H.B., & DeRosa, R. (2015) Assumptions and Conclusions: Fundamental Distinctions Between Tibetan Buddhist and Western Approaches to Happiness. *Journal of Rational-Emotive and Cognitive-Behavior Therapy,* 33, 341–367. https://doi-org.jerome.stjohns.edu/10.1007/s10942-015-0216-9.

David, D. O., DiGiuseppe, R., Dobrean, A., Păsărelu, C. R., & Balazsi, R. (2019). The measurement of irrationality and rationality. In M. E. Bernard & W. Dryden

(Eds.), Advances in REBT: Theory, practice, research, measurement, prevention and promotion. (pp. 79–100). Springer Nature Switzerland AG. https://doi-org.jerome.stjohns.edu/10.1007/978-3-319-93118-0_4.

David, D., Lynn, S. J., & Ellis, A. (2010). *Rational and irrational beliefs: Research, theory, and clinical practice*. New York: Oxford University Press.

David, D., Schnur, J., & Belloiu, A. (2002). Another search for the "hot" cognition: Appraisal of irrational beliefs, attribution, and their relation to emotion. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *20,* 93-131. https://doi.org/10.1023/A:1019876601693.

David, D., Szentagotai, A., Kallay, E., & Macavei, B. (2005a). A synopsis of rational-emotive behavior therapy (REBT): Fundamental and applied research. *Journal of Rational-Emotive and Cognitive-Behavior Therapy, 23,* 175-221. https://doi.org/10.1007/s10942-005-0011-0.

DiGiuseppe, R., Doyle, K., Dryden, W., & Backx, W. (2014). A practitioner's guide to rational emotive behavior therapy (3rd ed.). New York: Oxford University Press.

DiGiuseppe, R., & Leaf, R. C. (1990). The endorsement of irrational beliefs in a general clinical population. *Journal of Rational-Emotive & Cognitive Behavior Therapy*, *8(4),* 235–247. https://doi.org/10.1007/BF01065807.

DiGiuseppe, R., Leaf, R., Robin, M. W., & Exner, J. (1988). The development of a measure of irrational/ rational thinking (p. 6). Edinburgh, Scotland: Presented at the World Congress on Behavior Therapy.

DiGiuseppe, R., Leaf, R., Gorman, B., & Robin, M. W. (2018). The development of a measure of Irrational/Rational beliefs. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 36*(1), 47-79. https://doi.org/10.1007/s10942-017-0273-3.

DiGiuseppe, R., Gorman, B., & Raptis, J. (2020). The factor structure of the attitudes and beliefs scale 2: implications for rational emotive behavior therapy. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *38*(2), 111–142. https://doi.org/10.1007/s10942-020-00349-0.

DiGiuseppe, R., Gorman, B., Raptis, J., Leaf, R., & Robin, M. W. (2021). The development of a short form of an irrational/rational beliefs scale. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *39*(3), 456–490. https://doi.org/10.1007/s10942-021-00386-3.

Deng L, & Chan, W. (2017) Testing the Difference Between Reliability Coefficients Alpha and Omega. *Education and Psychological Measurement*. 77(2):185-203. https://doi.org/10.1177/0013164416658325.

Dryden, W., & David, D. (2008). Rational emotive behavior therapy: Current status. *Journal of Cognitive Psychotherapy, 22*(3), 195-209. https://doi.org/10.1891/0889-8391.22.3.195.

Dryden, W., David, D., & Ellis, A. (2010). Rational Emotive Behavior Therapy. In Keith S. Dobson (Eds.), *Cognitive-Behavioral Therapies- Third Edition* (pp. 226-276). The Guilford Press.

DuBay, W. H. (2007). Smart Language: Readers, Readability, and the Grading of Text. https://files.eric.ed.gov/fulltext/ED506403.pdf.

Dunn, K. J., & McCray, G. (2020). The place of the bifactor model in confirmatory factor analysis investigations into construct dimensionality in language testing. *Frontiers in Psychology*, *11*, 1357–1357. https://doi.org/10.3389/fpsyg.2020.01357.

Ellis, A. (1962). *Reason and emotion in psychotherapy*. Secaucus, NJ: Lyle Stuart.

Ellis, A. (1976). The biological basis of human irrationality. *Journal of Individual Psychology*, *32(2),* 145–168. https://files.eric.ed.gov/fulltext/ED119041.pdf.

Fülöp, I. (2007). A confirmatory factor analysis of the attitudes and belief scale 2. *Journal of Cognitive and Behavioral Psychotherapies, 7(2),* 159–170. http://jebp.psychotherapy.ro/vol7no2/a-confirmatory-factor-analysis-of-the-attitudes-and-belief-scale-2/.

Harrington, N. (2011a). Frustration and discomfort intolerance: Introduction to the special issue. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *29(1)*, 1–3. https://doi.org/10.1007/s10942-011-0125-5.

Harrington, N. (2011b). Frustration Intolerance: Therapy issues and strategies. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *29*, 16. https://doi.org/10.1007/s10942-011-0126-4.

Hyland, P., Fox, R., Treacy, G., Maguire, P., Boduszek, D., & Vallières, F. (2017). Assessing the factorial validity of the attitudes and belief scale 2-abbreviated version: A call for the development of a gold standard method of measuring rational and irrational beliefs. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 35*(2), 111-124. https://doi-org.jerome.stjohns.edu/10.1007/s10942-016-0243-1.

Hyland, P., Maguire, R., Shevlin, M., & Boduszek, D. (2014). Rational beliefs as cognitive protective factors against posttraumatic stress symptoms. *Journal of Rational-Emotive & Cognitive-Behavior Therapy,32(4)*. 297-312. https://doi.org/10.1007/s10942-014-0195-2.

Hyland, P., Shevlin, M., Gary Adamson, G., & Boduszek, D. (2015) Irrational Beliefs in Posttraumatic Stress Responses: A Rational Emotive Behavior Therapy Approach, *Journal of Loss and Trauma*, *20(2),* 171-188. https://doi.org/10.1080/15325024.2013.839772.

Hyland, P., Shevlin, M., Adamson, G., & Boduszek, D. (2014). Modeling the structure of the attitudes and belief scale 2 using CFA and bifactor approaches: Toward the development of an abbreviated version. *Cognitive Behaviour Therapy, 43*(1), 60-71. https://doi.org/10.1080/16506073.2013.777467.

Jibeen, T. (2017). Unconditional self-acceptance and self-esteem in relation to frustration intolerance beliefs and psychological distress. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *35*(2), 207–221. https://doi.org/10.1007/s10942-016-0251-1

Knekta, E., Runyon, C., & Eddy, S. (2019) One Size Doesn't Fit All: Using Factor Analysis to Gather Validity Evidence When Using Surveys in Your Research. *CBE Life Sciences Education,*18(1). doi: 10.1187/cbe.18-04-0064.

Lindner, H., Kirkby, R., Wertheim, E., & Birch, P. (1999). A brief assessment of irrational thinking: The shortened General Attitude and Belief Scale. *Cognitive Therapy and Research*, 23*(6),* 651–663. https://doi.org/10.1023/A:1018741009293.

Macavei, B., & McMahon, J. (2010). The Assessment of Rational and Irrational Beliefs. In D. David, S. J. Lynn, & A. Ellis (Eds.), *Rational and irrational beliefs: Research, theory, and clinical practice* (pp. 115–146). New York, NY: Oxford University Press.

Malkewitz, C.P., Schwall, P., Meesters, C., & Hardt, J. (2023) Estimating reliability: A comparison of Cronbach's α, McDonald's ω and the greatest lower bound. *Social Sciences & Humanities Open 7(1)*. https://doi.org/10.1016/j.ssaho.2022.100368.

Millon, T. (1987). *Manual for the MCMI-II (2nd Ed.)*. Minneapolis, MN: National Computer Systems.

Mindrila, A. (2010). Maximum Likelihood (ML) and Diagonal Weighted Least Squared (DWSL) estimation procedures: A comparison of estimation bias with ordinal and multivariate non-normality data. *International Journal of Digital Society 1(1),* 60-66.

Montgomery, G.H., David, D., DiLorenzo, TA, & Schnur, J.B. (2007). Response Expectancies and Irrational Beliefs Predict Exam-Related Distress. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 25, 17–34 (2007). https://doi-org.jerome.stjohns.edu/10.1007/s10942-006-0029.

Morin, A. J. S., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling*, *23*(1), 116–139. https://doi.org/10.1080/10705511.2014.961800.

Muthen, L. K. & Muthen, B. O. (2017). *Mplus: Statistical analysis with latent variables: User's guide* (8th Ed.). Los Angeles, CA: Muthen & Muthen.

Oltean, H., & David, D. O. (2018). A meta-analysis of the relationship between rational beliefs and psychological distress. *Journal of Clinical Psychology, 74*(6), 883–895. https://doi.org/10.1002/jclp.22562.

Opris, D., & Macavei, B. (2007). The profile of emotional distress; norms for the Romanian population. *Journal of Cognitive and Behavioral Psychotherapies, 7*(2), 139-142.

Portoghese, I., Porru, F., Galletta, M., Campagna, M., & Burdorf, A. (2020). Stress among medical students: factor structure of the university stress scale among Italian students. *BMJ Open*, *10*(9). https://doi.org/10.1136/bmjopen-2019-035255.

Robertson, D. (2010). *The Philosophy of Cognitive-Behavioural Therapy (CBT) : Stoic Philosophy As Rational and Cognitive Psychotherapy*. Routledge.

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software, 48(2)*, 1-36. URL: http://www.jstatsoft.org/v48/i02/.

Sava, F. A. (2009). Maladaptive schemas, irrational beliefs, and their relationship with the five-factor personality model. *Journal of Cognitive and Behavioral Psychotherapies*, *9(2),* 135–147.

Sacks, S., (2004). Rational emotive behavior therapy. *Journal of Psychosocial Nursing & Mental Health Services, 42*(5), 22-31. https://jerome.stjohns.edu/login?url=https://www.proquest.com/scholarly-journals/rational-emotive-behavior-therapy/docview/225540774/se-2.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review.

Journal of Educational Research, 99(6), 323–337. https://doi-org.jerome.stjohns.edu/10.3200/JOER.99.6.323-338.

Sentell, T. L., & Ratcliff-Baird, B. (2003). Literacy and Comprehension of Beck Depression Inventory Response Alternatives. *Community Mental Health Journal, 39*(4), 323-31. https://doi.org/10.1023/A:1024072108467.

Tecuta, L., Gardini, V., Schumann, R., Ballardini, D., & Tomba, E. (2021). Irrational Beliefs and Their Role in Specific and Non-Specific Eating Disorder Symptomatology and Cognitive Reappraisal in Eating Disorders. *Journal of Clinical Medicine, 10*(16), 3525. https://doi.org/10.3390/jcm10163525.

Terjesen, M. D., Salhany, J., & Sciutto, M. J. (2009). A psychometric review of measures of irrational beliefs: Implications for psychotherapy. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 27*, 83–96. https://doi.org/10.1007/s10942-009-0093-1.

Vîslă, A., Flückiger, C., grosse Holtforth, M., & David, D. (2016). Irrational beliefs and psychological distress: A meta-analysis. *Psychotherapy and Psychosomatics, 85*(1), 8-15. https://doi.org/10.1159/000441231.

Vita

Name	Mahdiya Fazel
Baccalaureate Degree	Bachelor of Science, Stetson University, DeLand Major: Psychology/Religious Studies
Date Graduated	May, 2013
Other Degrees and Certificates	Master of Science, St. John University, Jamaica, Major: School Psychology
Date Graduated	May, 2018