Master's Thesis of Yoon Young Choi

Development and Validation of the Korean version Freiburg Mindfulness Inventory (FMI) and Types of Positive Affect Scale (TPAS)

- Application of Item Response Theory -

한국판 Freiburg Mindfulness Inventory (FMI) 및 Types of Positive Affect Scale (TPAS) 척도 번역 및 타당화

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Abstract

The purpose of this study was to look into the psychometric qualities of the Korean versions of the Freiburg Mindfulness Inventory (FMI) and Types of Positive Affect Scale (TPAS) in a cross-sectional design using item response theory and factor analysis. The scale validation involves 352 healthy Korean individuals. Although the FMI scale showed one-factoriality, a two-factor model fits better. A two-factorial approach without item 13 also fitted well. For the Rasch analysis of items of FMI, item 13 did not show adequate fitting (INFIT=1.42). TPAS is not represented by a single factorial model. The TPAS two-factor model fit the data adequately. Item 4 (INFIT=1.51) and 7 (INFIT=1.76) are not consistent with the Rasch model analysis. Except for FMI item 13, the scale appears to function equally well across a variety of subgroups such as sex and patient group. In conclusion, the study reveals that the FMI-13's two-factorial model provides a decent approximation to Rasch requirements, albeit further debate of how to interpret the results is required. The one-factorial TPAS solution did not fit well. With the exception of items 4 and 7, the two-factorial model meets the Rasch criterion. As a result, these two items should be removed for more validity.

Keyword : Freiburg Mindfulness Inventory (FMI), Types of Positive Affect Scale (TPAS), Item Response Theory, Rasch Model, Validation, Psychometric

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Chapter 1. Introduction

1.1 Study Background

The growing interest in mental health emphasizes importance of quality of measures. Reliability and validity are higher in physiological indicators, however due to practical reason, health data is highly dependent on the self-reported questionnaire (SRQ), which often called psychometric test or self-reported inventory(Drogin, 2019). The self-report questionnaires are widely used to identify specific symptoms or indicators of psychiatric illnesses. Also, SRQ is frequently used to evaluate symptoms before and after, in order to compare responses across different intervention. They are also utilized to assess the prevalence of the disorders(Demetriou et al., 2015). Likewise, the utilization of SRQ in the health research is immense. Thus, it is important to develop quality of psychometric tool in order to produce high quality data.

Good quality of health data provides evidence to support quality of health promotion and health policy. Since form 2021, South Korean Ministry of Health and Welfare has promoted 5 years plan including multiple health promotions and policies to improve public's mental health. Purpose of the 5 years of national plan is not only to aid mental illness patients but also to prevent mental illness, improve mental health in general and even improve quality of life (2021년 정신건강사업 안내,

2021.).

One of the examples of among the health promotion programs in South Korea is forest therapy program. The South Korean mystery of forestry provides forest therapy program, a health promotional program which aims to enhance both physical and mental health of participants(Rajoo et al., 2020). Forest therapy often called forest bathing,산림욕. Forest therapy program utilizes natural elements of forest to improve multiple aspects of health. The positive aspect about forest therapy is that general public who can access to forest can easily utilize forest therapy program. In South Korea demands on forest therapy is growing(Korea Forest Service, n.d.). To assess more scientific and evidence base forest therapy program, research on the health outcome of forest therapy program is necessary.

In recent decade, many researches were done to prove the effect of forest therapy and its' environment. In the systematic review of the previous research on tools of forest therapy outcome measures, anxiety, depression, mood, stress were most observed indicators of the effect. However, it is important to expand psychological outcome indicators of forest therapy(Han et al., 2016).

Numerous publications indicate that the influence of mindfulness(Ambrose-Oji, 2013; 안희영 & 이건호, 2013), acceptance(김홍규 et al., 2016; 서병찬, 2020) and positive emotion(이주은 & 신원섭, 2019) from the forest therapy programs should be examined further research. According to the papers, further data collection is required for a study that quantitatively assesses the impacts of forest therapy on mindfulness and positive affect. Furthermore, mindfulness and positive emotions

are major psychological indicators that can improve the resiliency of psychological recovery(Oh et al., 2016). Further research needs to be done in depth as other important elements of mental health(Han et al., 2016) promotion from the context of forest therapy.

Thus, this research examined mindfulness and positive affect measures. Most suitable measures for forest therapy and its environment has been chosen, however, both measured were not translated into Korean. Thus, two measures will be translated and validated for Korean population according to proper process.

1.2 Mindfulness

1.2.1 Mindfulness

The capacity for attentive attention to the present moment with acceptance, non-judgment, and non-reactivity is known as mindfulness. (Kabat-Zinn, 1990, 1994). Throughout the course of its history, the concept of mindfulness, as it relates to research and practice, has been debated and investigated via a variety of lenses(Lee et al., 2021). The origin of mindfulness is adopted from the Buddhist meditation technique: 'Sati', where a person became aware of one's senses(Walach et al., 2006). According to Buddhist traditions, the definition and concept of mindfulness are extensive, it encompasses a mentality in which how past, present, and future moments arise and explains sinking into momentary sensory perceptions and

cognition(Karunamuni & Weerasekera, 2019). The cognitive scientific interpretation of mindfulness describes it as a psychological process that involves paying attention to calm and stability on purpose without passing judgment on the events or sensations that are taking place in the here and now. This interpretation recognizes mindfulness as a mental action that is universal to humans(Belzer et al., 2013). While there are various views on mindfulness, most of the theories agree that mindfulness is a mental state where one brings attention to the present moment without judgment (Creswell, 2017).

Mindfulness intervention showed a significant effect on mental health such as reducing anxiety, PTSD, depression, and stress(Goldin & Gross, 2010; Lee et al., 2021; Sala et al., 2020). Mindfulness may be seen as a way to increase wisdom and self-awareness. (Karunamuni & Weerasekera, 2019). Moreover, mindfulness is related to the strengthening the psychological resilience in spite of physiological and psychological challenge and even it could possibly affect longevity of a person(Asch et al., 2021). Evermore, it shows an effect on neurological diseases such as Alzheimer's(Innis et al., 2021). Also, several studies have shown that mindfulness intervention can be implied to different population groups(Dunning et al., 2019; Lee et al., 2021). Likewise, the growing attention in the health science field, the development of a valid tool to measure mindfulness become more important to produce scientific evidence.

As it is made for various theoretical backgrounds and various purposes, the types of measures to measure mindfulness are bound to vary. One of the reasons why it is difficult to agree on the definition of mindfulness is that mindfulness is studied

by various theoretical foundations(Hayes & Hofmann, 2018). While adapting its concept to a theorem, different frameworks define mindfulness by different components(고은미 & 김정호, 2021).

1.2.2 Measures

There are many different points of view regarding mindfulness. There are perspectives that regard mindfulness as a state, and there are other perspectives that view it as a trait. State mindfulness (i.e., being mindful in the present moment) is distinguished from trait mindfulness theory (i.e., the stable tendency to be mindful)..

In the case of mindfulness as a trait, the frequency and intensity of mindfulness vary from person to person on average(Brown & Ryan, 2003). Thus the mindfulness measures trait focus on the individual differences in the overall level of mindfulness that can be found at different times and in different settings. SRQ to measure mindfulness as a trait is Mindful Attention Awareness Scale (MAAS)(Brown & Ryan, 2003), Freiburg Mindfulness Inventory (FMI)(Walach et al., 2006), Kentucky Inventory of Mindfulness Skills (KIMS)(Baer et al., 2004), Cognitive and Affective Mindfulness Scale (CAMS)and revised version Revised Cognitive and Affective Mindfulness Scale (CAMS-R)(Feldman et al., 2022), Mindfulness Questionnaire (MQ), , Philadelphia Mindfulness Scale (PHLMS) (Sala et al., 2020)

State mindfulness is the moment of attentive, nonjudgmental awareness of moment-to-moment cognition, emotion, perception, and experience that is not

constrained by past or future thinking(Garland et al., 2017). The degree that a person is mindful at any given moment is referred to as their "state of mindfulness."(Buchheld et al., 2001; Goldberg et al., 2017; Lee et al., 2021) State mindfulness is measured with Toronto Mindfulness Scale (TMS) and State Mindfulness Scale (SMS). The Toronto Mindfulness Scale (TMS) is a tool that measures mindfulness as a state-like entity, which may be induced and maintained by consistent practice. The State Mindfulness Scale (SMS) is a survey that consists of 21 questions and contains an overall state mindfulness scale in addition to two subscales, including state mindfulness of mind and state mindfulness of body(Dunning et al., 2019; G & A, 2013).

1.2.3 Freiburg Mindfulness Inventory (FMI)

The Freiburg Mindfulness Inventory (FMI; Buchheld et al. 2001) was the one of the first mindfulness measure, which created from the fundamental Buddhist idea of mindfulness, examining nonjudgmental present-moment observation and openness to unfavorable situations in meditators. Original version of FMI has four interpretable factors with 30 items (Buchheld et al. 2001). Walach et al. (2006) developed a one-dimensional short form (FMI-14) that retains all elements of the long form operationally independent of a Buddhist or meditation setting. Therefore, short form FMI is suitable to all population groups. The short version FMI is consist of 14 questions by 4 factors: 1) mindful presence, 2) non-judgemental acceptance, 3) openness to experiences, and 4) Insight(Walach et al., 2006).

To date, FMI has been translated from several countries. FMI is actively used in countries in Asia as well as Western cultures such as Germany, where FMI was first created. Among Asian countries, Turkey, China, and Japan are conducting mindfulness research with translated version of FMI. Therefore, it can be assumed that FMI is a suitable tool not only for Western cultures but also for Eastern cultures. However, FMI has not been translated in Korean yet.

1.3 Affect

1.3.1 Affect

Affect, in psychology, refers to the underlying experience of feeling, emotion or mood(Russell, 2009). According to Diener, affect is equivalent to mental health(Diener, 2009). Every minute of our lives, whether we realize them or not, we are subject to effects. These affects are caused by both behavior and cognition. It can also influence cognition and behavior. ABC theory in psychology contends that affect, behavior, and cognitions are inextricably linked with one another(Ziegler & Leslie, 2003).

Maintaining positive emotion and feeling is not simply avoiding negative state of mind. Of course, there are lots of researches states that the positive emotion or feeling of the research's interest is closely related to the health outcome. Not only it relates to mental health dimension, but also it regulates physical health as well(Ong

et al., 2011; Ryff & Singer, 2003). There is a research claims that the psychological resilience and positive emotional granularity is positively related and it relates to the ability to coping with one's health such as cardiovascular disease, mental health and even longevity (Tugade et al., 2004). Also, a research defines positive emotion as hope and curiosity discovered that the person who has higher hope and curiosity decreased the likelihood of developing hypertension and diabetes mellitus(Richman et al., 2005).

1.3.2 Measures

There are less consensus on operational definition of affect, as well as emotion, which does not have scientific consensus on definition(Lewis et al., 2010). In affect study, emotion measures are classified into three types: (1) dimensional measures (e.g., PANAS:Thompson, 2007); (2) discrete emotion measures; (3) measures that are "blended," implying that in addition to emotion questions, integrated a wider set of emotional components such as meaning and purpose(Moskowitz et al., 2021). Dimensional model measures captures two dimension of affect: valence and activation. The valence dimension represents the spectrum of how pleasant vs unpleasant an emotion is, whereas the activation dimension describes the continuum of how stimulating or invigorating an emotion is(Larsen & Diener, 1992). Discrete measurements of emotion, on the other hand, are founded on the concept that there is a core set of basic emotions that can be separated based on physiological, behavioral, and subjective experience components such as rage, joy, and others(Izard

& Buechler, 1980).

1.3.3 Types of Positive Affect Scale (TPAS)

Types of Positive Affect Scale (TPAS) was developed by Gilbert in 2008(Gilbert et al., 2008). A total of 18 questions ask about active positive affects and content/ safe positive affects which is system indicated by neuroscience (Depue & Morrone-Strupinsky, 2005) . The scale was created to assess the degree to which people feel various positive emotions. Respondents are asked to score 18 "feeling" words on a 5-point scale to indicate how typical they are (0= ‘not characteristic of me’ to 4 = ‘very characteristic of me’). Cronbach alphas of.83 for Activating Positive Affect and Relaxed Positive Affect, and.73 for Safeness/contentment Positive Affect, indicated that the scale had strong psychometric qualities(Gilbert et al., 2008).

1.4 Objectives

This research is to validate the Freiburg Mindfulness Inventory (FMI) and Types of Positive Affect Scale (TPAS) in the Korean language using item response theory (Rasch model). Following is the main objectives of the research.

First, translate FMI and TPAS into compliable Korean language and culture.

Second, validate translated version of FMI and TPAS.

Chapter 2. Methods

2.1 Translation

Translation process is abided by the International Testing Commission(ITC) guideline(ITC,2017.). Through the translation process, translator with the appropriate experience made sure that the translation and adaptation procedures take into account the linguistic, psychological, and cultural variations in the intended populations. Following is the translation process of FMI and TPAS.

2.1.1. Translation Process of FMI

First, permission form the original other was granted. English version of FMI was translated into Korean by a researcher who is both fluent in Korean and English which has undergraduate degree in psychology. Turkish FMI was translated into Korean by the bilingual translator. Both set of English-Korean, Turkish-Korean FMI was used to generate preliminary version of FMI. The translation process ensured that the translated version reflects Korean language and culture which can depict same contents as the original measure. Then the back translation Korean to English process was done by another bilingual who majored psychology. Final discussion among the researchers including mindfulness expert refine the final copy of FMI.

2.1.2. Translation Process of TPAS

The researcher got a permission to translated the TPAS into Korean form the original author. TPAS is construct with 18 adjective words which depicts positive affect. Thus, 3 researchers translated each words without discussion. Also, one bilingual and one semi-bilingual researcher translated the items. The researchers compared 5 sets of translated version to choose the best option. After the discussion, preliminary version of TPAS was back translated by another bilingual professional translator. Final discussion was done by all researchers.

2.2 Data Collection

2.2.1 Participants

Sample size for validation to fulfill requirement for factor analysis and item response model. There are different views on the adequate number of samples for translation and validation of the psychometric scale. Some scholar claims the participants should be calculated by the ratio of the number of items (Gorsuch, 1990; Pedhazur, 1997). Considering various aspects, 300 or more is adequate sample for the factor analysis (서원진 et al., 2018a). In general, less than 100 participants is "poor", more than 200 participants regarding "fair", if there are more than 300 participants counted “good” and more than 500 sample is "very good" size to validate scale (Comfrey AL, Lee HB., 1992). Also, at least 100 samples are recommended to validate scale with IRT (Linacre, 1994). However, some claims that 200 or more

sample is more adequate (Orlando & Marshall, 2002).

To minimize the linguistic differences and cultural influence, it is important to sample irrelevant population of interest(*ITC,* 2017.). Those who understands the meaning of the culture, nuance, and context contained in the Korean language were included(A. Y. Kim & Lim, 2003). Thus, Korean adults who is fully aware of Korean language and Korean culture were sampled. Exclusion criteria is a personal whose lack of Korean language and understanding of Korean culture. Non-Korean was also excluded.

With these criteria, 352 healthy Korean adult's data was collected. No missing values were reported.

2.2.2 Measures

Sociodemographic questions include sex, age, residential province, education level, income, marital status, chronic illness, and subjective class level. Other than the translated version of FMI and TPAS, Korean Version Five-factor mindfulness Questionnaire, Positive Affect and Negative Affect Schedule (PANAS), Beck Depression Scale, and Korean Acceptance-Action Questionnaire-Ⅱ were used to measure criterion validity. Total of 130 questions will be asked.

(1) Translated version of Freiburg Mindfulness Inventory (FMI)

Freiburg Mindfulness Inventory (FMI) was the first mindfulness measure, developed by Buchhled (Buchheld et al., 2001). The short version FMI is consist of 14 questions which is applicable for the non- professional individual in mindfulness (Walach et al., 2006). The Likert scale is 1-4 (1: Rarely, 2: Occasionally , 3: Fairly often, 4: Almost always). The original measure does not specify the reference period. However, this data collection reference period was 'in usual days(during last week)'.

(2) Translated version of Types of Positive Affect Scale (TPAS)

Types of Positive Affect Scale (TPAS) was developed by Gilbert in 2008(Gilbert et al., 2008). The item is constructed with total of 18 items. Each item is an adjective describes positive affect. The question asks how extends does a person thinks or feel the given item describe one self. The Likert scale is 0-4 (0: Not Characteristic of me , 2: Fairly Characteristic of me, 4: Very Characteristic of me).

(3) Korean Version of Five-factor mindfulness Questionnaire

FFMQ is measurement is developed by Baer et al.,2006. Baer et al. (2006) performed a joint factor analysis of five major mindfulness measures, including the FMI(Walach et al., 2006), Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) , Kentucky Inventory of Mindfulness Skills (KIMS;Baer et al., 2004), Cognitive and Affective Mindfulness Scale (CAMS;Feldman et al., 2007), and Mindfulness Questionnaire(Chadwick et

al., 2008), in order to clarify the dimensional structure of mindfulness. The Likert scale is 1-5 (1: Never or very rarely true, 2:Rarely true, 3: Sometimes true, 4:Often true, 5:Very often or always true). Korean version was translated by Won and Kim, 2006.

(4) Positive Affect and Negative Affect Schedule; PANAS

The Positive and Negative Affect Schedule, also known as PANAS, is a self-report questionnaire that measures both positive and negative affect. PANAS is comprised of 20 items that are rated on a scale from 1 (not at all) to 5 (very much)(Thompson, 2007). Korean version of PANAS was developed in 2016 by Park and Lee(박홍석 & 이정미, 2016).

(5) Beck Depression Scale

The original BDI, which was originally released in 1961 and later altered in 1978 as the BDI-1A, as well as the BDI-II, which was published in 1996. Korean version of BDI was revised in 2011(임선영 et al., 2011). The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, published by the American Psychiatric Association modified several of the diagnostic criteria for Major Depressive Disorder, prompting the development of the BDI-II, a revision of the BDI. There are 21 items in total, and each question has four different response answers varying the intensity (Beck et al., 1996).

(6) Korean Acceptance-Action Questionnaire-Ⅱ

The Acceptance and Action Questionnaire, often known as the AAQ-II, is a self-report measure that was developed with the aim to evaluating psychological rigidity and experiential avoidance(F. W. Bond et al., 2011). It is consist of 10 items with 7 point Likert scale. Korean version was translated (허재홍 et al., 2009).

2.2.3 Collection Procedure

This study recruited samples through a survey company called 'Korea Research'. Data collection was done throughout 2022. 10.17~ 2022. 10.20. The study was a part of an ongoing study of the『Feasibility study of health measurement tools and protocols for forest therapy program』project with the Korea Forestry Promotion Institute. Participants can participate in the survey by clicking on the link sent by Korea Research. Once a participant consent for the study from the site, one can participate in the study. Consent form and the questions are attached in appendix.13. This study was conducted with the approval of the Institutional Ethics Committee of Seoul National University (IRB No. 2210/002-021, IRB No. E2211/003-011).

2.3 Data Analysis

First, descriptive statistical analysis will be done with collected data. The normality and skewness of each item is checked. Item-total correlation and Cronbach's alpha is used to show internal consistency. An item reported absolute skew value > 2 or an absolute kurtosis >7 means the data is not normally distributed (H.-Y. Kim, 2013). Cronbach's alpha of.70 and above is considered good,.80 and above is considered better, and.90 and above is considered best(Taber, 2018). All corrected item-total correlations were more than 0.30, showing that each item was related to the entire scale(Nunnally, 1994).

Then to analyze factor structure of FMI and TPAS, Principal Component Analysis (PCA), Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) has been done. After confirming factor structure, item validity was analyzed by applying item response model. Each item's validity and scale has been evaluated. Differential item functioning (DIF) was perform to check group difference of the items. To check the criterion validity, correlation analysis with BDI, FFMQ, PANAS, and K-AAQ-2 will be performed. All statistical analysis was done by R software 4.2.0. In Appendix. 14. R package used in this research is summarized.

2.3.1 Principal Component Analysis (PCA)

Horn's Parallel Analysis (PA) is an method for determining the number of principal components (PCA) or factors (CFA) that account for the variation in a set of n observations on p variables (Horn, 1965). A scree plot was used to determine the number of factors in FMI and TPAS. The eigenvalues in a scree plot are always displayed in descending order, from greatest to smallest. The "elbow" of the graph where the eigenvalues appear to level out is determined using the screeplot, and factors to the left of this elbow consider significant(Dmitrienko et al., 2007).

Also, biplot was used to visualize the result of PCA. Biplots combine a scoring plot with a loading plot. A biplot enables the graphical representation of information on both samples and variables in a data matrix. Variables are represented as vectors, linear axes, or nonlinear trajectories, while samples are displayed as points. Category level points may be used to denote the levels of a categorical variable in the case of categorical variables(Greenacre, 2017).

2.3.2. Exploratory Factor Analysis (EFA)

EFA is a factor analysis technique with the primary purpose of identifying the underlying connections between measured variables. The EFA identifies variables as a function of common factors, unique factors, and measurement errors. Each unique component influences only one variable and does not explain the relationships between variables. Common factors influence several manifest variables, and "factor

loadings" quantify the influence of a common factor on a manifest variable(Norris & Lecavalier, 2010).

EFA was conducted to analyze the factor structures of FMI and TPAS. Maximum likelihood method was implied because the collected data were normally distributed(Seo, 2017). Also, for the factor rotation, oblimin rotation was implied. EFA confirmed the underlying factors and constructs of FMI and TPAS. According to the result of the EFA, CFA is conducted.

2.3.3. Confirmatory Factor Analysis (CFA)

The purpose of a confirmatory factor analysis is to examine whether or not the data fit to a predicted model fit. Thus, after the factor composition of the items confirmed by EFA the factor structure is confirmed through CFA. Best model confirmed from the EFA and PCA was implied to the CFA.

It is critical to select the suitable components for the factors when developing and organizing them. An item's factor load should be larger than.30 to.40, and when one item is simultaneously loaded on two or more factors, the difference in load amount should be.10 or greater(Floyd & Widaman, 1995).

The model evaluation criteria were the absolute fit index: 1) root mean square error of approximation (RMSEA), and the relative fit indices, 2) the comparative fit index (CFI), 3)the Tucker-Lewis index (TLI) which is less susceptible to sample size . Chi-square verification was only utilized as a reference for evaluating the model

because it is sensitive to sample size and has the drawback of readily rejecting the model as the sample size increases(Nunnally, 1994).

The smaller the RMSEA, the better, and if it is less than .05, it is judged as a good fit. Generally, CFI, TLI of 0.9 or higher is considered a good fit, 0.8 or higher means mediocre fit(Akkuş, 2019; Cudeck, 1993).

2.3.4. Item Response Theory

The item response theory has the advantage of estimating the difficulty, discrimination, or speculation of the question by estimating item characteristic curves which portraits which assume the attributes of the subject(Scott, 2001). For the validation of the FMI and TPAS, the Rasch model, which is a representative model of item response theory will be used.

The Rasch model, which is part of the family of IRT models, offers a credible alternative to the Classical Test Theory (CTT). IRT models often identify the likelihood of advocating a specific item or trait as a function of latent factor. The Rasch model examines whether the association between item responses and a latent variable follows an s-formed curve comparable to a cumulative normal curve. CTT models imply a linear connection, even if the underlying model is rarely explicitly evaluated. In comparison to CTT, the Rasch model can perform item based analysis(T. Bond et al., 2020; Embretson & Reise, 2000; Scott, 2001; Wind & Hua, 2022).

Property of Rasch model in most basic dichotomous version, a logistic function of the difference between ability θ (or latent factor.) and item difficulty β on a linear scale. It measures the chance that person p will be able to solve i item j. X is frequently used to represent the response to an item. Endorsing a dichotomous item (yes) can be represented by $X = 1$, whereas non-endorsing (no) can be represented by $X = 0$(Sauer et al., 2011; Scott, 2001).

$$P(X_{pi} = 1|\theta_p, \beta_i) = \frac{\left(e^{\theta_p} e^{-\beta_i}\right)^{X_{pi}}}{1 + e^{\theta_p} e^{-\beta_i}} = \frac{e^{(\theta_p - \beta_i)X_{pi}}}{1 + e^{(\theta_p - \beta_i)}}$$

Andrich's Rating Scale Model (RSM) was chosen from among the several Rasch models. This model seems to be the best fit for our data set due to the fact that it 1) allows for the analysis of a scale consisting of items with more than two answer possibilities (also known as polytomous items), and 2) maintains the same number of answer alternatives across all items(Andrich, 1978).

Differential item functioning (DIF) is a statistical method to indicates extent of the item may be assessing differing skills for members in different subgroups. Thus, it analyzed the difference of subgroup's response by an item. For DIF, Wald test method were implied. For this analysis, Partial Credit model, which is another Rasch model was implied. The difference between dichotomous group (Sex: Male/Female, Chronic disease patient: patient/ non-patient) were analyzed.

2.3.5. Correlation Analysis

Pearson's correlation analysis were done in sum of all reference measures. Additionally, all measures items (FMI,TPAS, BDI, FFMQ, PANAS, and K-AAQ-2) were divided into latent factors. Based on the Korean translation literature, items from the factor components of the reference measures were divided.. The components of FMI and TPAS were determined by combining the results of PCA, EFA, and CFA. Each measure's factor correlation is analyzed by Pearson's correlation. Appendix 6 provides a table includes the items and factors for each measures.

Chapter 3. Result

3.1 Descriptive Analysis

3.1.1 Participants Characteristic

Table.1 is the descriptive analysis of the study participants. 352 data sets were collected. Age and sex was evenly distributed among the sample. There were n=175 males and n=177 females. Age distribution was almost even throughout all age groups(20's=71, 30's=68, 40's=70, 50's=68, +60= 75). Participant who reported one or more chronic illnesses was n=157. Chronic illness categorization was asked according to the Korea National Health and Nutrition Survey from Korea Centers for Disease Control and Prevention (2021). Income level was divided into fifth quartile according to 2017 income level distribution(KOSIS, 2017). Region was grouped by capital area including Seoul, Kyunggi and Incheon. Other region were grouped as non-capital area. Subjective social level class was grouped by three levels.

Table.1 Participants Characteristic

Item		Count	Mean (SD)
Sex	Male	175	
	Female	177	
Age	20-29	71	25.45(2.52)
	30-39	68	34.65(3.03)
	40-49	70	43.56(2.71)
	50-59	68	54.18(3.22)
	60+	75	64.99(4.61)
Chronic Illness①	Yes	157	
	No	195	
Marital State	Married	191	
	Others②	30	
	Single	131	
Income level③	1Q	12	0 (0)
	2Q	54	1953.11 (445.76)
	3Q	84	3399.00 (388.38)
	4Q	92	5341.96 (647.73)
	5Q	120	9809.73 (3098.02)
Psychiatric Illness	Yes	7	
	No	345	
Education	Elementary	1	
	Middle School	3	
	High School	77	
	College	271	
Region④	SKI	216	
	Others	136	
Subjective Social level	High (8~10)	22	
	Middle (4~7)	251	
	Low (1~3)	79	

① KCDC: KNHANES (2021)
② Separated/Divorced/ Widowed
③ KOSIS: 가계금융복지조사 (2017)
④ Region: [(SKI: Seoul, Kyunggi, Incheon),(Others: Busan, Daegu, Gwangju, Daegeon, Ulsan, Gangwon, North Chungcheong Province, South Chungcheong Province, North Jeolla Province, South Jeolla Province, North Gyeongsang Province, South Gyeongsang Province, Jeju)

3.1.2 Descriptive analysis of FMI and TPAS

Cronbach's alpha of all measurements were adequate (FMI=.88, TPAS=.94, FFMQ=.889, PANAS=.86, BDI=.92, KAAQ2=.85). Table2 is the descriptive analysis of response of FMI and table 3 is descriptive analysis of response of TPAS from collected samples. Skewness and kurtosis was reported to check normal distribution of each items. Normality of the items were adequate in all measures. None on the item reported greater either an absolute skew value greater than 2 or an absolute kurtosis value greater than 7(H.-Y. Kim, 2013).

Also, corrected item-total sum correlation and Cronbach's alpha if item is deleted were reported(Table.2, Table 3). Item 13 in FMI showed low correlation between item-total sum(r=.22). Other items showed relatively steady correlation. Item 7 in TPAS also reported low item-total correlation(r=.29). Item 4 in TPAS reported slightly low correlation compare to other items(r=.47). Total item correlation is frequently used as an initial evaluation criteria in assessments. Item-total correlation below 0.3 indicates a poor correlation between the item and the entire scale(Tutelman et al., 2022). Also, this low correlation between item and total sum may indicated that the item could belong in different facet (Seo, 2017). Thus, further analysis should assess validity of on those items in depth.

Table.2 Descriptive analysis of FMI

Item	Item Contents	Mean(SD)	Skew	Kurtosis	Corrected Item- Total Correlations	α If Deleted
1	나는 지금 순간의 경험에 마음이 열려있다. I am open to the experience of the present moment.	2.67(0.79)	-0.07	-0.49	0.57	0.87
2	나는 먹을 때나, 요리할 때나, 청소할 때나, 말할 때나, 나의 몸을 느낀다. I sense my body, whether eating, cooking, cleaning or talking.	2.61(0.82)	-0.17	-0.5	0.49	0.87
3	나는 마음이 다른 곳에 가 있다는 것을 알아차릴 때, 부드럽게 지금 여기에서 일어나는 경험으로 돌아온다. When I notice an absence of mind, I gently return to the experience of the here and now.	2.38(0.84)	0.21	-0.51	0.53	0.87
4	나는 나 스스로에게 감사할 수 있다. I am able to appreciate myself.	2.72(0.87)	-0.11	-0.75	0.62	0.86
5	나는 내 행동의 이면에 무엇이 있는지 주의를 기울인다. I pay attention to what's behind my actions.	2.53(0.86)	-0.07	-0.64	0.56	0.87
6	나는 내 실수나 곤경을 판단하지 않고 바라본다. I see my mistakes and difficulties without judging them.	2.08(0.84)	0.38	-0.52	0.53	0.87
7	나는 지금 여기에서 일어나는 경험과 연결되어 있다고 느낀다. I feel connected to my experience in the here-and-now.	2.62(0.79)	-0.02	-0.48	0.54	0.87

Item	Item Contents	Mean(SD)	Skew	Kurtosis	Corrected Item- Total Correlations	α If Deleted
8	나는 불쾌한 경험들도 받아들인다. I accept unpleasant experiences.	2.38(0.74)	0.38	-0.13	0.50	0.87
9	나는 무언가 잘못되어도 나 스스로에게 친절하다. I am friendly to myself when things go wrong.	2.19(0.87)	0.25	-0.68	0.51	0.87
10	나는 휩쓸리지 않고 내 감정을 바라본다. I watch my feelings without getting lost in them.	2.44(0.87)	-0.1	-0.75	0.59	0.86
11	나는 힘든 상황에서 즉각적으로 반응하지 않고 잠시 멈출 수 있다. In difficult situations, I can pause without immediately reacting.	2.39(0.81)	-0.04	-0.55	0.61	0.86
12	나는 정신없고 스트레스받는 상황일지라도, 내면의 평화와 편안을 찾을 수 있다. I experience moments of inner peace and ease, even when things get hectic and stressful.	2.21(0.85)	0.16	-0.73	0.65	0.86
13	나는 나 스스로와 남들에 대해 참을성이 없다. I am impatient with myself and with others.	3.09(0.77)	-0.37	-0.64	0.22	0.88
14	나는 내가 가끔 삶을 얼마나 힘들게 하는지 알아차릴 때도 웃을 수 있다. I am able to smile when I notice how I sometimes make life difficult.	2.12(0.81)	0.25	-0.57	0.56	0.87

Table.3 Descriptive analysis of TPAS

Item	Item Contents	Mean(SD)	Skew	Kurtosis	Corrected Item-Total Correlations	α If Deleted
1	안정된 (Secure)	2.05(1.03)	0.05	-0.37	0.75	0.93
2	차분한 (Calm)	2.16(0.93)	0.16	-0.35	0.66	0.94
3	활동적인 (Active)	1.84(1.10)	0.25	-0.63	0.59	0.94
4	느긋한 (Laid Back)	2.00(1.05)	0.04	-0.41	0.47	0.94
5	생기있는 (Lively)	1.84(0.99)	0.21	-0.3	0.74	0.93
6	기운넘치는 (Energetic)	1.74(1.07)	0.31	-0.52	0.74	0.93
7	고요한 (Serene)	2.09(0.98)	-0.02	-0.34	0.29	0.94
8	열심인 (Eager)	2.28(0.99)	-0.07	-0.54	0.54	0.94
9	역동적인 (Dynamic)	1.65(1.07)	0.3	-0.44	0.67	0.94
10	안전한 (Safe)	2.22(0.94)	0.08	-0.02	0.65	0.94
11	따듯한 (Warm)	2.25(0.95)	-0.04	-0.29	0.73	0.94
12	만족한 (Content)	2.00(1.05)	-0.01	-0.53	0.79	0.93
13	신이 난 (Excited)	1.66(1.02)	0.26	-0.57	0.73	0.94
14	모험심있는 (Adventurous)	1.55(1.12)	0.35	-0.65	0.61	0.94
15	평온한 (Tranquil)	2.13(0.96)	0	-0.21	0.73	0.94
16	평화로운 (Peaceful)	2.15(0.96)	0.01	-0.29	0.76	0.93
17	열렬한 (Enthusiastic)	1.57(1.03)	0.31	-0.42	0.70	0.94
18	편안한 (Relaxed)	2.20(1.00)	-0.17	-0.26	0.77	0.93

3.2 Factor Analysis

3.2.1 Parallel Analysis

Parallel analysis and scree plot were used to determine a number of factor and component of measures in the study population. According to scree plot of FMI (Figure.1), 3 factors and 2 components were suggested. From third to fourth factor the ‘elbow’ of the plot decrease drastically. As the scree plot of TPAS (Figure.2) suggests, 2 factors and 2 components from the collected data.

3.2.2 Principal Component Analysis (PCA)

PCA confirmed 3 factors can be explained in FMI. By the proportion of variance, first factor explained 39.05% of the loading; second factor explained 10.32%. For third factor, 7.36% is explained. With 3 factors, 56.76% were explained. This result also shows in the Figure.3 biplot. Two factors in TPAS observed in PCA. As the biplot (Figure.4) indicates, two factor seems possible. First factor explains 50.98% and second factor explains 14.49%, 65.48% were cumulatively explained. Further detail of both measure’s PCA result is in Appendix.1

However, PCA is not fully suitable for validating numbers of latent variables because the purpose of the PCA method is to reduce the dimension of the data. Factor analysis should be additionality process as more suitable method to validate psychometric scale(Gruijters, 2020; 서원진 et al., 2018b).

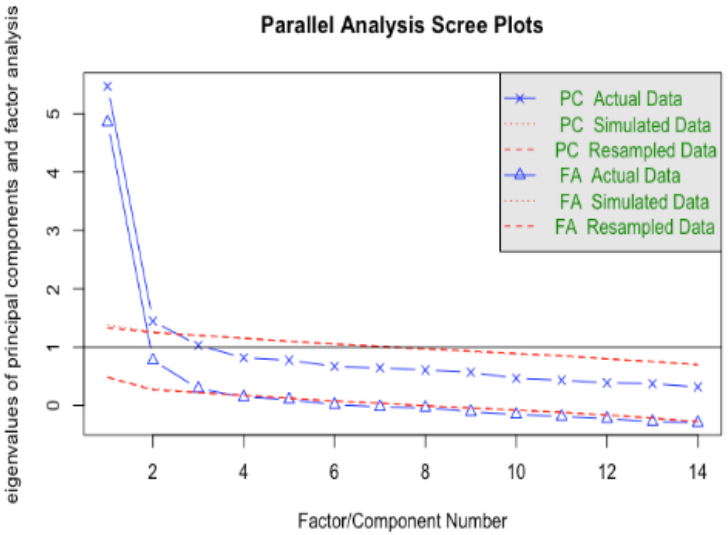

Figure.1 Scree Plot of FMI

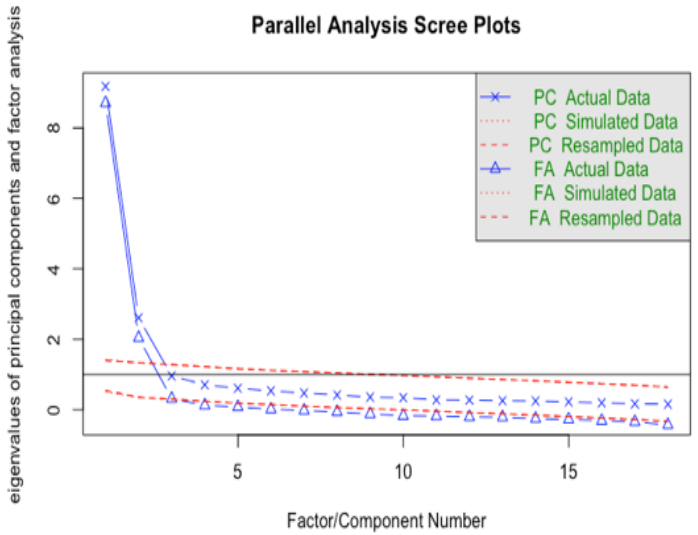

Figure.2 Scree Plot of TPAS

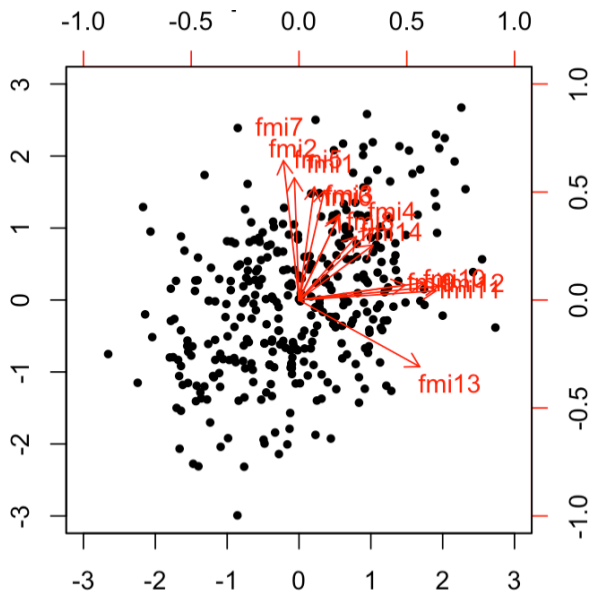

Figure. 3 Biplot of FMI

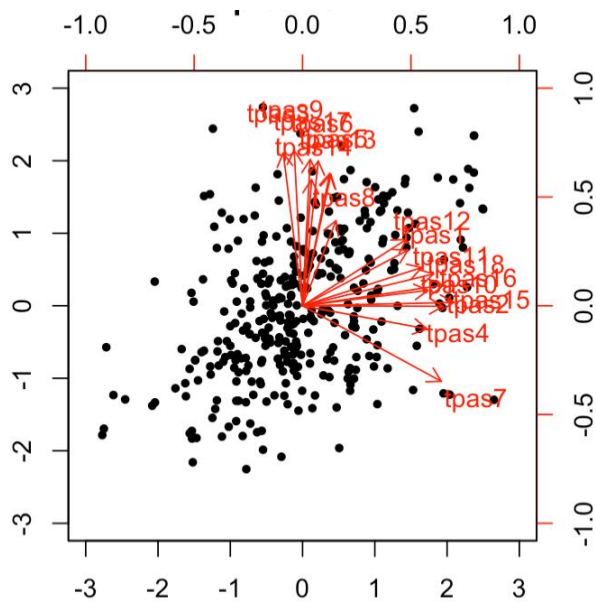

Figure. 4 Biplot of TPAS

3.2.3 Exploratory Factor Analysis (EFA)

EFA was conducted by referring to the results of PCA. Both FMI and TPAS are likely to have one or two components. Appendices 2 and 3 examined both the one-factor and two-factor models of FMI and TPAS.

Each items in the one factor model of FMI showed that factor loading was 0.5 or more, indicating that the correlation was high. The model fit index was (χ^2 (df)= 336.52(77), TLI= 0.811, RMSEA= 0.098). In the case of the two-factor model, it is divided into item 9~ item14 corresponding to the first factor and item 1 ~ item 8 appearing as the second factor. Each factor is 0.3 or more, which seems to be an appropriate correlation. The model fit was (χ^2 (df)= 141.76(64), TLI= 0 932, RMSEA= 0.059) which showed higher fit than the one-factor model. The result model of EFA expressed as a two-factor model is as shown in Figure 5.

Most of items in the one-factor model of TPAS is analyzed to have a factor load of 0.5<. In the case of item 7, load amount is lower (0.31) than other factors, however, it is not insufficient. The fit of the one-factor model is (χ^2 (df)= 1546.53(135), TLI= 0 659, RMSEA= 0.179). It is inadequate outcome as a model fit. When TPAS is analyzed with a two-factor model, it is divided into first factor (item 1,2,4,7,10,11,12,15,16,18) and second factors (item 3,5,6,8,9,13,14,17). The factor load of all item is appropriate. Also, item load of item 7, which showed a low value in the one factor model EFA, also increased in two factor model. The model fit of the two-factor model was analyzed to be suitable as (χ^2 (df)= 438.72(118) , TLI= 0 911, RMSEA= 0.088). The two factor model TPAS is shown in Figure.6.

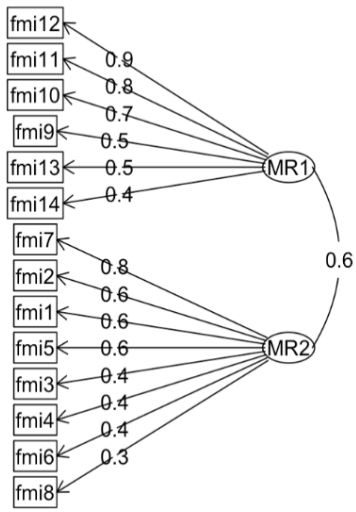

Figure.5 EFA of FMI

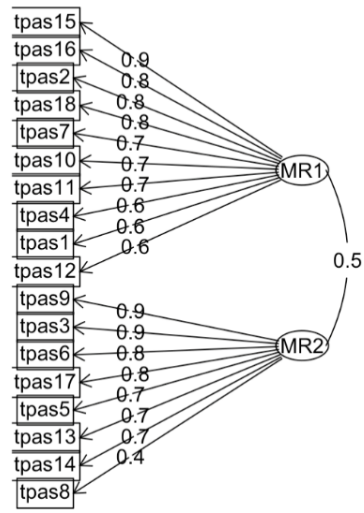

Figure.6 EFA of TPAS

3.2.4 CFA

Confirmatory factor analysis also analyzed each by one factor and two factor model. Additional model analysis is done with models with drop items from the low loading values and correlation in PCA and EFA. Item 13 was dropped from FMI and dropped model was named FMI13. Appendix.4 shows result from the analysis. CFA Figure 7 shows the diagram of FMI13, which is two factor models with the best fitting according to the CFA results. Model fit of two factor FMI13 is (χ^2 (df)= 169.908(64) , CFI=0.93, TLI=0.92 , RMSEA= 0.07).

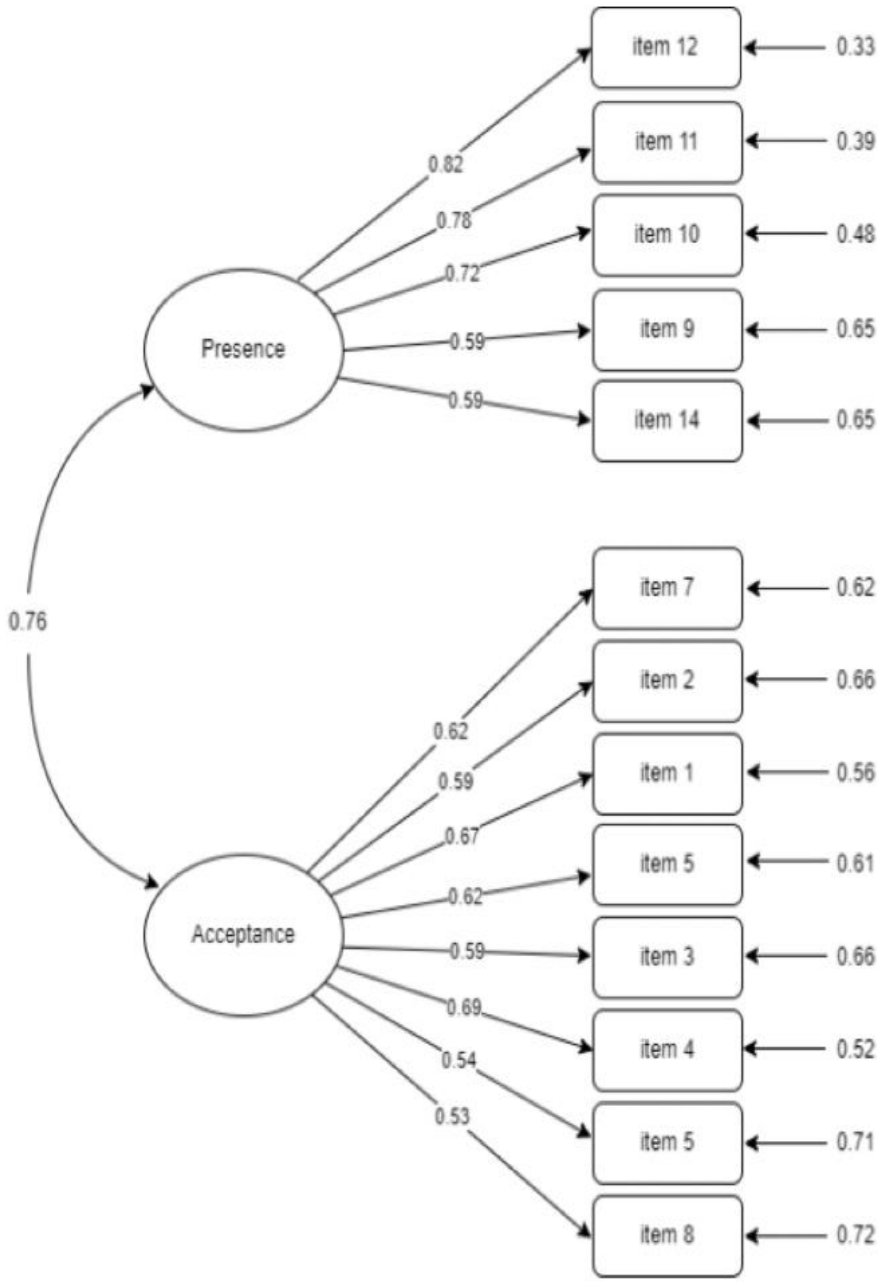

Figure. 7 CFA of FMI

CFA was done in TPAS one factor model and two factor model. In the analysis of TPAS, the results of PCA and EFA showed that item 7 and item 4 had low factor load. Comparing TPAS17 models (excluding item 7) and TPAS16 (excluding both items 7 and 4)through CFA, there was no significant difference in model fit between TPAS17 and TPAS16. However, it showed a more suitable fit than the original TPAS including all items(χ^2 (df)= 498.512(118) , CFI=0.92, TLI=0.91 , RMSEA=0.096). The model fit of single factors model of TPAS, TPAS17, and two factor model of TPAS, TPAS17, and TPAS16 is summarized in Appendix.5. The two factor model of TAPS17, the most suitable model, is shown in Figure 8.

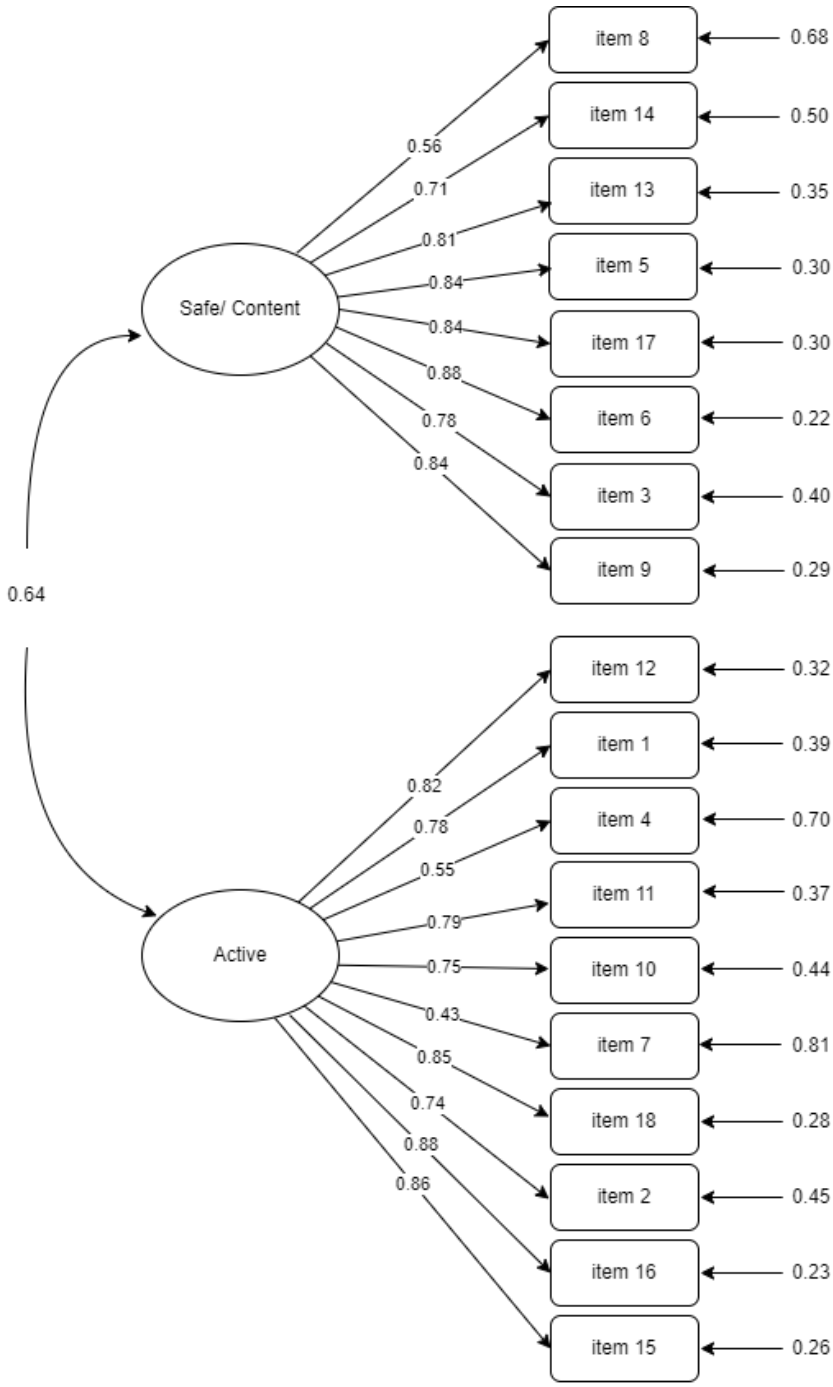

Figure.8 CFA of TPAS

3.3 Item validation

3.3.1 Item Response Model

It was shown through factor analysis that the two-factor model had a greater degree of applicability in each of the measurements. In the case of FMI, it would appear that the one-dimensional assumption is valid because the one-factor model indicated that there was sufficient fitting from the data. In addition, the kurtosis and skewness that are part of descriptive analysis confirm to validate the assumption of normality. Therefore, conducting an IRT analysis on FMI is feasible.

The Wright Map allowed us to understand the approximate distribution of difficulty of the item by participant's chance to answer each category and distribution of participants by each items. Following IRT analysis of the FMI in Figure 9, most respondents (subjects) appeared to have selected 2, 3, and 4 on the Likert scale, with fewer respondents selecting 1 in all questions. Furthermore, given the participant distribution, it was confirmed that the participants' abilities were unevenly distributed in the measurement. As a result, it is easy to see that the scale distribution is uneven.

The distribution of the individuals' abilities is evenly distributed in the case of TPAS's Wright Map (Figure 10). Furthermore, it was established that the distribution of each category of item was evenly distributed, making it an appropriate Likert scale threshold.

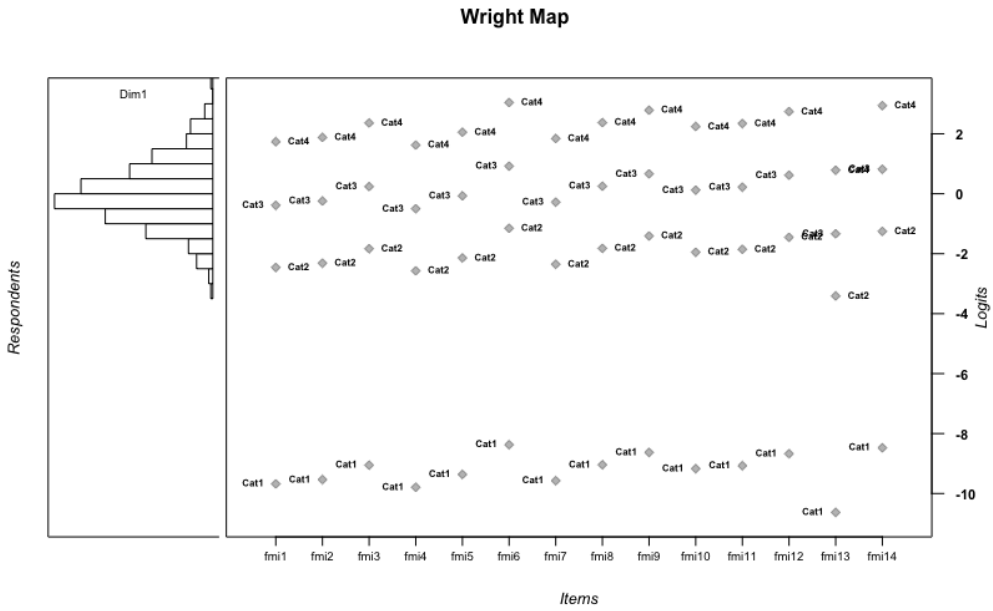

Figure.9 Wright Map of FMI

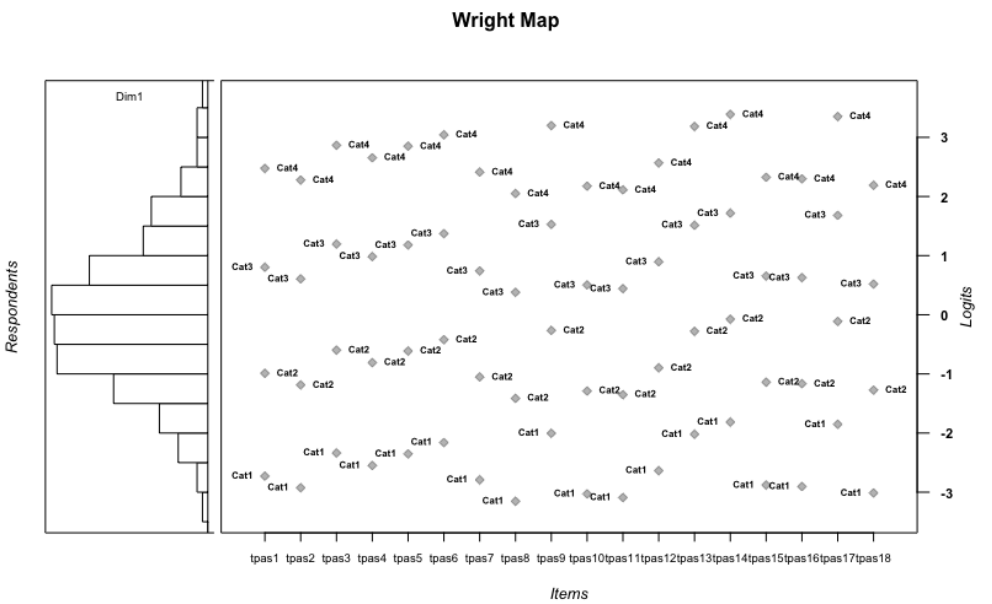

Figure.10 Wright Map of TPAS

Table.4 is showing the fitting indices of IRT analysis of FMI and TPAS. Fitting of FMI13 is more reasonable than FMI with all 14 items. The model fit of Rasch analysis of FMI13 was (CFI=0.93, TLI=0.91, RMSEA=0.1), which is acceptable values. However, TPAS, both models were analyzed to deviate from the standard.

Table.4 IRT model fit of FMI and TPAS

	FMI	FMI13	TPAS	TPAS17
CFI	0.88	0.93	0.73	0.79
TLI	0.91	0.91	0.80	0.84
RMSEA	0.11	0.10	0.22	0.21

Figure. 11 is Item Characteristic Curve (ICC) of FMI. It explains probability of answering each category by the θ, difficulty(in this case, mindfulness ability). Most of the questions are clustered in a similar form. However, item 13 alone shows different difficulties and curves according to the subject's ability. The result of item 13 was also shown on the Item Information Curve (IIC) of Figure 12. Other items show a gradual increase and decrease based on θ around 0. However, item 13 gradually increases at a higher level based on θ around 1 and then decreases rapidly. From this figure, it can be determined that the difficulty of item 13 is different from that of other items, and that it is a item characteristics is dissimilar from other items.

In this analysis, the goodness-of-fit index of the item was found to be inappropriate for both outfit and infit in item 13 (Table 8). Outfit is sensitive to outsiders, so it is mainly referred to as infit, and item 13's infit (1.42)was found to

be misfit because it was larger than 1.4 which is a standard value commonly used. Fitting of other questions was found to be acceptable value.

It was found that difficulty range of FMI is -1.47 to -2.71 excluding item 13. It seems that the distribution of difficulty for each item is evenly distributed in the factors of the measurement. In the distribution of difficulty by factors, factor 1 (Presence) was found to be -1.57 to -2.23, and factor 2 (Acceptance) was found to be -1.47 to -2.71. Each item's Expected Score Curve and Fitting(appendix.7), Item Characteristic Curves by Response(appendix.11), and Item Information Curve are summarized in appendix 9.

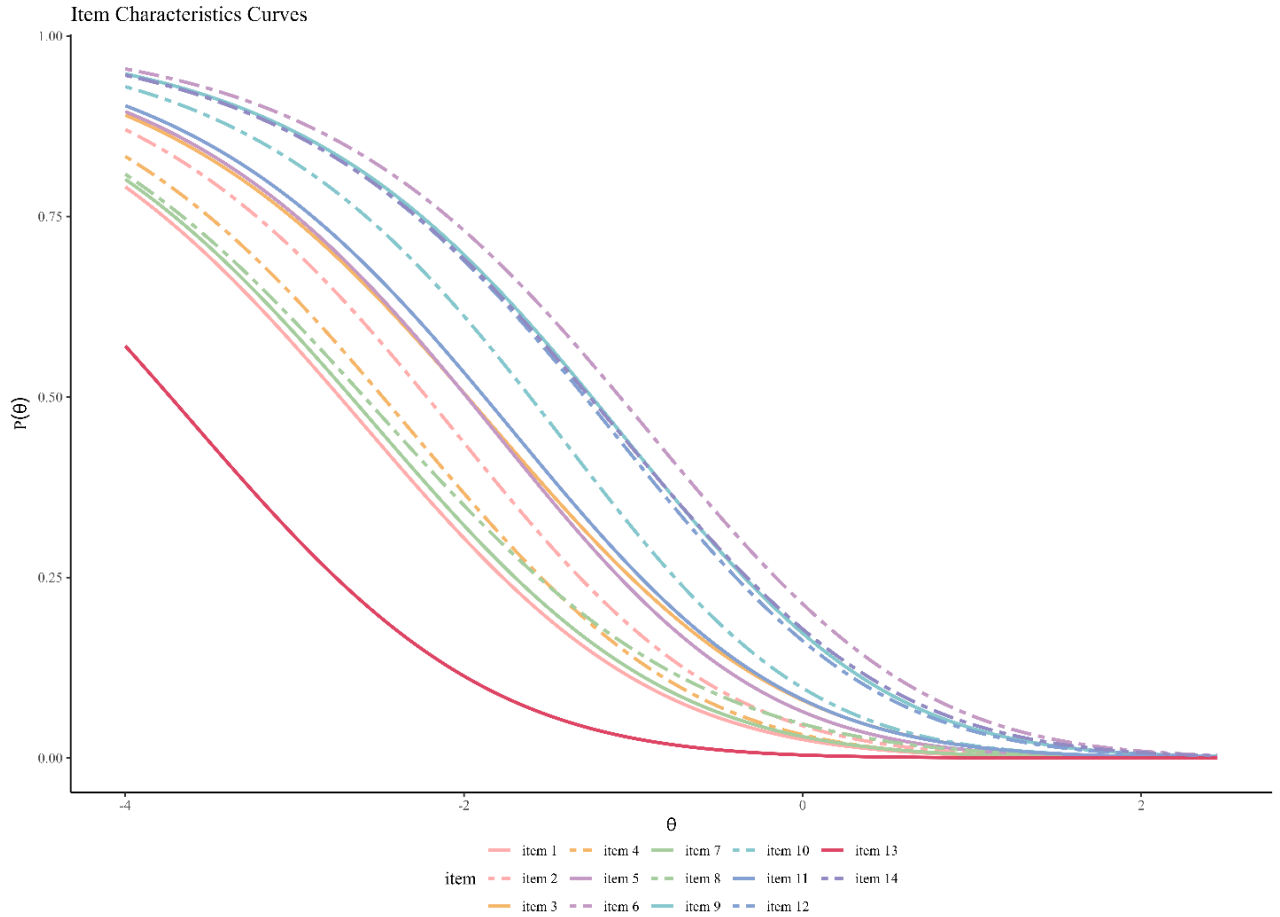

Figure. 11 Item Characteristic Curves of FMI

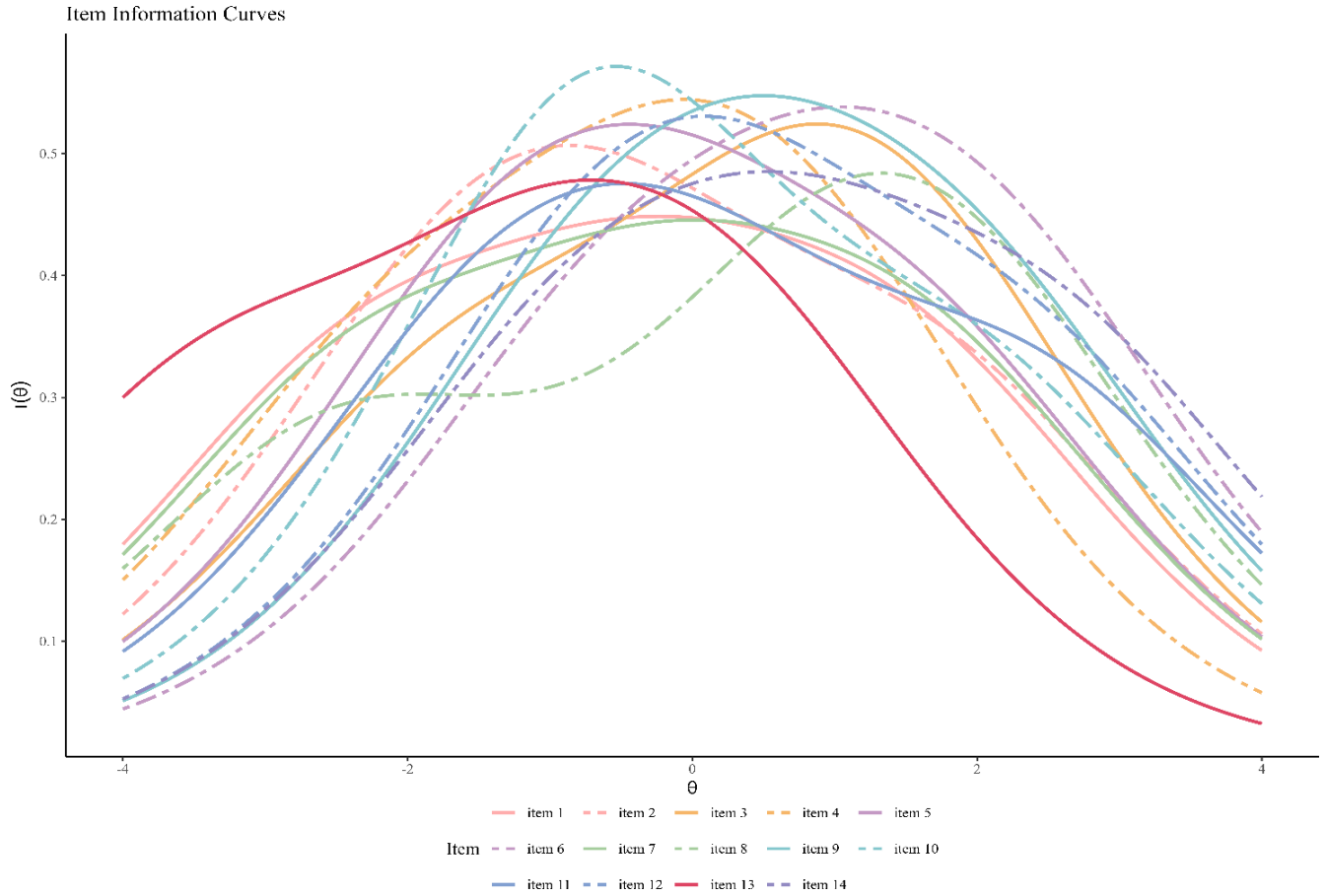

Figure.12 Item Information Curves of FMI

Table . 5 Difficulty and Fitting by items of FMI

Item	Item Contents	Difficulty	Outfit	Infit	Factor
13	나는 나 스스로와 남들에 대해 참을성이 없다. I am impatient with myself and with others.	-1.11	1.52	1.42	Presence
6	나는 내 실수나 곤경을 판단하지 않고 바라본다. I see my mistakes and difficulties without judging them.	-1.47	1.09	1.10	Acceptance
14	나는 내가 가끔 삶을 얼마나 힘들게 하는지 알아차릴 때도 웃을 수 있다. I am able to smile when I notice how I sometimes make life difficult.	-1.57	0.99	1.00	Presence
9	나는 무언가 잘못되어도 나 스스로에게 친절하다. I am friendly to myself when things go wrong.	-1.71	1.16	1.15	Presence
12	나는 정신없고 스트레스받는 상황일지라도, 내면의 평화와 편안을 찾을 수 있다. I experience moments of inner peace and ease, even when things get hectic and stressful.	-1.76	0.85	0.85	Presence
8	나는 불쾌한 경험들도 받아들인다. I accept unpleasant experiences.	-2.10	0.88	0.87	Acceptance
3	나는 마음이 다른 곳에 가 있다는 것을 알아차릴 때, 부드럽게 지금 여기에서 일어나는 경험으로 돌아온다. When I notice an absence of mind, I gently return to the experience of the here and now.	-2.12	1.03	1.02	Acceptance

Item	Item Contents	Difficulty	Outfit	Infit	Factor
11	나는 힘 상황에서 즉각적으로 반응하지 않고 잠시 멈출 수 있다. In difficult situations, I can pause without immediately reacting.	-2.13	0.79	0.78	Presence
10	나는 휩쓸리지 않고 내 감정을 바라본다. I watch my feelings without getting lost in them.	-2.23	0.97	0.97	Presence
5	나는 내 행동의 이면에 무엇이 있는지 주의를 기울인다. I pay attention to what's behind my actions.	-2.41	1.07	1.07	Acceptance
2	나는 먹을 때나, 요리할 때나, 청소할 때나, 말할 때나, 나의 몸을 느낀다. I sense my body, whether eating, cooking, cleaning or talking.	-2.57	1.06	1.06	Acceptance
7	나는 지금 여기에서 일어나는 경험과 연결되어 있다고 느낀다. I feel connected to my experience in the here-and-now.	-2.61	0.96	0.96	Acceptance
1	나는 지금 순간의 경험에 마음이 열려있다. I am open to the experience of the present moment.	-2.71	0.88	0.87	Acceptance
4	나는 나 스스로에게 감사할 수 있다. I am able to appreciate myself.	-2.81	0.93	0.95	Acceptance

TPAS IRT analysis is shown in Figure 13, Figure 14, and Table 8. All items in TPAS were widely clustered and distributed in ICC of TPAS(Figure.13). IIC also showed no large distribution and showed similar levels between the items. In analysis of TPAS's item fitting, item 4(INFIT=1.51) and item 7(INFIT=1.76) were found to be inappropriate. Infit measure over 1.4 indicates misfit of the item.

Difficulty of TPAS is distinguished by the factors. The factor of 'safe/content' was analyzed as a relatively 'easy' item with a range of 0.8 to 0.27. The items in 'Active' are from 0.07 to -0.47. It seems the difficulty of TPAS was structured in two different level. However, item 8 was found to be the most difficult item outside the bisected difficulty level of 'safe/content' and 'active'.

Individual item's Expected Score Curve and Fitting(appendix.8), Item Characteristic Curves by Response(appendix.10), and Item Information Curve are in appendix 12.

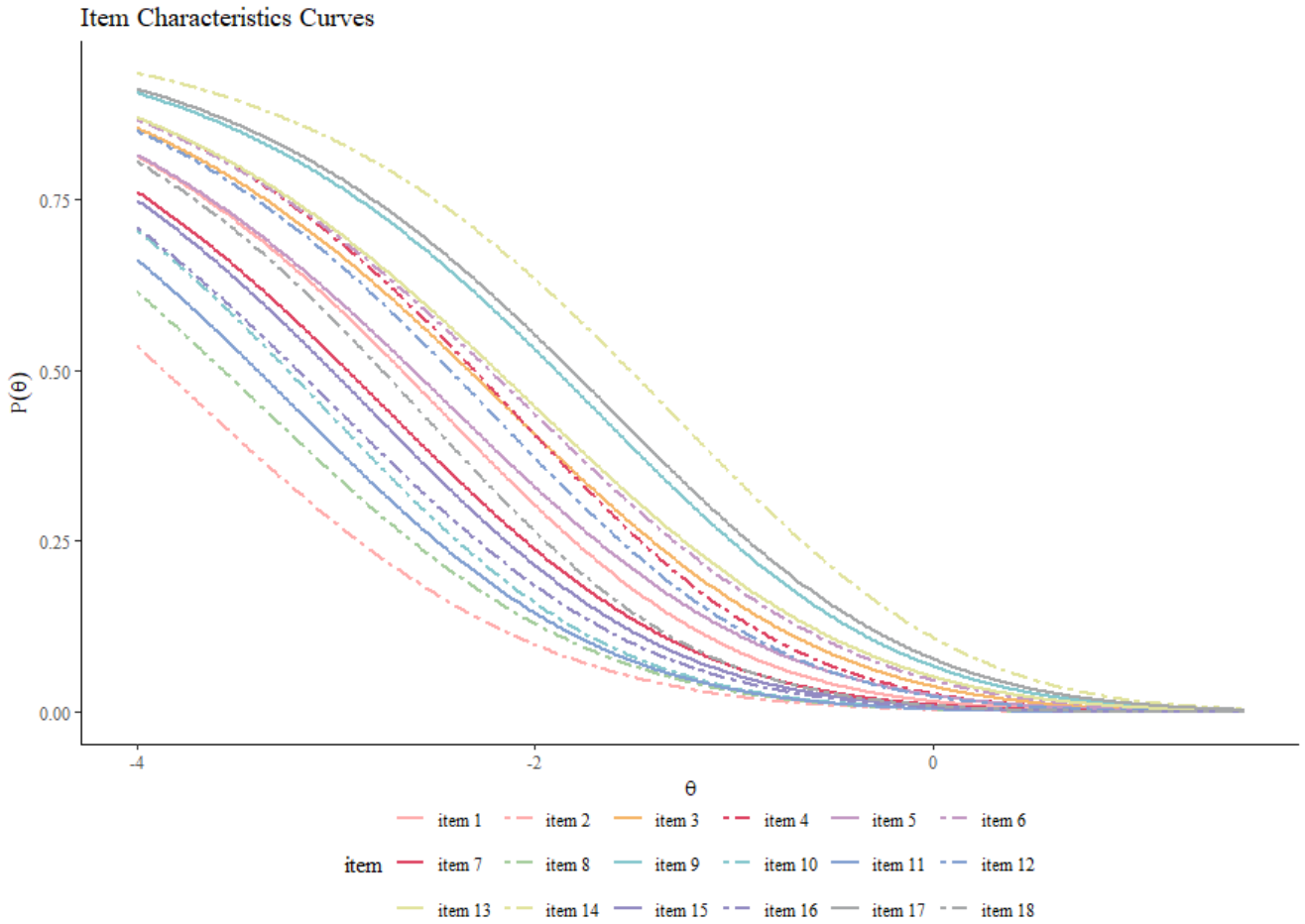

Figure.13 Item Characteristic Curves of TPAS

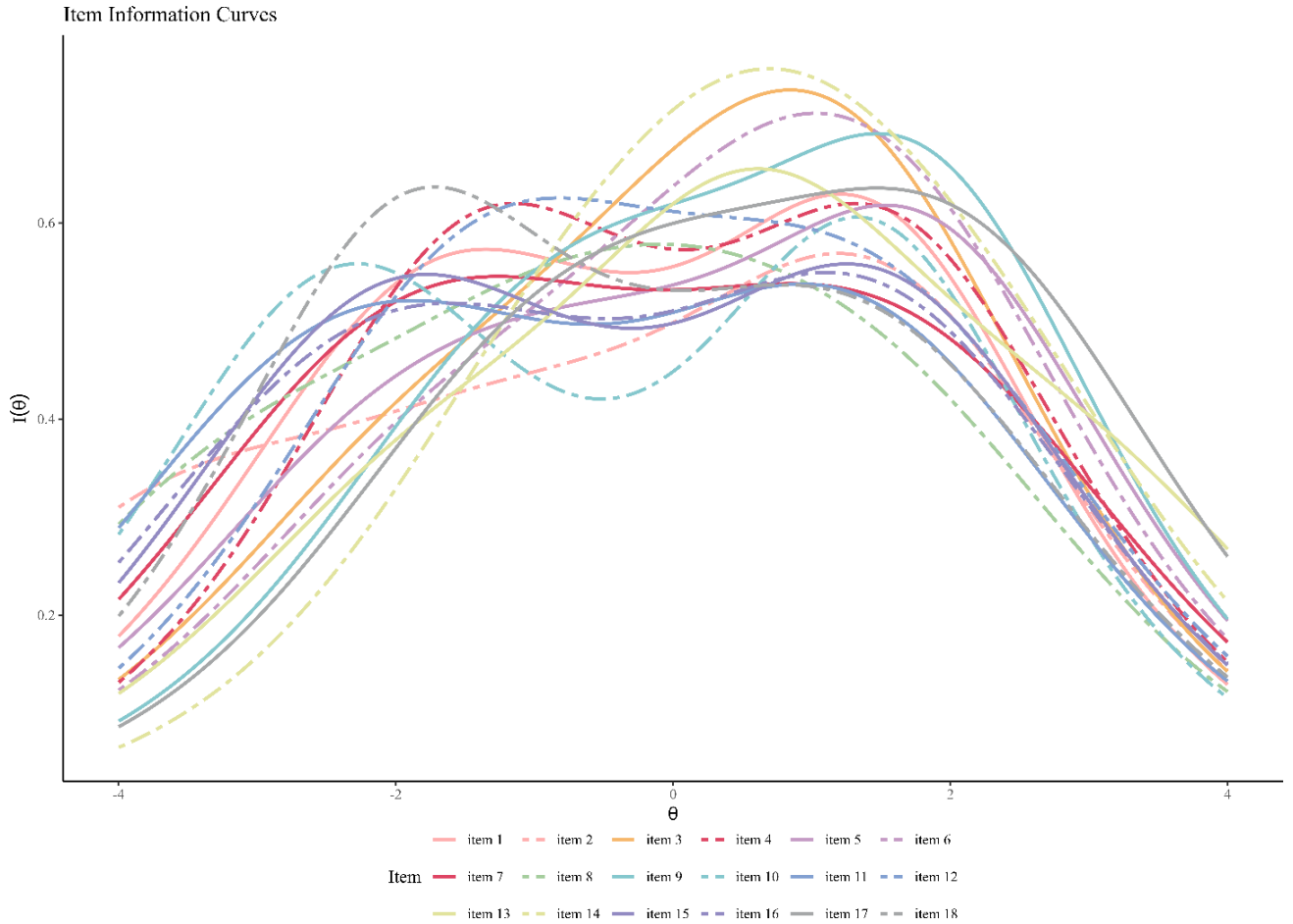

Figure. 14 Item Information Curves of TPAS

Table .6 Difficulty and Fitting by items of TPAS

Item	Item Contents	Difficulty	Outfit	Infit	Factor
14	모험심있는 (Adventurous)	0.80	1.37	1.36	Active
17	열렬한 (Enthusiastic)	0.77	0.93	0.94	Active
9	역동적인 (Dynamic)	0.61	1.07	1.08	Active
13	신이 난 (Excited)	0.60	0.87	0.87	Active
6	기운넘치는 (Energetic)	0.46	0.91	0.92	Active
3	활동적인 (Active)	0.28	1.33	1.33	Active
5	생기있는 (Lively)	0.27	0.78	0.79	Active
4	느긋한 (Laid Back)	0.07	1.56	1.51	Safe/Content
12	만족한 (Content)	-0.02	0.77	0.77	Safe/Content
1	안정된(Secure)	-0.11	0.82	0.83	Safe/Content
7	고요한 (Serene)	-0.17	1.79	1.76	Safe/Content
15	평온한 (Tranquil)	-0.26	0.75	0.76	Safe/Content
16	평화로운 (Peaceful)	-0.29	0.70	0.70	Safe/Content
2	차분한(Calm)	-0.31	0.86	0.87	Safe/Content
18	편안한 (Relaxed)	-0.39	0.73	0.74	Safe/Content
10	안전한 (Safe)	-0.41	0.88	0.90	Safe/Content
11	따듯한 (Warm)	-0.47	0.73	0.74	Safe/Content
8	열심인 (Eager)	-0.53	1.23	1.24	Active

3.3.2. Differential Item Functioning (DIF)

The DIF of the FMI was conducted by sex and patient group. Figures 15 and 16 show the DIFs of FMI by sex and chronic disease patient. Figures 17 and 18 showed the difference between the sex and patient, non-patient group in TPAS response. In the case of TPAS, there was no difference between groups according to sex and chronic illness patient/ non- patient group(Figure.17,18).

In the case of FMI, it was found that there were no significant differences between groups in all questions by the presence or absence of chronic illness(Figure.16). However, analysis by sex showed significant difference in item 3via Wald test(w = 2.23). The value over absolute 2 indicates significant difference between groups(Figure.15). Item 3 asks 'When I notice an absence of mind, I gently return to the experience of the here and now'. Female has higher score compared to male.

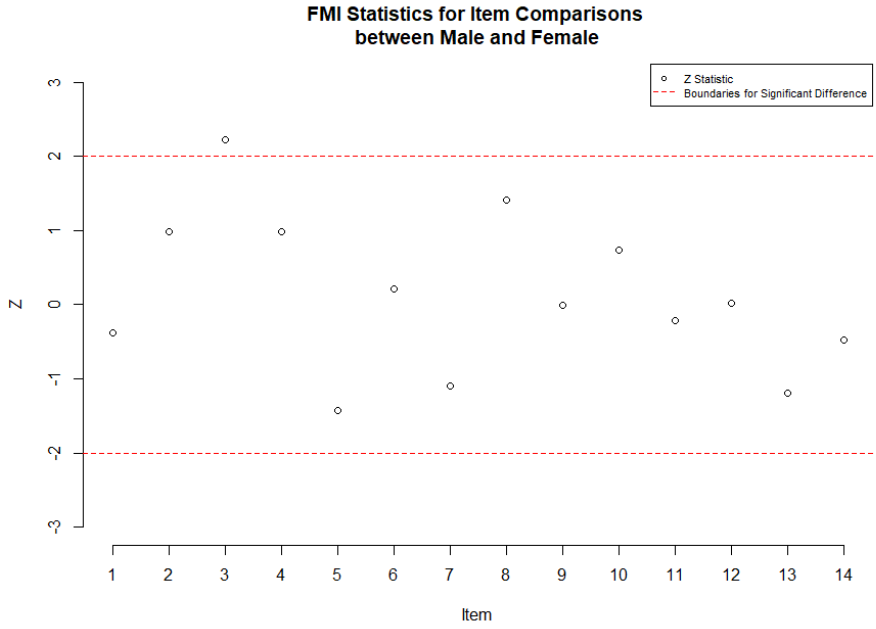

Figure. 15 Differential Item Comparison of FMI by Sex

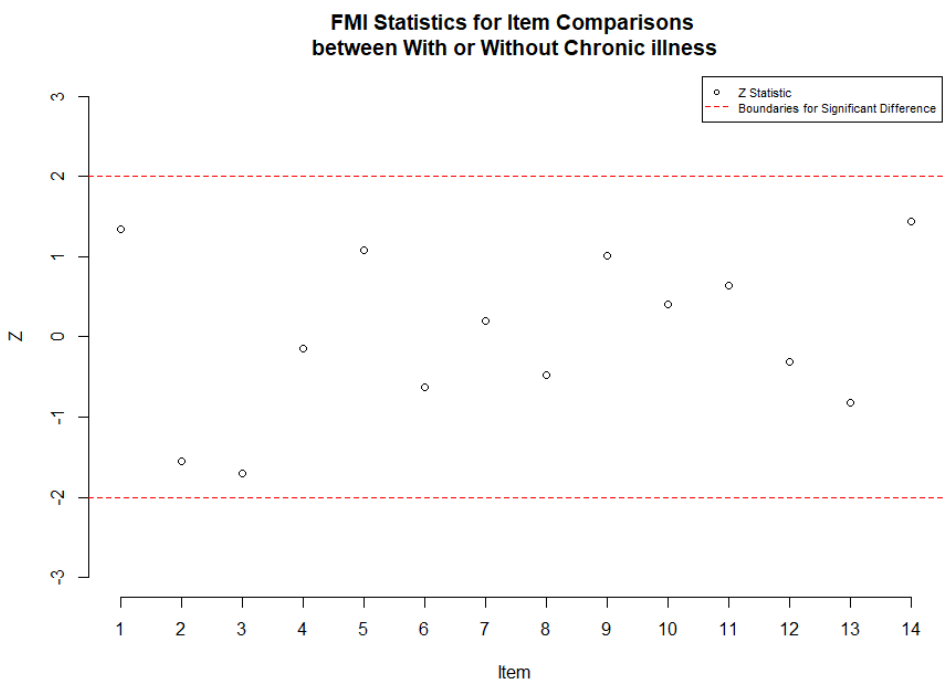

Figure.16 Differential Item Comparison of FMI by Chronic Illness

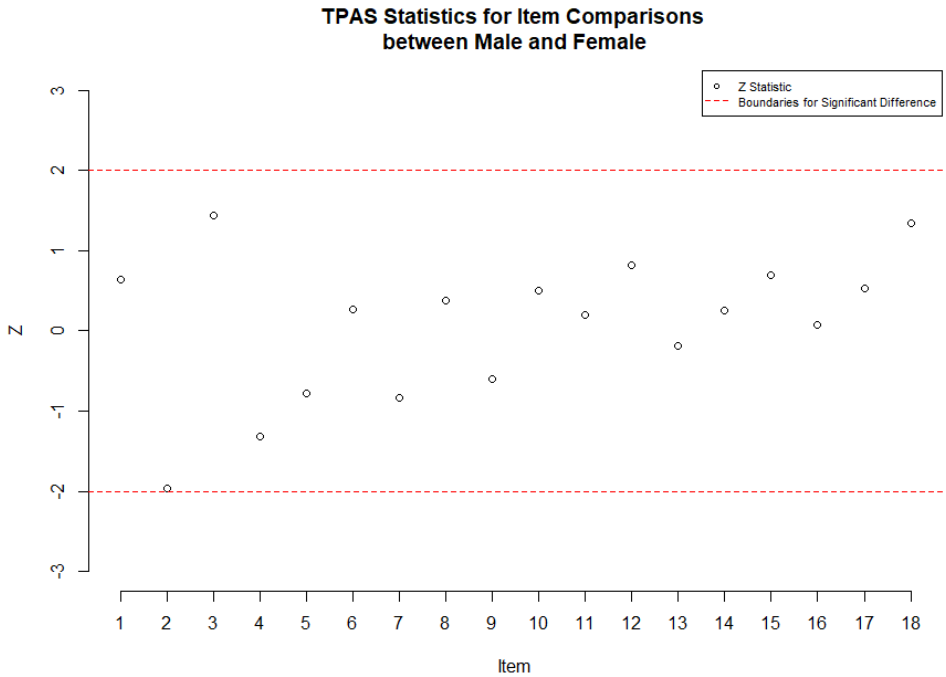

Figure. 17 Differential Item Comparison of TPAS by Sex

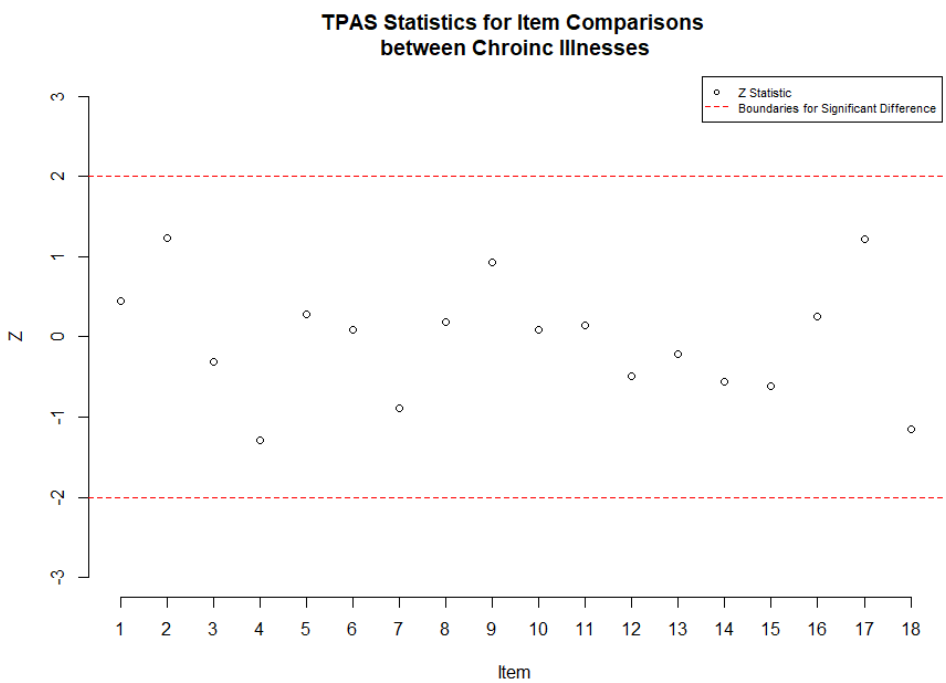

Figure. 18 Differential Item Comparison of TPAS by Chronic Illness

3.3.3 Correlation Analysis

For measurement's validity Pearson's correlation of all measurements were analyzed in Figure 19. FMI Showed High correlations with TAPS the most with correlation of r=0.69. Also, FMI showed High correlation with FFMQ. Also, it showed negative correlation with negative affect measures such as BDI(r=-0.42).

TPAS Reported High correlation with PANAS positive(r=0.67).Also, TPAS had high correlation with KAAQ-2(r=0.5) and FFMQ(r=0.51). As well as FMI, TPAS also had negative correlation with BDI(r=-0.55).

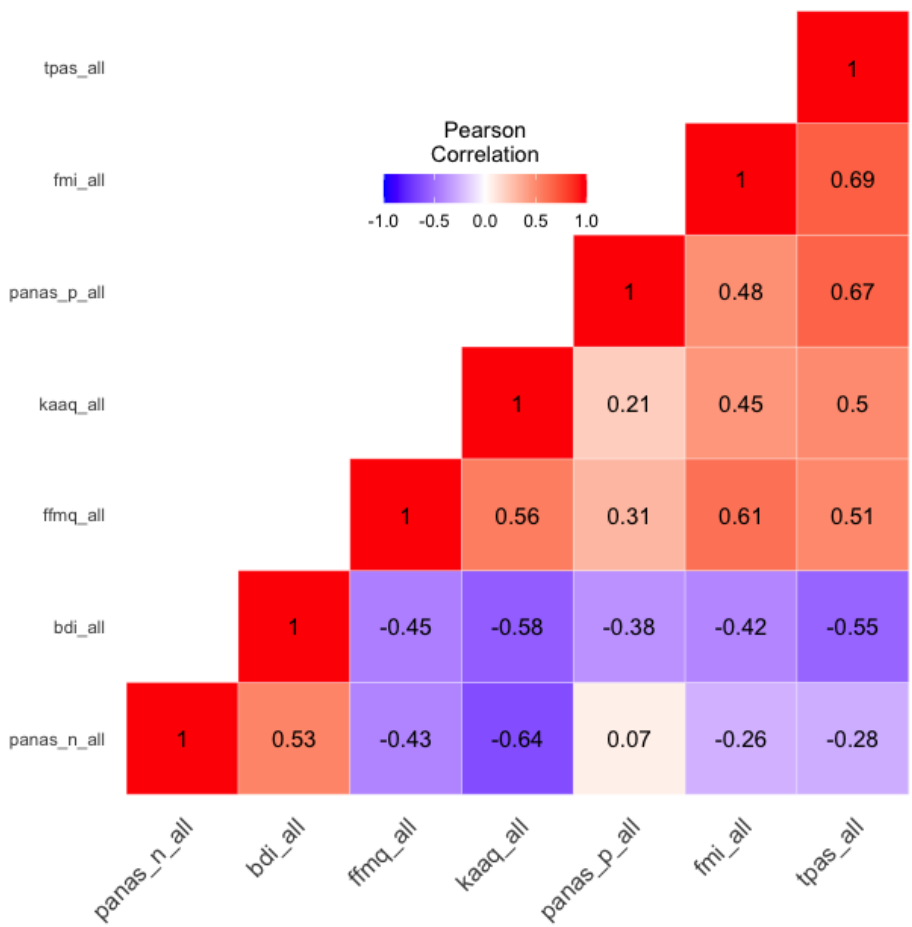

Figure. 19 Correlation of Sum of all measures

For the in-depth analysis, the measurements were divided by the latent factors(Figure.20). FMI has two factors, which is factor 1(Presence) and factor 2(acceptance). TPAS also has two factors, factor 1 (Safe/content) and factor 2 (Active).

FMI and TPAS's factors were highly correlated. FMI factor 1(Presence), was positively correlated TPAS factor 1 (Safe/Content) r= 0.51 and TPAS factor 2(Active) r=0.49. FMI factor2 (Acceptance) was correlated with TPAS factor 1 r=0.65 and TPAS factor 2 r=0.53.

Other reference factors shown adequate correlation by the factors of FMI and TPAS. For TPAS factor 1, KAAQ (Acceptance) r = 0.5, FFMQ Factor 4 (Non-reactivity) r = 0.61 and BDI factor 1 (emotion) r = - 0.52 was highly correlated. For TPAS factor 2, PANAS (Positive) r = 0.74, BDI factor 1 (emotion) r = - 0.46 was highly correlated.

Correlation of FMI with other reference measure's factors were: FMI factor 1 with FFMQ factor 3 (observing) r = 0.53. For FMI factor 2, BDI factor 2 (cognitive) r = - 0.43, KAAQ (acceptance) r = 0.47 was highly correlated.

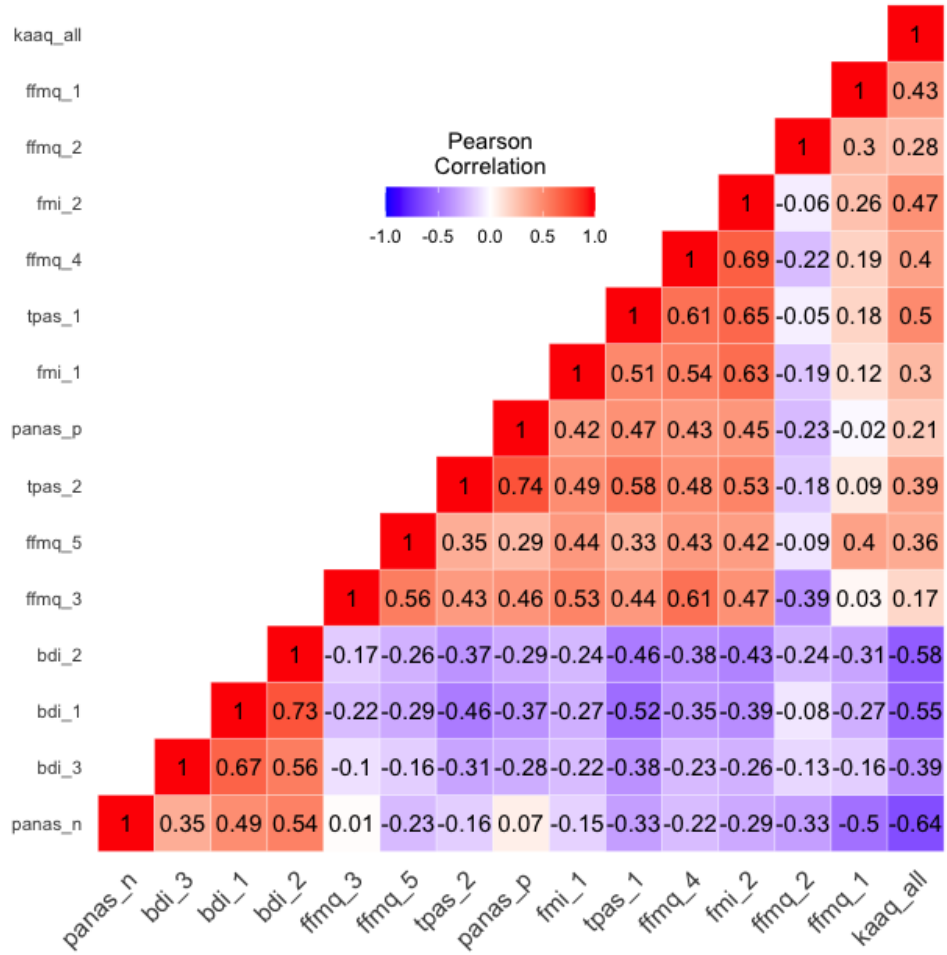

Figure. 20 Correlation of all measures by factors

Chapter 4. Conclusion and discussion

4.1 Conclusion

Each conclusions and discussion will be followed by result of each measurement's analysis.

4.1.1 FMI

(1) Factor Model of FMI

FMI was fitted with both a single factor model and a two factor model. Both models were acceptable model. Previous study using factor analysis to validate FMI also confirmed that both factorial model(one factor model, two factor model) is adequately fit for FMI analysis(Karatepe & Yavuz, 2019; Walach et al., 2006). Albeit both model shown acceptable fitting, two factor model's fitting(χ^2 (df)= 214.461(76) , CFI=0.92, TLI=0.9 , RMSEA= 0.07) was better than one factor model (χ^2 (df)= 345.516(77) , CFI=0.84, TLI=0.81 , RMSEA= 0.1) in CFA and Rasch analysis. Additionally, the model without item 13 showed better fifing in all models. From the previous FMI validation study using IRT: RSM model suggested to use two factory model and to drop item 13 (Sauer et al., 2011). Thus, it is proper to use two factory model in further research.

(2) Scale threshold of FMI

In classical testing theory, Likert scale assumes that the distances between each choice (response option) are equal because the test is often constructed by taking the simple sum or average of questionnaire responses across a range of individual items. However, in some SRQ the option (category) distribution is not equal. However, in item response theory has the advantage that the researcher can adjust the category to reflect the chosen latent variable depending how the test wanted be represent the level of the variables(Courville, 2004; Embretson & Reise, 2000; Scott, 2001).

FMI is a tool consisting with 4 point Likert scales. After examining the IRT analysis with a Wrightmap, it was found that the intervals between the scales were inconstant. Gap between category 1 (드물게)and 2(가끔) was broader compare to category 2 (가끔) to 3 (자주) and 3(자주) to 4(항상). This uneven distribution of scale might be a problem of mal-translation of Likert scale(Cha et al., 2007). Psychological distance between category 1 to 2 was wider than other categories. Thus, further research should consider using other translated scale.. However, from the result, it can be conclude that the category 1 (드물게) can be used as the clean cut off that the person does not have the given mindfulness trait which the item asks.

For other suggestion is to modify the 4 point Likert scale into 3 point Likert scale or 5 point scale. Since the gap of scale threshold between 2 to 4 is narrow, by removing category 3 can achieve equal interval. Or adding one more category in between category 1 and 2 is possible. The new 3 point Likert scale could be : 1) Rarely : 드물게, 2) Occasionally:가끔, 3)Almost always :거의 항상. And the new suggestion for the 5 point scale is 1) Rarely : 드물게, 2) Seldom : 종종 3)

Occasionally : 가끔 4)Fairly often:자주, 5)Almost always :거의 항상.

(3) Difficulty of FMI

As a result of IRT analysis, question difficulty (item difficulty to measure mindfulness) is advanced in FMI. Due to the item difficulty, the distribution of participants was uneven (Figure.9). The distribution of items on easy-hard by two constructed factors was even. Thus, it can be conclude that the two factors of FMI is tested in similar difficulty within the measurement.

Compared to the previous research of Sauer et al. 2011, FMI validation applying Rasch model, logit item difficultly ranged from -0.32 to 1.23. However, this study shown range of -2.81 to -1.11. This differences could be driven form the cultural difference or the study population differences. In Sauer's study, the participants were the patients from the medical clinic and more than half of the study population have had regular spiritual or meditative exercises such as mindfulness meditation or yoga(Sauer et al., 2011). However, our study collected overall general adults rather the participants which has disease or rather the person have had meditative exercises in regular basis.

The original scale of FMI was developed for meditation experts(Walach et al., 2006), and previous research confirmed that a short version of FMI is adequate for the nonprofessionals(Walach et al., 2006), still there are many questions in line with the certain property of mindfulness expertise(Kotzé & Nel, 2016). Thus. there may be cases where questions of FMI are not intuitive and have to carefully process the question (Belzer et al., 2013). This means that for the general population who does not practice meditation or mindfulness exercise, the FMI questionnaire could

demands unfamiliar cognitive process for the participants

Due to the sophisticated nature of the FMI, test taker should process the question itself. Since the original FMI does not provide how promptly the test taker should answer the item, it is advice to add guide line in what matter to answer the FMI. Because in the previous research on the effect of the quick answers of SRQ showed poor quality of data which might not depict the state or trait of interest well(Greszki et al., 2015). Thus, the FMI should be answered with consideration and contemplation.

(4) Item 13 in FMI

In the case of item 13 '나는 나 스스로와 남들에 대해 참을성이 없다.(I am impatient with myself and with others.)' in FMI, the fitting were better without item 13 in all factor analysis[Two factor Model FMI: (χ^2 (df)= 214.461(76) , CFI=0.92, TLI=0.9 , RMSEA= 0.07) , Two factor Model FMI13: (χ^2 (df)= 169.461(76) , CFI=0.93, TLI=0.92 , RMSEA= 0.07), item total correlation(r = 0.22) and IRT analysis(INFIT =1.42). Biplot with PCA also shown that the item 13 alone extends in different directions. This misfitting problem was founded in previous study as well. The previous research pointed out that the item 13 is one and only inversed question in FMI and it could affect the result(Sauer et al., 2011).

Also, the factor property of item 13 is not contained by two factors. Additional EFA with three factor model of FMI shown that the third factor of FMI does not contain other items than item 13. This indicates that item 13 is in different property from the other factors of FMI. Therefore, it is recommended to drop item 13 for a more valid measurement.

(5) Item 3 in FMI

DIF of FMI shown that the difference in sex on item 3. Fitting was adequate with item 3 (INFIT= 1.02). Item 3 asks '나는 마음이 다른 곳에 가 있다는 것을 알아차릴 때, 부드럽게 지금 여기에서 일어나는 경험으로 돌아온다.(When I notice an absence of mind, I gently return to the experience of the here and now)'. Female significantly answered more higher score on this item than male. It needs to be discuss why this question shown difference in sex.

4.1.2. TPAS

(1) Factor Model of TPAS

TPAS only fit the two factor model, according to factor analysis. The CFA of the one factorial model(χ^2 (df)= 1584.803(13) , CFI=0.7, TLI=0.66 , RMSEA= 0.175) was and two factorial model was (χ^2 (df)= 638.341(134) , CFI=0.90, TLI=0.88 , RMSEA= 0.1). The model was not adequate in the study that saw the whole fitting in the IRT analysis(CFI=0.73, TLI=0.8, RMSEA=0.22). This issue could be caused by the analysis method. The M^2 and RMSEA are sensitive in detecting errors due to slope parameter verification and partially (or completely) simple structure for multidimensional data, but not misfits due to within-item multidimensional structures(Xu et al., 2017). Since the TAPS fail to fulfill uni-dimensionality, it could affect the fitting result. Thus, further analysis needed to be done to adjust multidimensionality of TPAS.

Analyzing the difficulty of individual questions, it was found that the factors were not evenly distributed according to the difficulty in TPAS. The items under ‘Safe/Content’ factor is easier items. On top of the items, items corresponding to ‘active’ factor were distributed. This indicates that the ‘safe/content’ have to be preceding factor of ‘active’ in the model. Further analysis has to be done to verify the hierarchy structure of the measure.

(2) Scale threshold and difficulty of TPAS

The distribution of categories in TPAS was adequate. The threshold of the category was even in the Figure. #. This indicates that the Likert scale was properly breaks into five. Difficulty of the items were evenly distributed within the factors. The items were relatively ‘easy’ since the range of difficulty is 0.8 to -0.53. The difficulty index can be expressed as "very easy" if the item difficulty index is less than -2, "easy" if it is more than -2, "normal" if it is more than -0.5 and less than 0.5, "difficult" if it is more than 0.5 and less than 2.0, and "very difficult" if it is more than 2.0(장은아, 2014). Thus the TPAS is relatively easy, intuitive measures.

(3) Item 4 and item 7

There were two misfit items in TPAS. Item 4 ‘느긋한(Laid back)’ reported INFIT= 1.51 and item 7 ‘고요한(Serene)’ reported INFIT=1.76. From the item-total correlation, item 4 showed r =0.47and item 7 showed r = 0.29. item 4’s correlation is less than a half but still acceptable correlation. However, item 7’s correlation is low. From the factor analysis of two factor model, each items’s loading was adequate. By removing item 7, the model fit of TPAS increased from (χ^2 (df)= 638.341(134) , CFI=0.90, TLI=0.88 , RMSEA= 0.1) to (χ^2 (df)= 498.512(118) ,

CFI=0.92, TLI=0.91 , RMSEA= 0.96). However, fit did not increased by removing additional item 4(χ^2 (df)= 459.772(103) , CFI=0.92, TLI=0.91 , RMSEA= 0.1).

This might be the result due to the cultural difference or mal-translation. Although multiple translators who comprehend both English, Korean and cultural context agreed on those two items final translation. However, the historical, societal, and linguistic context of each word could be different(Cha et al., 2007; Sperber, 2004). In terms of Korean cultural perspectives, it was discovered that an ambivalent perspective of ease and laid-backness. The aspect of 'laid back' could be positive to Koreans due to it relaxes and ease. However, it also it could be interpreted as laziness or not focusing on given life. In the context, an item 4 '느긋한(Laid back)' could partially portrays aspect of negative affect(우아미 & 정태연, 2021). Similarly, and an item 7 '고요한(Serene)' depicts ambivalent perspective of Korean culture. According to standard Korean dictionary, 'Serene' means silent and still(표준국어대사전, n.d.). The nuance of the word in 고요한 contains loneliness in Korean language. Therefore, the word 고요한 is not completely positive in Korean culture.

It is better to drop item 4 and 7 in Korean version of TPAS. If it used all a whole, care should be taken in the interpretation.

(4) Correlation of FMI and TPAS

The association between FMI and TPAS was discovered to be very high between the two measures. Furthermore, the correlation analysis between factors of measures discovered the all sub factors of FMI and TPAS were highly correlated. This outcome denotes the link between mindfulness and positive affect.

As the previous research showen, relationship of the two mental states are connected in our research. In previous research, mindfulness serves as a crucial basis for other contemplative state such as insight, meaning and purpose of life and worthiness(Dahl & Davidson, 2019). In the same vain, there are some evidence that the mindfulness related to the emotional regulation, and it help the promote more positive emotion and feeling to the person(Garland et al., 2017; Hill & Updegraff, 2012). Also, one research claims that the state mindfulness and positive emotions emerged to mutually reinforce each other with the dynamics of an upward spiral (Du et al., 2019).

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부족한 제자를 이끌어주신 조성일 교수님께도 깊은 감사의 말씀을 전합니다. 2년 간의 석사과정 동안 귀한 경험들을 하였고 그 덕분에 참으로 많은 것을 배웠고 느꼈습니다. 앞으로 더 성장하도록 노력하겠습니다. 또 이 자리를 빌어 논문 지도와 심사에 고생해주신 김호교수님과 조은이 박사님께도 감사의 인사를 드립니다.

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Appendix

Appendix.1 PCA result of FMI, FMI-13, TPAS

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12	PC13	PC14	PC15	PC16	PC17	PC18
FMI																		
Standard deviation	2.3391	1.2023	1.0151	0.90432	0.8799	0.81741	0.80281	0.7789	0.75352	0.6825	0.65766	0.62177	0.61063	0.56219				
Proportion of Variance	0.3908	0.1032	0.0736	0.05841	0.0553	0.04773	0.04604	0.04333	0.04056	0.03327	0.03089	0.02761	0.02663	0.02258				
Cumulative Proportion	0.3908	0.494	0.5676	0.62606	0.6814	0.72908	0.77512	0.81845	0.85901	0.89228	0.92318	0.95079	0.97742	1				
FMI-13																		
Standard deviation	2.325	1.1463	0.927	0.88913	0.86574	0.803	0.78871	0.7729	0.68289	0.67538	0.6272	0.62006	0.56245					
Proportion of Variance	0.4158	0.1011	0.0661	0.06081	0.05765	0.0496	0.04785	0.04595	0.03587	0.03509	0.03026	0.02957	0.02433					
Cumulative Proportion	0.4158	0.5169	0.583	0.64381	0.70147	0.7511	0.79892	0.84487	0.88074	0.91583	0.94609	0.97567	1					
TPAS																		
Standard deviation	3.0293	1.6151	0.9796	0.84055	0.7808	0.07327	0.6881	0.6482	0.5991	0.5857	0.5288	0.5238	0.5064	0.49865	0.4727	0.44262	0.41199	0.397
Proportion of Variance	0.5098	0.1449	0.05331	0.03925	0.0338	0.00298	0.0263	0.0233	0.0199	0.0190	0.0155	0.0152	0.0142	0.01381	0.01241	0.01088	0.00943	0.00876
Cumulative Proportion	0.5098	0.6548	0.70806	0.74731	0.7811	0.08110	0.8373	0.8606	0.8806	0.8996	0.9152	0.9304	0.9447	0.95852	0.97093	0.98181	0.99124	1

Appendix.2 . Exploratory Factor Analysis of FMI

Items	One-factor Model	Two-factor model	
		1	2
fmi1	0.591		**0.65**
fmi2	0.489	-0.146	**0.716**
fmi3	0.555	0.144	**0.471**
fmi4	0.673	0.292	**0.445**
fmi5	0.56		**0.614**
fmi6	0.539	0.184	**0.413**
fmi7	0.513	-0.216	**0.827**
fmi8	0.537	0.242	**0.348**
fmi9	0.573	**0.554**	
fmi10	0.69	**0.685**	
fmi11	0.724	**0.814**	
fmi12	0.761	**0.851**	
fmi13	0.28	**0.526**	-0.239
fmi14	0.594	**0.392**	0.25
χ^2(df)	336.52(77)	141.76(64)	
TLI	0.811	0.932	
RMSEA	0.098	0.059	

Appendix.3 . Exploratory Factor Analysis of TPAS

Items	One-factor Model	Two-factor model	
		1	2
tpas1	0.787	**0.612**	0.26
tpas2	0.68	**0.773**	
tpas3	0.599	-0.138	**0.872**
tpas4	0.482	**0.624**	
tpas5	0.741	0.123	**0.76**
tpas6	0.739		**0.853**
tpas7	0.31	**0.696**	-0.378
tpas8	0.533	0.164	**0.459**
tpas9	0.658		**0.895**
tpas10	0.694	**0.72**	

Items	One-factor Model	Two-factor model	
		1	2
tpas11	0.773	**0.687**	0.165
tpas12	0.842	**0.627**	0.307
tpas13	0.752	0.168	**0.713**
tpas14	0.607		**0.682**
tpas15	0.768	**0.916**	
tpas16	0.805	**0.864**	
tpas17	0.704		**0.828**
tpas18	0.805	**0.778**	0.117
χ^2(df)	1546.53(135)	438.72(118)	
TLI	0.659	0.911	
RMSEA	0.172	0.088	

Appendix.4 . Confirmatory Factor Analysis Based on Model (FMI)

	One Factor Model		Two Factor Model	
	FMI	FMI13	FMI	FMI13
χ^2 (df)	343.516(77)	288.528(65)	214.461(76)	169.908(64)
CFI	0.84	0.86	0.92	0.93
TLI	0.81	0.83	0.9	0.92
RMSEA	0.1	0.1	0.07	0.07

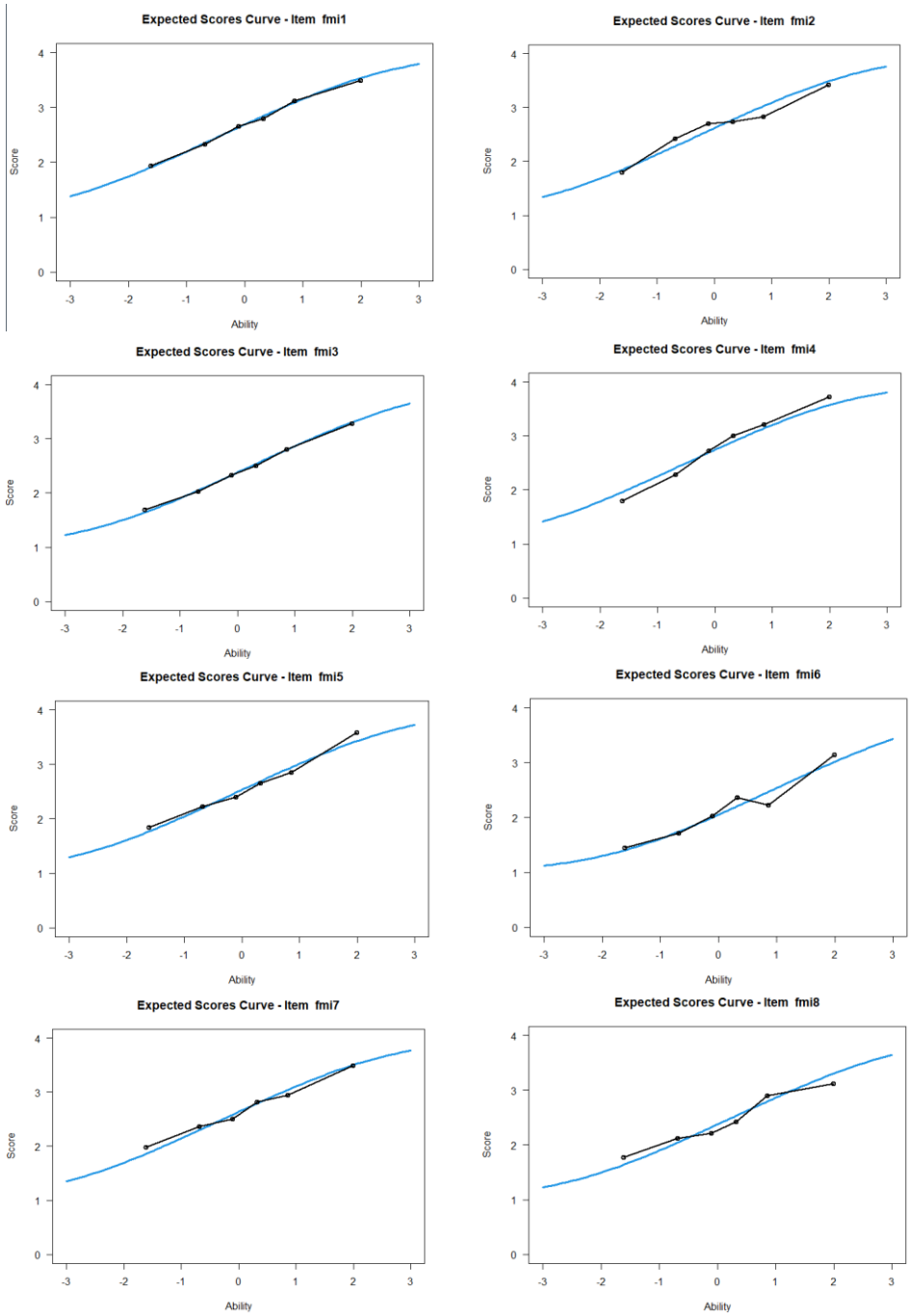
Appendix. 5 Confirmatory Factor Analysis Based on Model (TPAS)

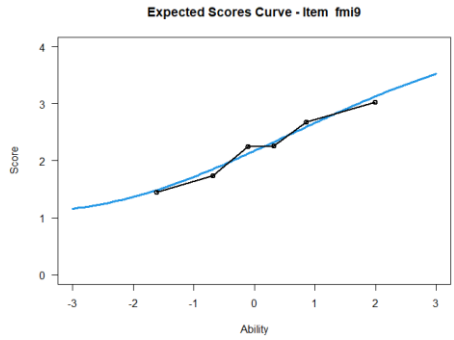
	One Factor Model		Two Factor Model		
	TPAS	TPAS17	TPAS	TPAS17	TPAS16
χ^2 (df)	1584.803(135)	1409.428(119)	638.341(134)	498.512(118)	459.772(103)
CFI	0.7	0.72	0.90	0.92	0.92
TLI	0.66	0.68	0.88	0.91	0.91
RMSEA	0.175	0.176	0.10	0.096	0.01

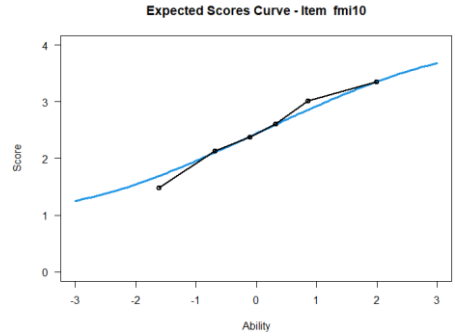
Appendix.6 Factors of measurements

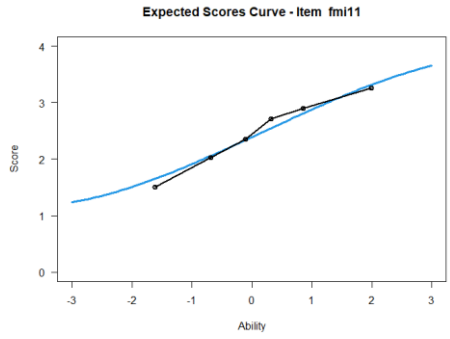
Measures						
FMI				TPAS		
Factor 1 (Presence) 현존	Factor 2 (Acceptance) 수용			Factor 1 (Safe/content) 안정적	Factor 2 (Acitve) 활동적	
1	4			1	3	
2	6			2	5	
3	8			4	6	
5	9			7	8	
7	10			10	9	
	11			11	13	
	12			12	14	
	13			15	17	
	14			16		
				18		
BDI				PANAS		
Factor1 (Emotional) 감정적 증상	Factor 2 (Cognitive) 인지적 증상	Factor 3 (Physical) 신체적 증상		Factor 1 (Positive) 긍정	Factor 2 (Negative) 부정	
1	3	15		1	2	
2	5	16		4	3	
4	6	18		5	6	
9	7	20		8	7	
10	8	21		9	10	
11				12	11	
17				14	13	
				17	15	
				18	16	
				19	20	
FFMQ						
Factor 1 (Awareness) 자각	Factor 2 (Nonjudging) 비판단	Factor 3 (Observing) 관찰	Factor 4 (Nonreactivity) 비자동성	Factor 5 (Describing) 기술		
3	7	2	1	5		
4	13	9	6	12		
10	18	14	8	16		
11	26	15	17	21		
20	28	19	22	25		
23	32	24	31	30		
27	36	35	37	33		
29	39	38		34		

Appendix.7 Expected Score Curve of FMI




Expected Scores Curve - Item fmi9
Score
Ability


Expected Scores Curve - Item fmi10
Score
Ability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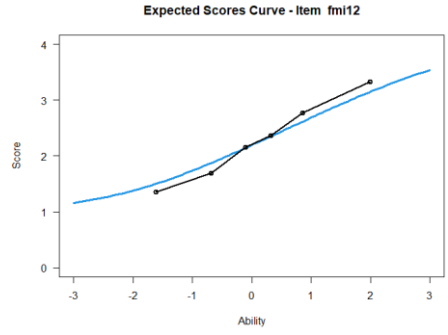
Score
Ability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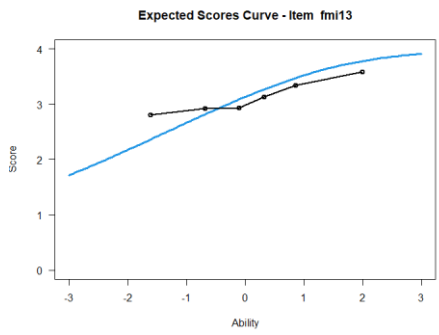
Ability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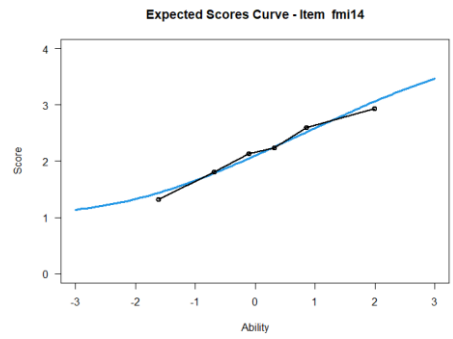
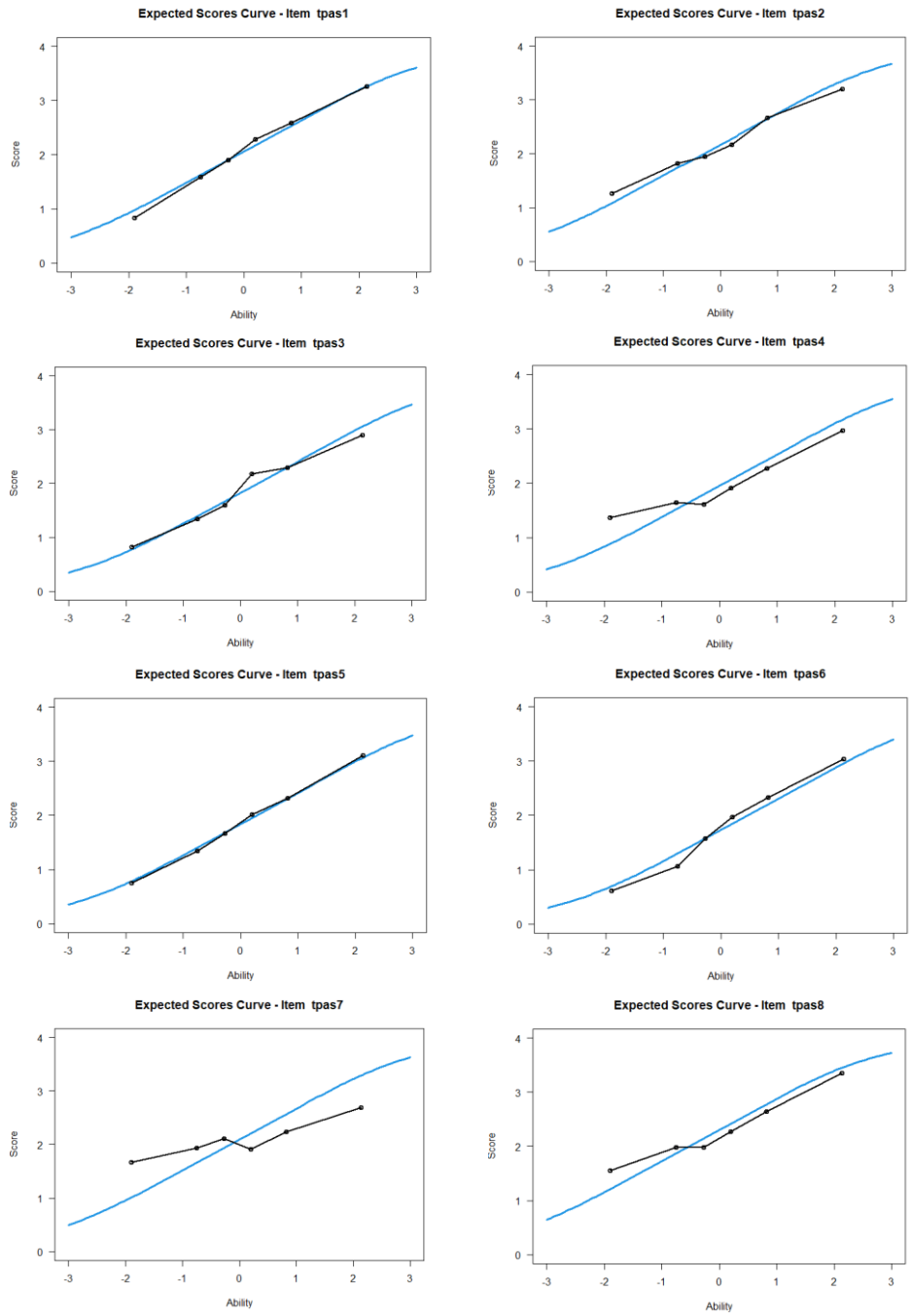
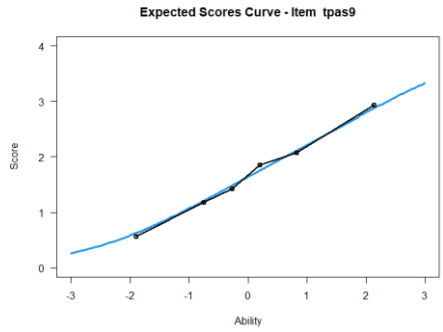
Score
Ability


Expected Scores Curve - Item fmi14
Score
Ability

Appendix.8 Expected Score Curve of TPAS

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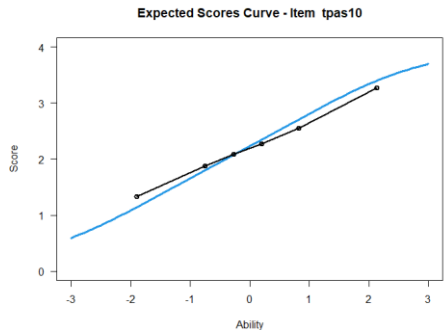
Score
Ability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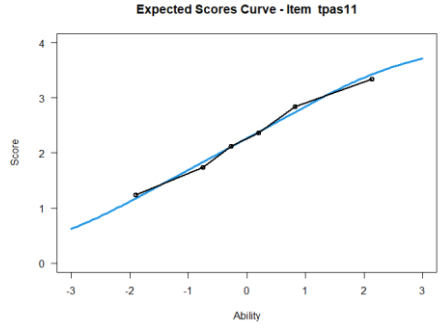
Score
Ability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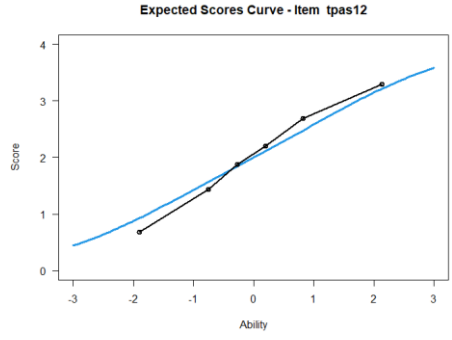
Ability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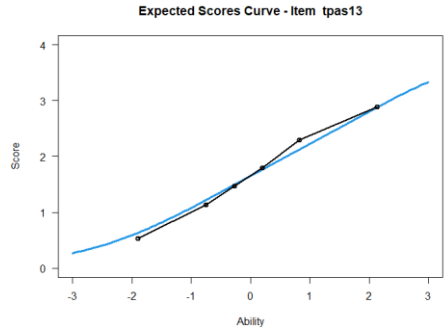
Ability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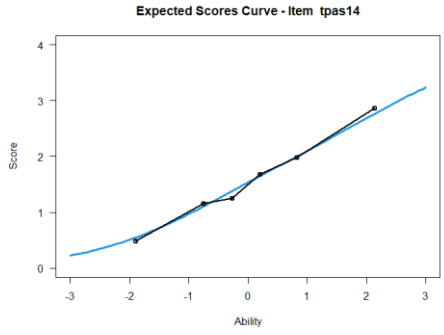
Score
Ability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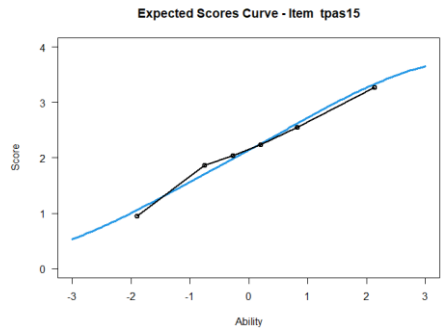
Score
Ability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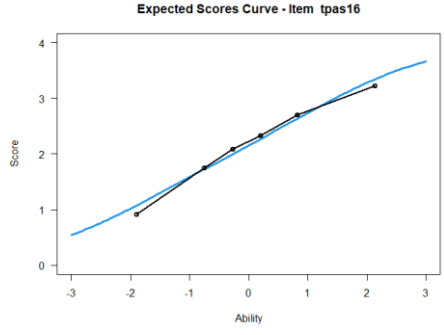
Score
Ability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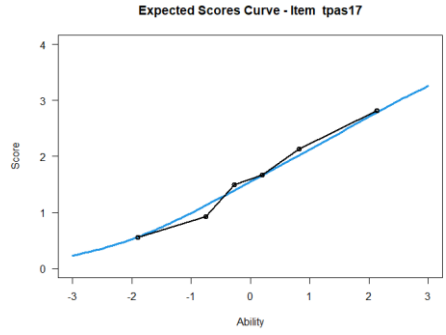
Score
Ability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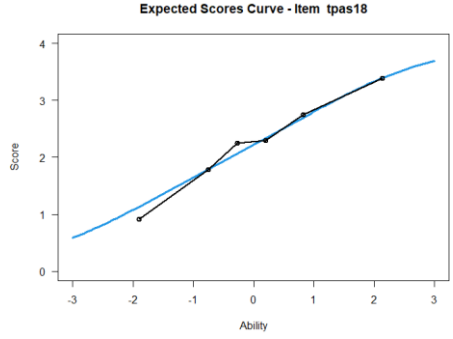
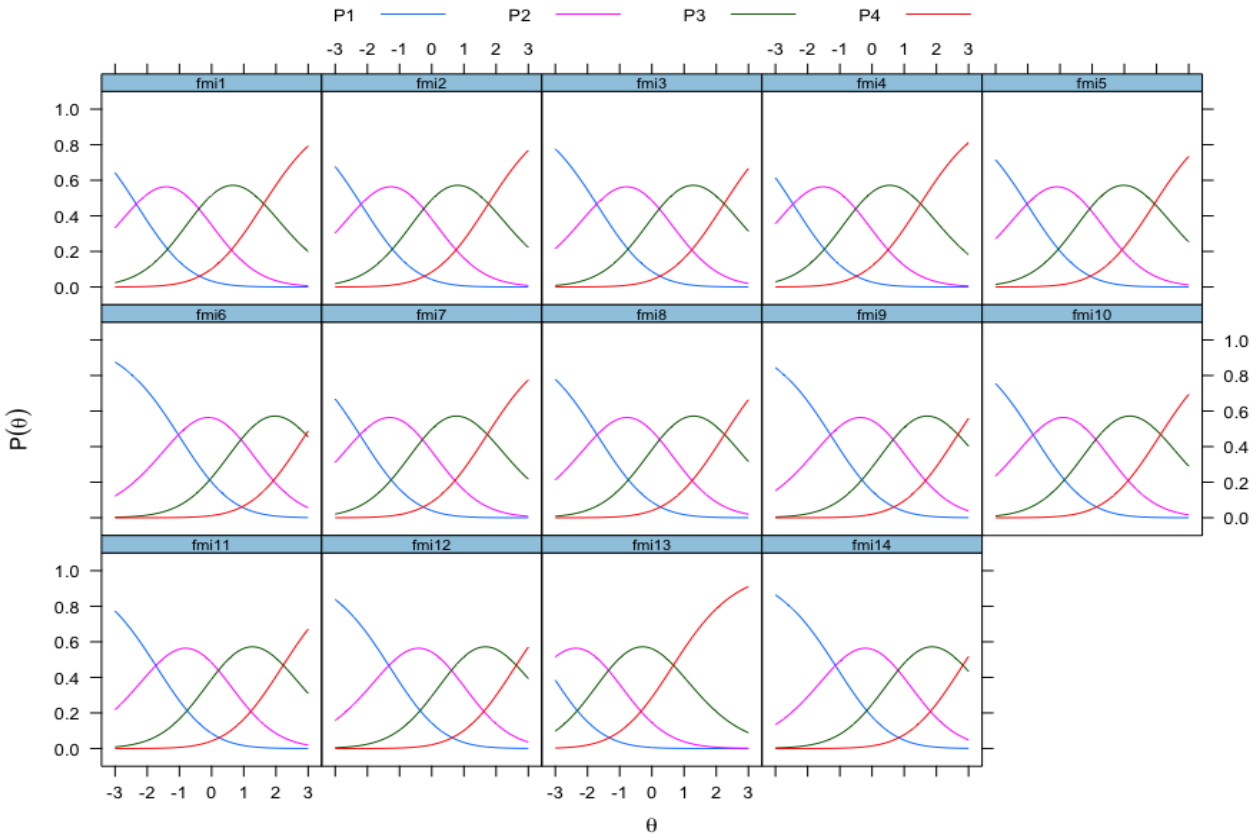
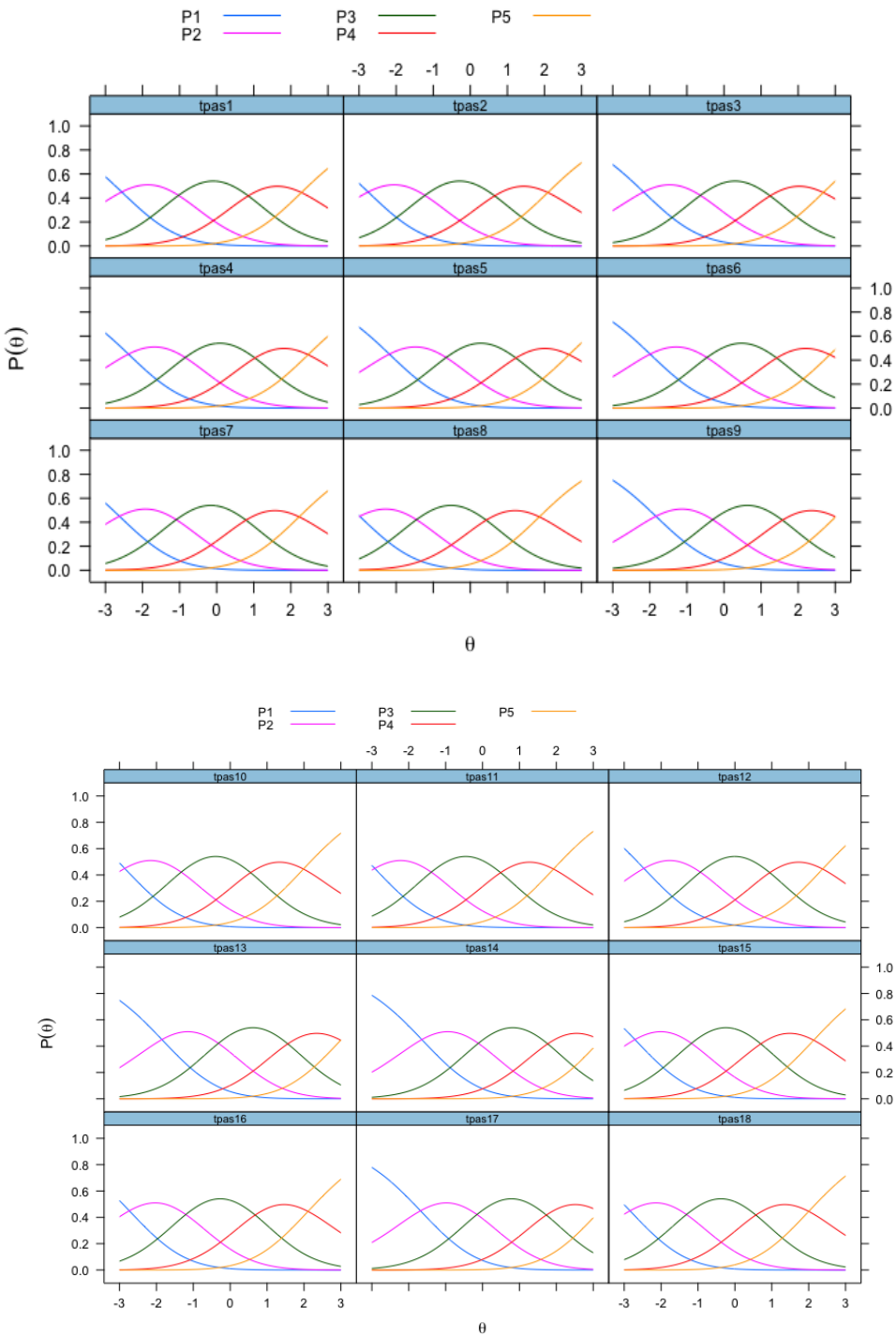
Score
Ability


Expected Scores Curve - Item tpas18
Score
Ability

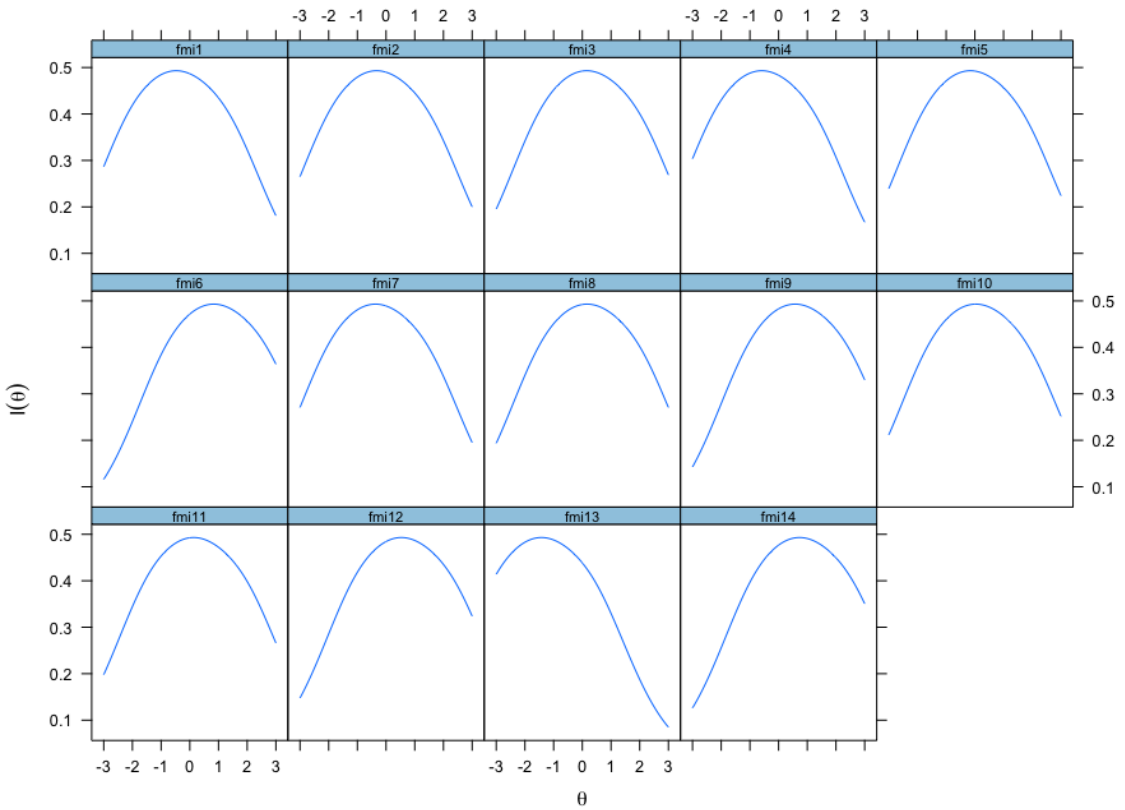
Appendix.9 Item Characteristic Curves by items (FMI)



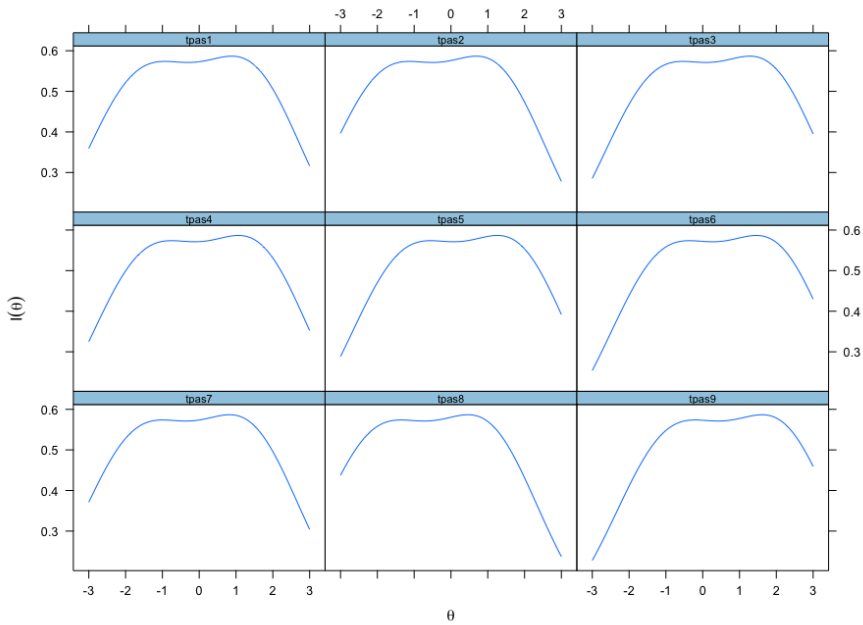
Appendix.10 Item Characteristic Curves by items (TPAS)

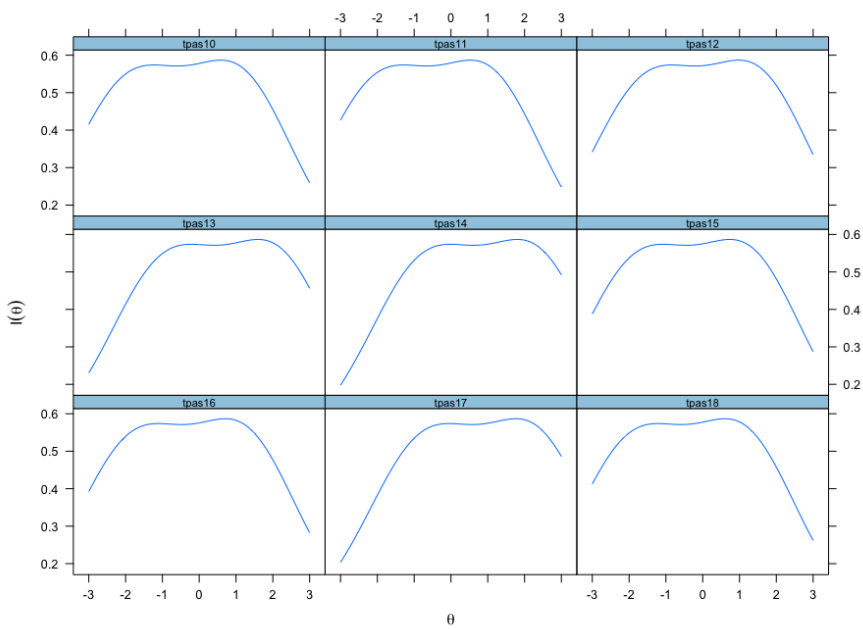


Appendix.11 Item Information Curves (FMI)



Appendix.12 Item information curves (TPAS)





Appendix.13 Online Questionnaire

한국판 FMI 및 TPAS 척도 번안 및 타당화 조사

안녕하십니까?

본 설문은 이 연구는 Freiburg Mindfulness Inventory(FMI)와 Types of Positive Affect Scale(TPAS)의 번안과 타당화에 대한 연구입니다.

귀하께서 응답해주신 내용은 본 연구를 위한 중요한 자료로 활용되며, 연구 목적 이외 다른 용도로 사용하지 않을 것을 약속 드립니다.

바쁘시더라도 질문에 성심성의껏 답변해주시면 감사하겠습니다.

감사합니다.

SQ. 선정질문

SQ1. 귀하의 성별은 어떻게 되십니까?

1) 남성

2) 여성

SQ2. 귀하의 연령은 어떻게 되십니까? 만( )세

만 20세 이상 참여 가능

1) 20~29세 2) 30~39세 3) 40~49세 4) 50~59세 5) 60세 이상

< 아래의 연구참여자용 설명문을 읽어주시기 바랍니다. >

● **연구 과제명 : 한국판 Freiburg Mindfulness Inventory (FMI) 및 Types of Positive Affect Scale (TPAS) 척도 번안 및 타당화**

● **연구 책임자명 : 조성일 (서울대학교 보건대학원 교수)**

이 연구는 Freiburg Mindfulness Inventory(FMI)와 Types of Positive Affect Scale(TPAS)의 번안과 타당화에 대한 연구입니다. 귀하는 건강한 성인이기 때문에 이 연구에 참여하도록 권유 받았습니다. 이 연구를 수행하는 서울대학교 소속의 최윤영연구원(010-7371-7342)이 귀하에게 이 연구에 대해 설명해 줄 것입니다. 이 연구는 자발적으로 참여 의사를 밝히신 분에 한하여 수행 될 것이며, 귀하께서는 참여 의사를 결정하기 전에 본 연구가 왜 수행되는지 그리고 연구의 내용이 무엇과 관련 있는지 이해하는 것이 중요합니다. 다음 내용을 신중히 읽어보신 후 참여 의사를 밝혀 주시길 바라며, 필요하다면 가족이나 친구들과 의논해 보십시오. 만일 어떠한 질문이 있다면 담당 연구원이 자세하게 설명해 줄 것입니다.

1. 이 연구는 왜 실시합니까?

이 연구의 목적은 마음챙김척도인 Freiburg Mindfulness Inventory(FMI)와 긍정정서 척도인 Types of Positive Affect Scale(TPAS)의 번안과 타당화를 하기위함 입니다.

2. 얼마나 많은 사람이 참여합니까?

한국어 문해력이 있는 건강한 성인 400명이 참여 할 것입니다.

3. 만일 연구에 참여하면 어떤 과정이 진행됩니까?

만일 귀하가 참여의사를 밝혀 주시면 다음과 같은 과정이 진행될 것입니다.
귀하는 총 약 30분가량 설문 문항에 답변하게 될 것입니다.

4. 연구 참여 기간은 얼마나 됩니까?

약 30분이 소요될 것입니다.

5. 참여 도중 그만두어도 됩니까?

예, 귀하는 언제든지 어떠한 불이익 없이 참여 도중에 그만 둘 수 있습니다. 만일 귀하가 연구에 참여하는 것을 그만두고 싶다면 설문참여 페이지에서 벗어나시면 됩니다. 그만두는 경우 모아진 자료는 즉시 폐기됩니다.

6. 부작용이나 위험요소는 없습니까?

설문 문항에 따른 부작용이나 위험 요소는 없습니다.

7. 이 연구에 참여시 참여자에게 이득이 있습니까?

귀하가 이 연구에 참여하면서 얻는 직접적인 이득은 없습니다. 하지만, 귀하의 참여로 한글판 마음챙김척도와 긍정정서 척도의 활용이 가능해집니다. 이 번안을 통해 앞으로 한국의 보건, 심리 연구와 발전에 기여하게 될 것으로 예상됩니다.

8. 만일 이 연구에 참여하지 않는다면 불이익이 있습니까?

귀하는 본 연구에 참여하지 않을 자유가 있습니다. 또한, 귀하가 본 연구에 참여하지 않아도 귀하에게는 어떠한 불이익도 없습니다.

9. 연구에서 얻은 모든 개인 정보의 비밀은 보장됩니까?

개인정보관리책임자는 서울대학교의 조성일(02-880-2717)입니다. 본 연구에서 수집되는 개인정보는 없습니다. 연구자료의 경우는 서울대학교 연구윤리 지침에 따라 가능한 한 영구 보관할 예정입니다. 저희는 이 연구를 통해 얻은 모든 개인 정보의 비밀 보장을 위해 최선을 다할 것입니다. 이 연구에서 얻어진 개인 정보가 학회지나 학회에 공개 될 때 귀하의 이름 및 기타 개인 정보는 사용되지 않을 것입니다. 그러나 만일 법이 요구하면 귀하의 개인정보는 제공될 수도 있습니다. 또한 모니터 요원, 점검 요원, 생명윤리위원회는 연구참여자의 개인 정보에 대한 비밀 보장을 침해하지 않고 관련규정이 정하는 범위 안에서 본 연구의 실시 절차와 자료의 신뢰성을 검증하기 위해 연구 결과를 직접 열람할 수 있습니다. 귀하가 본 온라인동의 페이지에 '동의' 버튼을 클릭 하시는 것은, 이러한 사항에 대하여 사전에 알고 있었으며 이를 허용한다는 동의로 간주 될 것입니다.

10. 이 연구에 참가하면 사례가 지급됩니까?

귀하가 성실히 모든 문항에 답변을 할 경우 귀하에게 2,000원이 지급될 것입니다.

11. 연구에 대한 문의는 어떻게 해야 됩니까?

본 연구에 대해 질문이 있거나 연구 중간에 문제가 생길 시 다음 연구 담당자에게 연락하십시오.

이름: 최윤영 전화번호: 010-7371-7342

만일 어느 때라도 연구참여자로서 귀하의 권리에 대한 질문이 있다면 다음의 서울대학교 생명윤리위원회에 연락하십시오.

서울대학교 생명윤리위원회 (SNUIRB) 전화번호: 02-880-5153 이메일: irb@snu.ac.kr

SQ3. 귀하께서는 해당 조사에 참여하시겠습니까?

● **연구 과제명 : 한국판 Freiburg Mindfulness Inventory (FMI) 및 Types of Positive Affect Scale (TPAS) 척도 번안 및 타당화**

● **연구 책임자명 : 조성일 (서울대학교 보건대학원, 교수)**

1. 나는 이 설명서를 읽었으며 담당 연구원과 이에 대하여 의논 하였 습니다.
2. 나는 위험과 이득에 관하여 들었으며 나의 질문에 만족할 만한 답변을 얻었습니다.
3. 나는 이 연구에 참여하는 것에 대하여 자발적으로 동의합니다.
4. 나는 이 연구에서 얻어진 나에 대한 정보를 현행 법률과 생명윤리위원회 규정이 허용하는 범위 내에서 연구자가 수집하고 처리하는 데 동의합니다.
5. 나는 담당 연구자나 위임 받은 대리인이 연구를 진행하거나 결과 관리를 하는 경우와 법률이 규정한 국가 기관 및 서울대학교 생명윤리위원회가 실태 조사를 하는 경우에는 비밀로 유지되는 나의 개인 신상 정보를 확인하는 것에 동의합니다.
6. 나는 언제라도 이 연구의 참여를 철회할 수 있고 이러한 결정이 나에게 어떠한 해도 되지 않을 것이라는 것을 압니다.
7. 나는 수집되는 자료가 본 연구 이외에 연구책임자 및 다른 연구자의 연구의 목적으로 사용되는 것에 동의합니다.
8. 나의 서명은 이 동의서를 받았다는 것을 뜻하며 나와 동의받는 연구원의 서명이 포함된 동의서를 보관하겠습니다.

1) 예(동의함)

2) 아니오(동의하지 않음) **-> 선정탈락**

DQ. 배경 질문

DQ1. 귀하의 거주지역은 어디 십니까?

1) 서울	7) 울산	13) 전북
2) 부산	8) 세종	14) 전남
3) 대구	9) 경기	15) 경북
4) 인천	10) 강원	16) 경남
5) 광주	11) 충북	17) 제주
6) 대전	12) 충남	

DQ2. 귀하의 최종 학력은 어떻게 되십니까?

1) 초졸이하

2) 중졸

3) 고졸

4) 대졸이상

DQ3. 귀하 가구의 연/월 평균 소득은 어떻게 되십니까? 1 년 또는 1 개월 기준을 선택 후 응답해 주시기 바랍니다.

1) 연 ( )만원

2) 월 ( )만원

DQ4. 귀하의 결혼상태는 어떻게 되십니까?

1) 혼인중 (기혼)

2) 별거/이혼/사별

3) 미혼

DQ5. 의사의 진단을 받은 만성질환에 모두 체크해 주십시오.

1) 고혈압

2) 당뇨병

3) 암

4) 폐질환

5) 간질환

6) 심장질환

7) 뇌혈관질환

8) 정신과적 문제

9) 관절염 및 류마티스 질환

10) 기타( )

11) 없음

DQ6. 다음 사다리 그림이 한국 사회를 나타낸다고 가정하고, 맨 위쪽(10)에는 사회경제적 지위가 높은 사람들이 위치하고 맨 아래쪽(1)에는 사회경제적 지위가 낮은 사람들이 위치한다고 가정할 때, 이 사다리 중 본인은 어디에 위치한다고 생각하십니까?

10) 10
9) 9
8) 8
7) 7
6) 6
5) 5
4) 4
3) 3
2) 2
1) 1

Q. 본 질문

Q1. 다음은 귀하의 마음챙김 경험에 대한 질문입니다. 평소(오늘을 포함한 지난 일주일) 일상을 기준으로 각 질문에 대답해 주시면 됩니다. 각 문항에 솔직하게 답해주시되, 너무 깊게 생각하시지 마시고 응답 부탁드립니다. 맞고 틀린 답이나, 좋고 나쁜 답은 없습니다. 귀하의 진실된 경험이 가장 중요합니다.

		드물게	가끔	자주	거의 항상
		1	2	3	4
1	나는 지금 순간의 경험에 마음이 열려 있다.				
2	나는 먹을 때나, 요리할 때나, 청소할 때나, 말할 때나, 나의 몸을 느낀다.				
3	나는 마음이 다른 곳에 가 있다는 것을 알아차릴 때, 부드럽게 지금 여기에서 일어나는 경험으로 돌아온다.				
4	나는 나 스스로에게 감사할 수 있다.				
5	나는 내 행동의 이면에 무엇이 있는지 주의를 기울인다.				
6	나는 내 실수나 곤경을 판단하지 않고 바라본다.				
7	나는 지금 여기에서 일어나는 경험과 연결되어 있다고 느낀다.				
8	나는 불쾌한 경험들도 받아들인다.				
9	나는 무언가 잘못되어도 나 스스로에게 친절하다.				
10	나는 휩쓸리지 않고 내 감정을 바라본다.				

		드물게	가끔	자주	거의 항상
		1	2	3	4
11	나는 힘든 상황에서 즉각적으로 반응하지 않고 잠시 멈출 수 있다.				
12	나는 정신없고 스트레스 받는 상황일지라도, 내면의 평화와 편안을 찾을 수 있다.				
13	나는 나 스스로와 남들에 대해 참을성이 없다.				
14	나는 내가 가끔 삶을 얼마나 힘들게 하는지 알아차릴 때도 웃을 수 있다.				

Q2. 다음은 긍정적인 감정을 설명하는 단어들입니다. 이러한 감정을 <u>평소에 얼마나</u> 느끼시는지 조사하고자 합니다. 왼쪽에 있는 단어들을 아래 척도를 활용해서 얼마나 느끼시는 지 표시해 주십시오.

		아니다		꽤 그렇다	매우 그렇다	
		0	1	2	3	4
1	안정된					
2	차분한					
3	활동적인					
4	느긋한					
5	생기있는					
6	기운넘치는					
7	고요한					
8	열심인					
9	역동적인					

		아니다		꽤 그렇다	매우 그렇다	
		0	1	2	3	4
10	안전한					
11	따듯한					
12	만족한					
13	신이 난					
14	모험심있는					
15	평온한					
16	평화로운					
17	열렬한					
18	편안한					

Q3. 다음은 매일의 일상에서 경험할 수 있는 일들을 모아 놓은 것입니다. 각 문항을 주의 깊게 읽고, 얼마나 자주 또는 가끔 경험하고 있는지를 가 장 잘 표현하는 것을 선택해 주시기 바랍니다. 자신이 해야 된다고 생각하는 것이 아니라, 실제 경험하는 바에 따라 해주시기 바랍니다.

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
1	나는 나의 느낌이나 감정에 즉각적으로 반응하지 않고 먼저 그것을 알아차린다.							
2	걷고 있을 때, 난 의도적으로 내 몸이 움직이는 감각을 알아차리고자 한다.							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
3	나는 내가 무슨 일을 하고 있는 지 자각하지 못한 채 기계적으로 반응하고 있는 것 같다.							
4	나는 공상을 하거나 걱정을 하거나 혹은 다른 생각에 빠져서 하고 있는 일에 주의를 집중하지 못한다.							
5	나는 대개 그 순간 내가 어떻게 느끼는지를 상당히 자세하게 묘사할 수 있다.							
6	괴로운 생각이나 이미지가 떠오를 때, 나는 한걸음 물러나 그 때 떠오르는 생각과 이미지를 인식하되 그에 압도 되지는 않는다.							
7	나는 가끔 나쁘거나 부적절한 감정을 느끼는데 그런 감정을 느끼면 안된다고 생각한다.							
8	나는 내 감정에 휘말리지 않고 그것을 주의 깊게 지켜본다.							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
9	샤워나 목욕을 할 때 나는 물이 내 몸에 닿는 감각에 주의를 기울인다.							
10	나는 무슨 일을 할 때 세심하게 주의를 기울이지 못한 채 급히 그 일을 해치운다.							
11	나는 일이나 업무를 처리할 때 내가 무엇을 하고 있는지 의식하지 못한 채 기계적으로 처리한다.							
12	나는 내 감정을 표현할 만한 말들을 잘 찾아낸다.							
13	나는 내 생각이 좋은지 혹은 나쁜지에 대해 평가적인 판단을 내리곤 한다.							
14	나는 색, 모양 재질 혹은 빛과 그림자의 패턴과 같은, 예술이나 자연의 시각적 요소들을 알아차린다.							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
15	나는 나의 감정이 내 생각과 행동에 어떻게 영향을 미치는지에 주의를 기울인다.							
16	나는 마음이 몹시 혼란스러울 때 조차도 그것을 말로 표현할 수 있다.							
17	어려운 상황에 부딪혔을 때 나는 즉각적으로 반응하지 않고 잠시 생각할 수 있는 여유를 가질 수 있다.							
18	내가 비합리적인 생각을 할 때면, 나는 나 스스로를 용납할 수 없다.							
19	나는 머리카락사이를 스치는 바람이나 얼굴에 비치는 햇살과 같은 감각에 주의를 기울인다.							
20	나는 주의를 기울이지 않은 채 무언가를 하고 있는 나 자신을 발견하곤 한다.							
21	나는 내가 어떤 일에 대해 어떻게 느끼는지를							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
	표현할 적절한 단어를 생각해내는 것이 어렵다.							
22	괴로운 생각이나 이미지가 떠오를 때, 나는 그것을 단지 알아차릴 뿐 즉각적으로 반응하지는 않는다.							
23	나는 쉽게 마음이 산만해 지곤 한다.							
24	나는 시계 소리, 새들이 지저귀는 소리, 차가 지나가는 소리 같은 것에 주의를 기울인다.							
25	나는 내 신념, 의견, 혹은 기대를 쉽게 말로 표현할 수 있다.							
26	나는 이상하거나 나쁜 생각들을 할 때가 있는데 그런 생각을 해서는 안된다고 믿는다.							
27	내가 무언가를 할 때, 내 마음은 쉽게 다른 생각에 빠져 정신이 산만해 지곤 한다.							
28	지금 내가 느끼는 것처럼 느껴서는 안된다고 스스로에게 말하곤 한다.							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
29	나는 현재 일어나는 일어 주의를 집중하기가 어렵다.							
30	나는 천성적으로 내 경험을 말로 표현하는 경향이 있다.							
31	괴로운 생각이나 이미지가 떠오를 때, 나는 곧 다시 평온을 찾는다.							
32	나는 비합리적이거나 부적절한 감정을 느끼는 나 자신을 간혹 비난하곤 한다.							
33	내 몸에 어떤 감각이 느껴질 때, 적절한 말이 생각나지 않아 그것을 표현하기 어렵다.							
34	나는 내가 생각하고 있는 것을 표현할 만한 말을 찾는 것이 어렵다.							
35	나는 주위에 있는 사물들의 냄새와 향기를 알아차린다.							
36	나는 내가 지금 생각하는 방식대로 생각하면 안된다고 스스로에게 말하곤 한다.							

		전혀 그렇지 않다	거의 그렇지 않다	드물게 그렇다	때때로 그렇다	자주 그렇다	거의 항상 그렇다	항상 그렇다
		1	2	3	4	5	6	7
37	괴로운 생각이나 이미지가 떠오를 때, 나는 그것을 단지 알아차릴 뿐 그에 집착하지 않는다.							
38	나는 음식과 음료수가 나의 생각, 신체 감각 그리고 정서에 어떻게 영향을 미치는지 인식한다.							
39	괴로운 생각이나 이미지가 떠오를 때, 나는 그 생각이나 이미지가 무엇인지에 따라서 나 자신을 좋은 사람 혹은 나쁜 사람이라고 평가를 내리곤 한다.							

Q4. 단어들은 다양한 감정이나 기분을 기술한 것입니다. 각 단어를 읽고, 오늘을 포함하여 <u>최근 2 주간</u> 느낀 감정이나 기분의 정도를 가장 잘 나타낸 숫자에 표시해 주시기 바랍니다.

		전혀 그렇지 않다	약간 그렇다	웬만큼 그렇다	상당히 그렇다	매우 그렇다
		1	2	3	4	5
1	흥미진진한					
2	과민한					
3	괴로운					
4	기민한					
5	흥분된					
6	부끄러운					
7	마음이 상한					
8	원기왕성한					
9	강한					
10	신경질적인					
11	죄책감 드는					
12	단호한					
13	겁에 질린					
14	주의 깊은					
15	적대적인					
16	조바심 나는					
17	열정적인					
18	활기찬					
19	자랑스러운					
20	두려운					

Q5-1. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 슬프지 않다.
1) 나는 슬프다.
2) 나는 항상 슬프고 기운을 낼 수 없다.
3) 나는 너무나 슬프고 불행해서 도저히 견딜 수 없다.

Q5-2. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 앞날에 대해서 별로 낙심하지 않는다.
1) 나는 앞날에 대해서 용기가 나지 않는다.
2) 나는 앞날에 대해 기대할 것이 아무 것도 없다고 느낀다.
3) 나는 앞날은 아주 절망적이고 나아질 가망이 없다고 느낀다.

Q5-3. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 실패자라고 느끼지 않는다.
1) 나는 보통사람들보다 더 많이 실패한 것 같다.
2) 내가 살아온 과거를 뒤돌아보면, 실패투성이인 것 같다.
3) 나는 인간으로서 완전한 실패자라고 느낀다.

Q5-4. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 전과같이 일상생활에 만족하고 있다.
1) 나의 일상생활은 예전처럼 즐겁지 않다.
2) 나는 요즘에는 어떤 것에서도 별로 만족을 얻지 못한다.
3) 나는 모든 것이 다 불만스럽고 싫증난다.

Q5-5. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 특별히 죄책감을 느끼지 않는다.
1) 나는 죄책감을 느낄 때가 많다.
2) 나는 죄책감을 느낄 때가 아주 많다.

3) 나는 항상 죄책감에 시달리고 있다.

Q5-6. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 벌을 받고 있다고 느끼지 않는다.
1) 나는 어쩌면 벌을 받을지도 모른다는 느낌이 든다.
2) 나는 벌을 받을 것 같다.
3) 나는 지금 벌을 받고 있다고 느낀다.

Q5-7. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 나 자신에게 실망하지 않는다.
1) 나는 나 자신에게 실망하고 있다.
2) 나는 나 자신에게 화가 난다.
3) 나는 나 자신을 증오한다.

Q5-8. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 내가 다른 사람보다 못한 것 같지는 않다.
1) 나는 나의 약점이나 실수에 대해서 나 자신을 탓하는 편이다.
2) 내가 한 일이 잘못되었을 때는 언제나 나를 탓한다.
3) 일어나는 모든 나쁜 일들은 다 내 탓이다.

Q5-9. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 자살 같은 것은 생각하지 않는다.
1) 나는 자살할 생각을 가끔 하지만, 실제로 하지는 않은 것이다.
2) 나는 죽고 싶은 생각이 자주 든다.
3) 나는 기회만 있으면 자살하겠다.

Q5-10. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 평소보다 더 울지는 않는다.

1) 나는 전보다 더 많이 운다.
2) 나는 요즈음 항상 운다.
3) 나는 전에는 울고 싶을 때 울 수 있었지만, 요즈음은 울래야 울 기력조차 없다.

Q5-11. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 <u>요즈음</u> 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 요즈음 평소보다 더 짜증을 내는 편은 아니다.
1) 나는 전보다 더 쉽게 짜증이 나고 귀찮아 진다.
2) 나는 요즈음 항상 짜증을 내고 있다.
3) 전에는 짜증스럽던 일에 요즘은 너무 지쳐서 짜증조차 나지 않는다.

Q5-12. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 <u>요즈음</u> 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 다른 사람들에 대한 관심을 잃지 않고 있다.
1) 나는 전보다 다른 사람들에 대한 관심이 줄었다.
2) 나는 다른 사람들에 대한 관심이 거의 없어졌다.
3) 나는 다른 사람들에 대한 관심이 완전히 없어졌다.

Q5-13. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 <u>요즈음</u> 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 평소처럼 결정을 잘 내린다.
1) 나는 결정을 미루는 때가 전보다 더 많다.
2) 나는 전에 비해 결정 내리는 데에 더 큰 어려움을 느낀다.
3) 나는 더 이상 아무 결정도 내릴 수가 없다.

Q5-14. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 <u>요즈음</u> 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 전보다 내 모습이 나빠졌다고 느끼지 않는다.
1) 나는 나이 들어 보이거나 매력없이 보일까 봐 걱정한다.
2) 나는 내 모습이 매력없게 변해버린 것 같은 느낌이 든다.
3) 나는 내가 추하게 보인다고 믿는다.

Q5-15. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 전처럼 일을 할 수 있다.
1) 어떤 일을 시작하는 데에 전보다 더 많은 노력이 든다.
2) 무슨 일이든 하려면 나 자신을 매우 심하게 채찍질해야만 한다.
3) 나는 전혀 아무 일도 할 수가 없다.

Q5-16. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 평소처럼 잠을 잘 수 있다.
1) 나는 전에 만큼 잠을 자지는 못한다.
2) 나는 전보다 한두 시간 일찍 깨고 다시 잠들기 어렵다.
3) 나는 평소보다 몇 시간이나 일찍 깨고 한번 깨면 다시 잠들 수 없다.

Q5-17. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 평소보다 더 피곤하지는 않다.
1) 나는 전보다 더 쉽게 피곤해진다.
2) 나는 무엇을 해도 피곤해진다.
3) 나는 너무나 피곤해서 아무 일도 할 수 없다.

Q5-18. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 내 식욕은 평소와 다름없다.
1) 나는 요즈음 전보다 식욕이 좋지 않다.
2) 나는 요즈음 식욕이 많이 떨어졌다.
3) 요즈음에는 전혀 식욕이 없다.

Q5-18-1. 귀하께서는 현재 음식조절로 체중을 줄이고 있는 중이십니까?

1) 예
2) 아니오

Q5-19. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 요즈음 체중이 별로 줄지 않았다.
1) 전보다 몸무게가 2Kg가량 줄었다.
2) 전보다 몸무게가 5Kg가량 줄었다.
3) 전보다 몸무게가 7Kg가량 줄었다.

Q5-20. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 건강에 대해 전보다 더 염려하고 있지는 않다.
1) 나는 여러 가지 통증, 소화불량, 변비 등과 같은 신체적인 문제로 걱정하고 있다.
2) 나는 건강이 염려되어 다른 일은 생각하기 힘들다.
3) 나는 건강이 너무 염려되어 다른 일은 아무 것도 생각할 수 없다.

Q5-21. 다음의 문항을 읽어보시고 각 번호의 여러 란 중에서 요즈음 자신에게 가장 적합하다고 생각되는 번호를 하나씩만 골라주시기 바랍니다.

0) 나는 요즈음 성(sex)에 대한 관심에 별다른 변화가 있는 것 같지는 않다.
1) 나는 전보다 성에 대한 관심이 줄었다.
2) 나는 전보다 성에 대한 관심이 상당히 줄었다.
3) 나는 성에 대한 관심을 완전히 잃었다.

Q6. 몇 가지 자신에 관한 진술을 읽고, 각 진술이 스스로에게 해당되는 정도를 선택해 주십시오.

		전혀 아님	거의 가능성 없음	별로 아님	가끔 그러함	자주 그러함	거의 대부분 그러함	항상 그러함
		1	2	3	4	5	6	7
1	나는 불쾌한 기억을 떠올리더라도 괜찮다.							
2	고통스러운 경험과 기억으로 인해 나는 내가 가치 있게 여기는 삶을 살기가 어렵다.							
3	나는 내 감정을 느끼는 것이 두렵다.							
4	나는 내 걱정과 느낌을 통제하지 못하는 것에 대해 염려한다.							
5	내 고통스러운 기억들은 내가 만족스러운 삶을 살지 못하게 한다.							
6	나는 내 삶을 잘 관리하고 있다.							
7	감정은 내 일상생활에서 문제를 일으킨다.							

		전혀 아님	거의 가능성 없음	별로 아님	가끔 그러함	자주 그러함	거의 대부분 그러함	항상 그러함
		1	2	3	4	5	6	7
8	대부분의 사람들은 나보다 자신의 삶을 잘 꾸려나가고 있는 것 같다.							
9	걱정은 내가 성공하는 데 걸림돌이 된다.							
10	내 생각과 감정은 내가 살고 싶은 방식대로 살아가는 데 방해되지 않는다.							

Appendix.14 R packages and Code

	Package	Code	Values or Function
Descriptive analysis	psych	describe	Skew, Kurtosis
		alpha	item deleted alpha
	ltm	cronbach.alpha	Cronbach's alpha
	empr	istudy	item-total correlation
PCA	psych	fa.parallell	Parallell analysis
		principlal	Principal components analysis, plot
	stats	factanal	maximum-likelihood factor analysis
		prcomp	Principal Components Analysis
EFA	psych	cortest.bartlett	correlation matrix
		fa	Exploratory Factor analysis, plot
		unidim	unidimensionality
CFA	lavaan	cfa	Confirmatory Factor Analysis
	semPlot	semPlot	CFA Plot
IRT	TAM	tam.mml	Test Analysis Modules: Marginal Maximum Likelihood Estimation
		IRT.Wrightmap	Wright map
		tam.fit	Item Infit and Outfit Statistic
		tam.threshold	item category parameters
	mirt	mirt	Test Analysis Modules: Marginal Maximum Likelihood Estimation
		M2	C2 model fit statistic
		itemfit	Item fit statistics
	eRm	RSM	Estimation of rating scale models
		threshold	item-category treshold parameters
		person.parameter	Estimation of Person Parameters
DIF	eRm	PCM	Estimation of partial credit models
		Waldtest	Wald test on item-level by splitting subjects
Correlation analysis	corrplot	cormat	Visualization of a correlation matrix

Abstract in Korean

본 연구는 문항반응이론(IRT)과 요인분석을 이용하여 한국어 번역본 Freiburg Mindfulness Inventory(FMI)와 Type of Positive Affect Scale(TPAS)의 타당도를 분석하였다. 건강한 한국 성인 352명이 분석 대상이 였다. FMI 척도는 2-요인 모형이 더 적합하지만 1-요인 모형 또한 적합한 수준으로 나타났다. 또한, 문항13을 제외한 2-요인 모형에서 가장 높은 적합도가 분석되었다. TPAS는 단일 요인 모형으로 적합하지 않았고, 2-요인 모형에서는 수용가능한 적합도가 나타났다. TPAS의 문항 4과 문항 7은 라쉬 모형 분석으로 적합하지 않은 것으로 나타났다. 차별문항기능(DIF)분석에서 FMI 문항 13을 제외하고 성별, 환자 그룹의 하위 그룹에서 두 척도의 차이가 없는 것으로 나타났다. 따라서, 라쉬분석과 요인분석을 종합해 보았을 때, FMI13의 2-요인 모델이 가장 합리적인 모형이다. 하지만, 문항의 난이도를 고려해 결과 해석에 대한 추가적인 논의가 필요하다. TPAS 는 단일 요인 모델이 적합하지 않으며, 문항7을 제외한 2-요인 모델이 라쉬분석과 요인분석을 종합했을 때 가장 적합한 것으로 나타났다.

키워드: 한국판 프라이베르그 마음챙김 척도(FMI), 한국판 긍정 정서 척도(TPAS), 문항반응이론, 라쉬모델, 타당화, 심리척도