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**Alexithymia assessment in cancer care: A content validity study of the 20-Item Toronto**

**Alexithymia Scale**

Eindwerk neergelegd tot het behalen van het getuigschrift van de opleiding

'Psycho-oncologie' door

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## **Abstract**

**Objectives:** Alexithymia - the inability to recognize and express emotions – has been observed among a wide range of psychiatric disorders, but also medical conditions such as cancer. Typically, the empirical research on alexithymia has measured the construct with the TAS-20, currently the most widely used self-report measure of alexithymia. However, questions have been raised on the (discriminant) content validity of this measure, that is whether it measures alexithymia in a relevant and comprehensive manner without contamination from related constructs. This study assessed the content validity and discriminant content validity of the TAS-20 items using the Discriminant Content Validity (DCV) methodology.

**Methods:** Via an online tool, participants (n = 81) were presented with the TAS-20 items and items of related constructs (i.e. anxiety, depression, and health anxiety). Items were rated against construct definitions (i.e. alexithymia, difficulty identifying feelings, difficulty describing feelings, externally-oriented thinking, limited imaginal capacity, anxiety, depression, and health anxiety) to determine whether they measured a particular construct (no/yes/yes, when reversed scored). Judges' confidence in each assessment was also assessed (0-100%) and used to establish quantitative estimates of content validity for each item.

**Results:** Data of 74 participants were analyzed using linear mixed effects models. The results revealed that all items from the included anxiety, depression, and health anxiety measures assessed the intended construct well and scored significantly higher on the intended construct than on any other construct. This was not the case for the TAS-20 items, where only 10 out of the 20 items measured alexithymia. In particular, the majority of these items were equally well perceived as measures of both the difficulty identifying feelings and the difficulty describing feelings constructs. Two items were perceived as measures of health anxiety, of which one was also found to measure anxiety. The other TAS-20 items were not perceived by participants as measures of any of the overarching constructs. Only one item of the externally-oriented thinking scale was identified to measure the externally-oriented thinking construct.

**Conclusions:**

Based upon current findings we can conclude that the TAS-20 may need some revision to adequately address all features of alexithymia. Furthermore, authors should be careful when using the TAS-20 with people suffering from anxiety complaints or debilitating diseases such as cancer with somatic complaints.

Keywords: alexithymia; TAS-20; oncology; content validity; discriminant content validity

## Introduction

The alexithymia concept ('alexithymic' from Greek stems *a* = lack, *lexis* = word, and *thymos* = mood, emotion) was proposed in the early seventies (Sifneos, 1972, 1973), and is defined as the inability to recognize and express emotions (Taylor, Bagby, & Parker, 2016). It is historically rooted in a large body of clinical observations of classic psychosomatic patients with poor response to psychotherapy (e.g., MacLean, 1949; Marty & de M'Uzan, 1963; Nemiah & Sifneos, 1970; Ruesch, 1948). Recognition of the significance of these early observations was boosted by Nemiah and Sifneos (1970) who performed a systematic investigation of transcripts of clinical psychiatric interviews from classic psychosomatic patients. The results of their study showed that these patients 'manifested either a total unawareness of feelings or an almost complete incapacity to put into words what they were experiencing. The associations of the majority of the patients were characterized by a nearly total absence of fantasy or other material related to their inner, private mental life of thoughts, attitudes and feelings, and a recounting, often in almost infinite detail, of circumstances and events in their environment, including their own actions. Their thoughts, that is, were stimulus-bound rather than drive-directed.' (Nemiah & Sifneos, 1970; p. 159). In recognition of the growing interest in the concept, alexithymia and its characteristics were subject of much discussion and debate at the 11<sup>th</sup> European Conference on Psychosomatic Research (Bräutigam & von Rad, 1977). At this conference consensus was reached on the need for agreement among clinicians and researchers on what the *alexithymia construct* constitutes, which resulted in four key features of alexithymia: (1) difficulty identifying feelings, differentiating among the range of common affects, and distinguishing between feelings and the bodily sensations of emotional arousal, (2) difficulty finding words to describe feelings to other people, (3) constricted imaginal processes as evidenced by a paucity or absence of fantasies referable to drives and feelings, and (4) a thought content characterised by a preoccupation with the minute details of external events, the last two characteristics also referred to as *pensée opératoire* (Nemiah, Freyberger, & Sifneos, 1976; Taylor & Bagby, 2013; Taylor et al., 2016). Taylor, Bagby, and Parker (1997) formulated these four interrelated features as they are presently defined and used: (1) difficulty identifying feelings and distinguishing between feelings and the bodily sensations of emotional arousal, (2) difficulty describing feelings to other people, (3) constricted imaginal processes, as evidenced by a paucity of fantasies, and

(4) a stimulus-bound, externally oriented cognitive style (Taylor et al., 1997, p. 29). This conceptualization has been the most influential in contemporary theory and research. It was proposed that these features reflect a multidimensional deficit in the cognitive processing of emotions (Sifneos, 1994, p. 194). Nowadays, alexithymia is considered as a transnosographic construct (Taylor & Bagby, 2004), and it is examined in relation to a wide variety of medical and psychiatric disorders (for an overview review, see Taylor & Bagby, 2000, 2004), including substance abuse disorders (e.g., Cecero & Holmstrom, 1997; Hendryx Haviland, Shaw, & Henry, 1994; Taylor, Parker, & Bagby, 1990), pathological gambling (e.g., Parker, Wood, Bond, & Shaughnessy, 2005), eating disorders (e.g., Jimerson, Wolf, Franko, Covino, & Sifneos, 1996; Taylor, Parker, Bagby, & Bourke, 1996), somatoform disorders (e.g., De Gucht & Heiser, 2003; Porcelli, Taylor, Bagby, & De Carne, 1999; Waller & Scheidt, 2004), a subtype of depression characterized by more somatic-affective symptoms (Vanheule, Desmet, Verhaeghe, & Bogaerts, 2007), posttraumatic stress disorders (e.g., Frewen, Pain, Dozois, & Lanius, 2006; Yehuda et al., 1997), stress-related disorders in general (Stone & Nielson, 2001), chronic pain (Pecukonis, 2009), low back pain (Mehling & Krause, 2005), kidney failure (Fukunishi, Saito, & Ozaki, 1992), asthma (Serrano et al., 2006), myocardial infarction (Kojima, Frasure-Smith, & Lesperance, 2001), inflammatory bowel disease (Porcelli, Zaka, Leoci, Centonze, & Taylor, 1995), functional gastrointestinal disorders (Porcelli, Taylor, Bagby, & De Carne, 1999), and also cancer (Todarello, La Pesa, Zaka, Martino, & Lattanzio 1989).

Different perspectives are taken concerning the role of alexithymia in cancer. Some researchers suggest that alexithymia is a predisposing vulnerability factor related to the development of cancer while others suggest that alexithymia is a reaction to the cancer itself which is life-threatening, still others argue that both trait and state alexithymia can co-exist (e.g., Luminet, Rokbani, Ogez, & Jadouille, 2007; Mikolajczak & Luminet, 2006). Several studies have been performed to examine the prevalence of alexithymia in cancer patients and the potential influence of alexithymia on the development and progression of cancer, treatment compliance, and psychological suffering and psychiatric outcomes. For example, alexithymia has been found to relate to the progression of cancer invasion in patients with hematologic malignancies (Messina, Fogliani, & Paradiso, 2011), to predict the development of persistent pain in cancer patients after breast surgery (Baudic et al., 2016), and to be reduced after

application of a multicomponent psychological intervention in cancer patients (Tulipani et al., 2010). However, as shown in a recent review of de Vries and colleagues (2012), no firm conclusions can be drawn on the directionality of relations between alexithymia and cancer in adults due to the lack of methodological soundness of studies and their often inconclusive or contradictory findings (de Vries, Forni, Voellinger, & Stiefel, 2012; see also De Berardis et al., 2016 for an overview). A number of factors, such as the method used to assess alexithymia, may have contributed to this inconclusiveness. Alexithymia has been mainly measured by self-report questionnaires, most often by the Toronto Alexithymia Scale – 20 (TAS-20; Bagby, Taylor, & Parker,). Although the TAS-20 has been found to be the most reliable and well validated self-report measure of alexithymia, therefore widely used (Taylor & Bagby, 2013), its validity, and in particular its content validity and discriminant content validity, has been subject to criticism (e.g., Bermond, Oosterveld, & Vorst, 2015; Lane et al., 2015; Lumely, Neely, & Burger, 2007).

*First*, doubts exists whether the TAS-20 measures the alexithymia construct in a comprehensive and relevant manner. The TAS-20 contains three subscales, i.e. difficulty identifying feelings, difficulty describing feelings, and externally-oriented thinking. It was developed to overcome the shortcomings of an earlier revision of the original TAS, the TAS-R (Taylor, Bagby, & Parker, 1992). The items for assessing the paucity of fantasies, representing the daydreaming factor, were eliminated because of either low magnitude corrected item-total correlations or high correlations with a social desirability measure, or a combination of both (Bagby, Parker, & Taylor, 1994a; Bagby et al., 1994b). While Bagby and colleagues (1994) (see also Taylor et al., 2016) noted that this factor could be measured indirectly by the factor externally-oriented thinking as it correlates with other measures of fantasizing (Bagby et al., 1994b; Taylor and Bagby, 2013), Sifneos (1996, 2000) commented that this eliminated factor represents one of the key features of alexithymia, thus, the TAS-20 fails to measure alexithymia as it was originally conceptualized. Doubts about the content validity have further been fueled by the internal consistency of the TAS-20, in particular of the externally-oriented thinking scale, that has been persistently reported to be low (Cronbach's alpha reliability coefficients are often under .60; e.g., Kooiman et al., 2002; Preece, Becerra, Robinson, & Dandy, 2017). Furthermore, confirmatory and exploratory factor analyses show that about half or more of the externally-oriented thinking items load

poorly on their intended factor (factor loadings  $< .40$ ; e.g., Kooiman et al., 2002; Preece et al., 2017; Taylor, Bagby, & Parker, 2003). It is presumed that these findings may be due to the content of the items of the externally-oriented thinking scale thought to represent externally-oriented thinking (Kooiman et al., 2002; Preece et al., 2017). In case aspects of the construct alexithymia are underrepresented by the TAS-20 items and/or TAS-20 items are not relevant for the construct, it would lack content validity. The obtained scores and inferences from these scores are very likely to be biased, especially when conclusions are made about alexithymia in general, and not about alexithymia as assessed by this particular measure.

*Second*, questions have been raised about the distinctiveness of the TAS-20 from measures assessing other theoretical constructs. Some authors suggested the TAS-20 as a measure of psychological distress, likely assessing negative affectivity rather than alexithymia (Leising, Grande, & Faber, 2009). Indeed, significant and substantial correlations have repeatedly been reported between the TAS-20 and measures of anxiety and depression in clinical samples (e.g., Marchesi, Ossola, Tonna, & De Panfilis, 2014) and the general population (e.g., Honkalampi et al., 2010). Others argue that although negative affect may contribute to some score elevation, in particular on the difficulty identifying feelings and difficulty describing feelings scales, the TAS-20 is not simply a proxy for negative affect (Lumley, 2000). Studies controlling for anxiety and depression, however, show contrasting results (e.g., Marchesi et al., 2014). Furthermore, Shahidi and colleagues (2012) found significant correlations between the TAS-20 scores and a measure of health anxiety. This study revealed that the difficulty in identifying feelings subscale alone predicted 52% of the total variance in health anxiety scores. It was also noticed that items of this subscale that measure difficulty in differentiating between bodily feelings and emotions tend to have stronger correlations with health anxiety compared to those questions measuring difficulty in differentiating between different feelings. Similar findings have been reported by other authors (Barsky, 2001; De Gucht et al., 2004; Nakao et al., 2002). In case the TAS-20 is contaminated by content relevant to related constructs such as anxiety, depression, and health anxiety it would lack discriminant content validity. The found relationships between the measures of these constructs may then simply be due to this contaminating content.

Despite these concerns, no study has rigorously examined the content and discriminant content validity of the TAS-20. In the current study, TAS-20 items are evaluated using the Discriminant Content Validity method (DCV; Johnston et al., 2014), a systematic and transparent way of investigating and reporting whether items are pure measures of target theoretical constructs, whether items are contaminated with content from other theoretical constructs, or whether items fail to measure the intended constructs. First, it is examined whether TAS-20 items and items of often related constructs (i.e. anxiety, depression, health anxiety) primarily assess the construct they were meant to measure. Second, for each TAS-20 item we were interested on which of the four subscales the items loaded on most (i.e. difficulty identifying feelings, difficulty describing feelings, externally-oriented thinking, and limited imaginal capacity).

## **2. Method**

### **2.1. Participants**

Participants were 81 second year bachelor psychology students (international track) recruited at Maastricht University via Sona Systems, a cloud-based participant pool management software package (<https://maastricht-fpn.sona-systems.com>). Inclusion criteria were: (1) being able to complete the online assessment in line with given instructions and quality checks (performance criteria), and (2) having a basic knowledge of English (self-reported).

### **2.2. Discriminant content validity method**

The Discriminant Content Validity method (DCV) method is a quantitative procedure to assess the (discriminant) content of theory-based measures (for a detailed overview of the methodology, see Johnson et al., 2014). Here, we describe the DCV questionnaire we developed in 5 steps.

#### **2.2.1. Step 1: Identification of constructs**

Eight constructs were identified to be used for the categorization of the items. These constructs were *alexithymia*, *difficulty identifying feelings*, *difficulty describing feeling*, *externally-oriented thinking*, *limited imaginal capacity*, *anxiety*, *depression*, and *health anxiety*.



The constructs *alexithymia*, *difficulty identifying feelings*, *difficulty describing feelings*, *externally-oriented thinking*, and *limited imaginal capacity* were selected to investigate to what extent TAS-20 items are identified as items that assess alexithymia, and to what extent they are identified to assess the respective alexithymia features. The categories *anxiety*, *depression*, and *health anxiety* were selected to investigate to what extent TAS-20 items could be clearly differentiated from other constructs to which alexithymia has been related to.

Finally, the other category was added. We included this category to prevent that participants get the impression that all items had to be assigned in one of the above-mentioned construct categories.

### **2.2.2. Step 2: Construct definitions**

Definitions were formulated for each of the identified constructs. For the alexithymia features, definitions were based upon the widely acknowledged definitions of Taylor and colleagues (1997). For other constructs, there are multiple definitions available, which could introduce bias in our construct definitions. Therefore, we based our definitions on those provided by the Online Oxford Living Dictionaries for English (<https://en.oxforddictionaries.com> accessed on 11/10/2018). The following definitions were used:

(1) Alexithymia: ‘The inability to recognize one's own emotions and to express them, especially in words.’; (2) Difficulty identifying feelings: ‘Difficulty identifying feelings and distinguishing between feelings and the bodily sensations of emotional arousal.’; (3) Difficulty describing feelings: ‘Difficulty describing feelings to other people.’; (4) Externally-oriented thinking: ‘A stimulus-bound, externally oriented cognitive style.’; (5) Limited imaginal capacity: ‘Constricted imaginal processes, as evidenced by a paucity of fantasies.’; (6) Anxiety: ‘A feeling of worry, nervousness, or unease about something with an uncertain outcome.’; (7) Depression: ‘Feelings of severe despondency and dejection.’; and (8) Health anxiety: ‘A feeling of worry, nervousness, or unease about one’s health.’

### **2.2.3. Step 3: Selection of alexithymia items**

Items for *alexithymia* were selected from the TAS-20 (Bagby et al., 1994). It comprises 20 items across three subscales (see Appendix), with most of the items positively keyed (+) and some negatively keyed

(-): difficulty identifying feelings (items 1+, 3+, 6+, 7+, 9+, 13+, and 14+; e.g., “I am often confused about what emotion I am feeling”), difficulty describing feelings (items 2+, 4-, 11+, 12+, and 17+; e.g., “It is difficult for me to find the right words for my feelings”), and externally-oriented thinking (items 5-, 8+, 10-, 15+, 16+, 18-, 19-, and 20+; e.g., “I prefer to analyze problems rather than just describe them”).

#### **2.2.4. Step 4: Selection of items for the other constructs**

Items for the contrast constructs *anxiety*, *depression*, and *health anxiety* were selected from (sub)scales that were considered appropriate for the respective construct. For feasibility reasons, the number of items for each construct was limited. For *anxiety*, four items (e.g., “I felt fearful”) were retrieved from the PROMIS® Item Bank v1.0-Emotional Distress-Anxiety – Short Form 4a (PA; Pilkonis et al., 2011). For *depression*, four items (e.g., “I felt hopeless”) were retrieved from the PROMIS® Item Bank v1.0 – Emotional Distress-Depression – Short Form 4a (PD; Pilkonis et al., 2011). For *health anxiety*, four items (e.g., “I usually think that I am seriously ill”) were retrieved from the Short Health Anxiety Inventory (SHAI; Salkovskis, Rimes, Warwick & Clark, 2002).

#### **2.2.5. Step 5: Rating scale of items**

Participants were instructed to rate two questions per construct for each item (e.g., Johnston et al., 2014). First, participants were asked to judge whether an item assesses a particular construct (common items: *no* and *yes when reverse scored* = -1, *yes* = 1; reversed items: *no* and *yes* = -1, *yes when reverse scored* = 1). Thereafter, participants were asked to indicate on an 11 point scale (0 = 0 % confidence to 10 = 100 % confidence) to what extent they were confident about their judgment. Weighted judgements were calculated to express the relationship between each item and each construct. The code of the answer for *no*, *yes*, and *yes when reverse scored* was multiplied with its accompanied confidence score, resulting in an outcome score with values ranging from -10 to +10.

### **2.3. Self-report measures**

#### **2.3.1. Participant characteristics**

After completion of the DCV items, participants were asked to provide demographic information including gender, age, nationality, ethnicity and current health status (1 = *healthy both mentally and physically*, 2 = *mentally troubled*, 3 = *physically troubled*, 4 = *troubled both mentally and physically*).

### **2.3.2. PROMIS Health Profile**

To evaluate the physical and mental health of the participants, the PROMIS® Profile - v2.1 - PROMIS-29 was filled out. Questions result in eight summary scores covering physical function (4 items), anxiety (4 items), depression (4 items), fatigue (4 items), sleep disturbance (4 items), social roles (4 items), pain interference (1 item), and pain intensity (1 item). All items, except for the pain intensity item, are scored on a 5-point Likert scale. The pain intensity item “In the last 7 days, how would you rate your pain on average?” is rated on a 11-point Likert scale ranging from 0 (*no pain*) to 10 (*worst imaginable pain*) (Hays et al., 1994). Research indicated that this questionnaire is reliable and valid for assessing health-related quality of life in the general population and in populations with chronic health condition (Hays et al., 2018; Rose et al., 2019).

### **2.3.3. Detection of careless responding**

The detection of careless responding (e.g., Meade & Craig, 2012; Oppenheimer, Meyvis, & Davidenko, 2009) was built-in via two ways. First, the DCV items were intermixed with three items from the Instructional Manipulation Check (IMC; e.g., “Please check “yes” and “30%” for all constructs.”). Second, two additional items were added at the end of the survey, asking participants how attentive they were when filling out the questionnaire (1 = *completely attentive*, 2 = *moderately attentive*, 3 = *not attentive at all*), and whether they answered all the questions truthfully (1 = *definitely yes*, 2 = *probably yes*, 3 = *might or might not*, 4 = *probably no*, 5 = *definitely no*).

## **2.4. Procedure**

The study was approved by the Ethics Review Committee Psychology and Neuroscience (ERCPN) of Maastricht University. The DCV was assessed via an online survey constructed using Qualtrics ResearchCore™ (<https://maastrichtuniversity.eu.qualtrics.com>).

Participants were picked up by the researcher at the entrance of Maastricht University, and guided to a room where they sat down at a table facing the wall. Testing took place in rooms situated in the buildings of the Faculty of Psychology and Neuroscience and the Maastricht School of Management. A computer screen, a keyboard, and a mouse were provided to create a standardized assessment condition for every participant. The questionnaire was opened by the researcher on the computer screen, set on full screen and 80% zoom. The screen was always positioned at the same length of distance (i.e. 40cm). The researcher welcomed and informed the participant orally in a standardized manner. Prior to testing, participants received an information letter and a declaration of consent. After signing the declaration of consent, the researcher repeated that they could end the study whenever they wanted to. Participants were not aware of the purpose of the study, that is the assessment of the content validity of the TAS-20, a measure of alexithymia. Next, participants started the online assessment. They were provided with the instructions of the DCV method and one non-related example on how the DCV could be completed. After the instructions, participants were provided with one of two item sets. Each item set contained all items, but differed in the order in which the constructs were presented (two random orders were drawn in advance which remained consistent throughout a person's assessment). The order in which the 35 DCV items (including IMC items) were presented was random. After participants completed these DCV items, they provided demographic information, answered the additional questions to detect careless responding, and filled out the questions assessing their physical and mental health (PROMIS® Profile - v2.1 - PROMIS-29).

To reduce careless responding further, each participant was forced to spend at least 30 seconds on each question to avoid quick and random answers. After finishing the survey, participants received an oral debriefing about the purpose of the study by the researcher. The online assessment lasted on average 45.16 minutes (SD= 17.53 minutes). Participants received course credits for participation in the study.

## **2.5. Analyses**

Analyses were performed with R, version 3.6.0 (R Core Team, 2019). To account for the correlations in within-subject data, linear mixed effect models were used as implemented in the package

ImerTest (Kuznetsova, Brockhoff, & Christensen, 2017). The dependent variable was the outcome score (ranging from -10 to 10). The fixed effect was the construct (*alexithymia, difficulty identifying feelings, difficulty describing feelings, externally-oriented thinking, limited imaginal capacity, anxiety, depression, health anxiety, and other*). A random effect was added introducing adjustments to the intercept conditional on the subject variable. A separate analysis was conducted for each item for all questionnaires included in this study. First, we were interested in whether each questionnaire loaded primarily on the construct they were meant to measure, i.e. TAS-20 – *alexithymia*, PA – *anxiety*, PD – *depression*, and SHAI – *health anxiety*. Second, for each item of the TAS-20, we were interested which of the four subscales of alexithymia the items loaded on most, i.e. *difficulty identifying feelings, difficulty describing feelings, externally-oriented thinking, and limited imaginal capacity*. To this end, a priori contrasts were calculated, comparing the relevant levels of the construct variables.

Models were fitted using Restricted Maximum Likelihood (REML). Model assumptions of independence, normality and homogeneity of variance were checked. Satterthwaite's approximation was used to obtain the degrees of freedom (SAS Technical Report R-101, 1978). *P*-values were corrected for multiplicity with Tukey's method. To get insight into the magnitude of the effects, 95% confidence intervals (CI) are reported.

### **3. Results**

#### **3.1. Participants**

Data from 81 participants (63 females) were collected. After application of the manipulation checks (see section 2.3.3.), data of 74 participants were left for further analyses. More specifically, six participants failed to respond correctly to at least one of the IMC items and one participant indicated that he/she was not attentive at all while completing the questionnaire. The final sample contained 74 participants (mean age of 21.0 years, SD = 1.4; 15 males). Most participants reported their ethnicity as Caucasian ( $N = 65$ ). The large majority of participants (86%) reported to be mentally and psychically healthy, 8% reported to be solely mentally troubled, 1% reported to be solely physically troubled, and 4% reported to be mentally and physically troubled. For the PROMIS, mean scores were 19.53 (SD = 1.37; range = 11-20) for physical function, 7.84 (SD = 3.21; range = 4-19) for anxiety, 6.6 (SD = 3.09;

range = 4-20) for depression, 10.36 (SD = 3.82; range = 4-20) for fatigue, 9.31 (SD = 3.51; range = 4-19) for sleep disturbance, 16.57 (SD = 3.23; range = 5-20) for social roles, 5.41 (SD = 2.85; range = 4-20) for pain interference, and 1.62 (SD = 1.89; range = 0-8) for pain intensity.

### 3.2. Content validity of the TAS-20

The estimated marginal means of the fitted models and their associated 95% CI are depicted in Figure 1. Eight out of the twenty items of the TAS (item 1, 2, 4, 6, 9, 11, 13 and 14) had significantly positive scores on *alexithymia*, *difficulty describing feelings* and *difficulty identifying feelings*. These items also had significantly higher scores on these three constructs than on any of the other constructs (all  $|t| > 5.77$ ,  $p < .001$ ).

Two items (item 12 and 17) had a significantly positive score on *alexithymia* and *difficulty describing feelings*. Item 12 had significantly higher scores on *difficulty describing feelings* than on the other constructs (all  $|t| > 5.60$ ,  $p < .001$ ), except for *alexithymia* ( $\Delta = 2.72$ ,  $t(584) = 2.86$ ,  $p = .10$ ). Moreover, the score on *alexithymia* for this item was not significantly different from the score on *difficulty identifying feelings* ( $\Delta = 2.64$ ,  $t(584) = 2.78$ ,  $p = .12$ ), but was significantly different from the other constructs (all  $|t| > 6.60$ ,  $p < .001$ ). The score on *difficulty identifying feelings* was also significantly higher than the score on the other constructs (all  $|t| > 3.80$ ,  $p < .005$ ). Item 17 had the highest score for *difficulty describing feelings* compared to all other constructs (including *alexithymia*) (all  $|t| > 4.27$ ,  $p < .001$ ). Moreover, this item had no significantly higher score for *alexithymia* than for *anxiety* ( $\Delta = 2.57$ ,  $t(584) = 2.61$ ,  $p = .19$ ) and *difficulty identifying feelings* ( $\Delta = 2.73$ ,  $t(584) = 2.77$ ,  $p = .13$ ).

Three of the items only had positive scores on one of the subscales of alexithymia. Item 7 had a significantly positive score on *health anxiety* and *difficulty identifying feelings*. This item had a significantly higher score for *difficulty identifying feelings* than for all other constructs (all  $|t| > 3.88$ ,  $p < .004$ ), except for *health anxiety* ( $\Delta = 1.99$ ,  $t(584) = 1.91$ ,  $p = .60$ ). Additionally, the score on *health anxiety* for this item was not significantly different from *difficulty describing feelings* ( $\Delta = 2.39$ ,  $t(584) = 2.30$ ,  $p = .34$ ) and *alexithymia* ( $\Delta = 2.04$ ,  $t(584) = 1.97$ ,  $p = .57$ ). Item 15 had a significantly positive score on *difficulty describing feelings*. However, the score for *difficulty describing feelings* did not differ

significantly from *difficulty identifying feelings* ( $\Delta = 2.30$ ,  $t(584) = 1.31$ ,  $p = .93$ ), *externally-oriented thinking* ( $\Delta = 2.20$ ,  $t(584) = 2.22$ ,  $p = .39$ ), *alexithymia* ( $\Delta = 1.70$ ,  $t(584) = 7.72$ ,  $p = .74$ ) and *other* ( $\Delta = 2.23$ ,  $t(584) = 2.25$ ,  $p = .38$ ). Item 20 only had a significantly positive score on *externally-oriented thinking*. The score of item 20 on *externally-oriented thinking* was significantly higher than all other constructs (all  $|t| > 3.50$ ,  $p < .005$ ), except for *limited imaginal capacity* ( $\Delta = 2.81$ ,  $t(584) = 3.10$ ,  $p = .053$ ).

Item 3 had a significantly positive score on *health anxiety* and *anxiety*. Item 3 had significantly higher scores for these two constructs than for any of the other constructs (all  $|t| > 3.50$ ,  $p < .02$ ). Moreover, the score on *health anxiety* was significantly higher than the score on *anxiety* ( $\Delta = 4.27$ ,  $t(584) = 4.21$ ,  $p = .001$ ).

Six of the items (item 5, 8, 10, 16, 18 and 19) did not have significantly positive scores for any of the constructs included in the study.

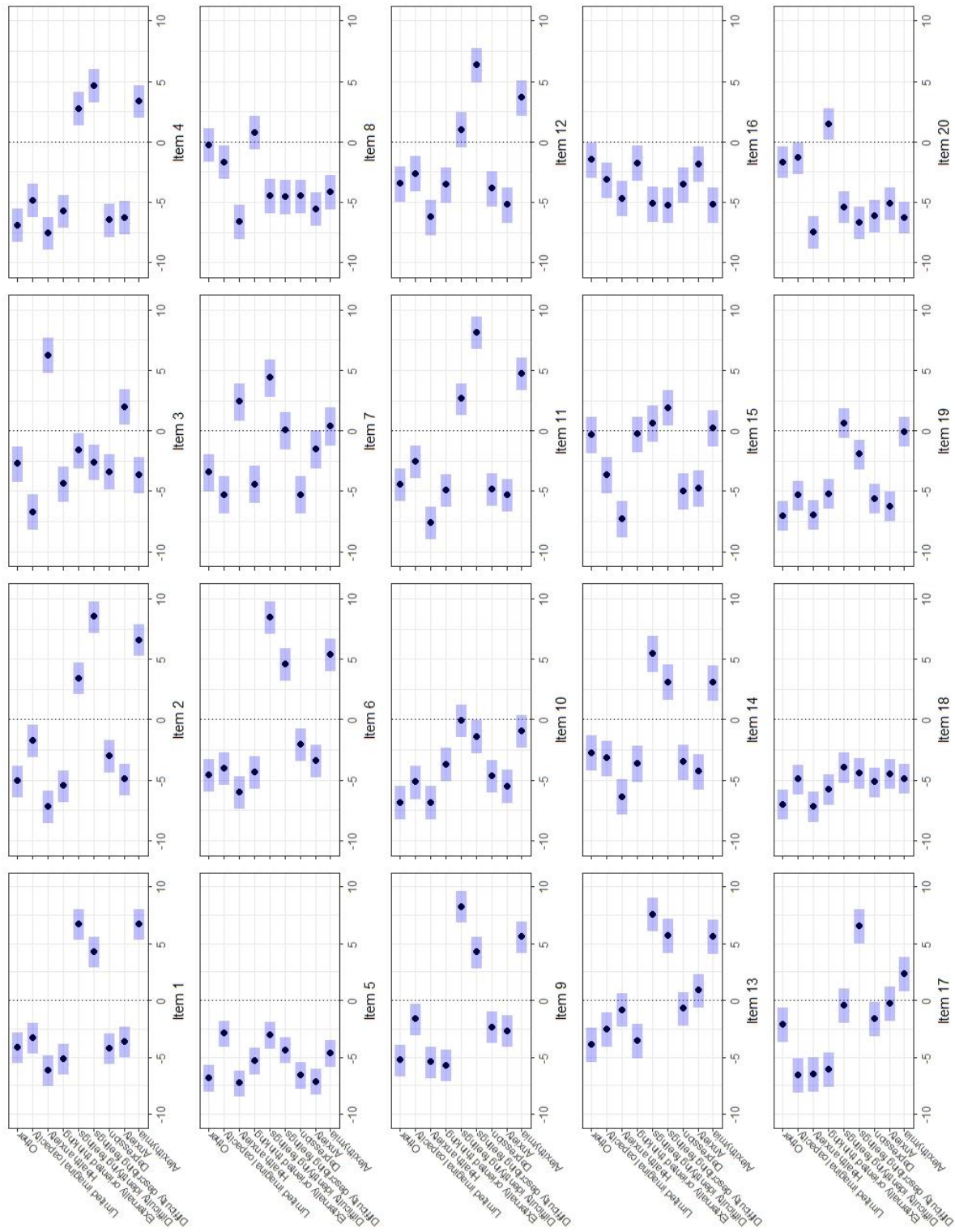


Figure 1: The outcome scores of each of the TAS-20 items for all constructs.

**3.2. Content validity of related construct measures**

**3.1.1. PA**



Estimated marginal means and their associated 95% CI are depicted in Figure 2. Item 1 and 2 had significantly positive scores for the constructs *anxiety* and *health anxiety*. Item 3 and 4 additionally had a positive score for *depression*. Crucially, for all four items the scores on *anxiety* were significantly higher than for any of the other constructs (all  $|t| > 4.30$ ,  $p < .001$ ).

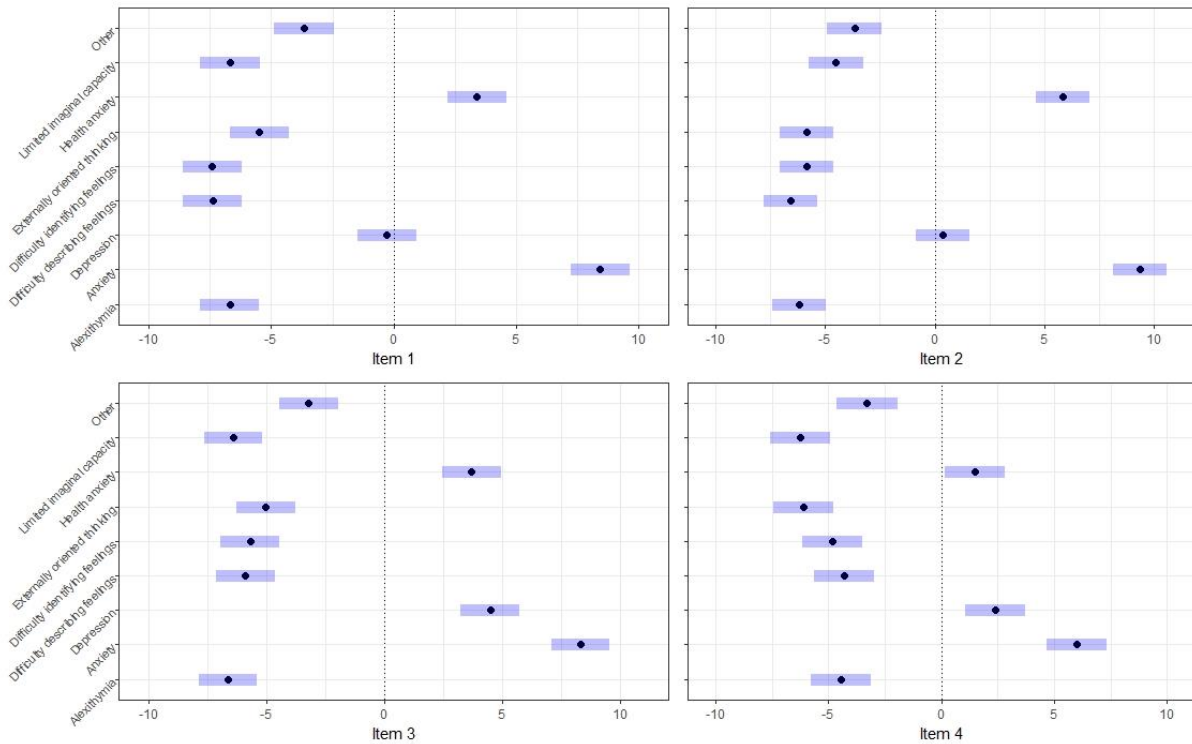


Figure 2: The outcome scores of each of the PA items for all constructs.

### 3.1.2. PD

Estimated marginal means and their associated 95% CI are depicted in Figure 3. Item 1, 2 and 4 had significantly positive scores for *depression* and *anxiety*. Item 3 only had significantly positive scores for *depression*. Again, all items had significantly higher scores on *depression* than on *anxiety* (all  $|t| > 3.11$ ,  $p < .05$ ).

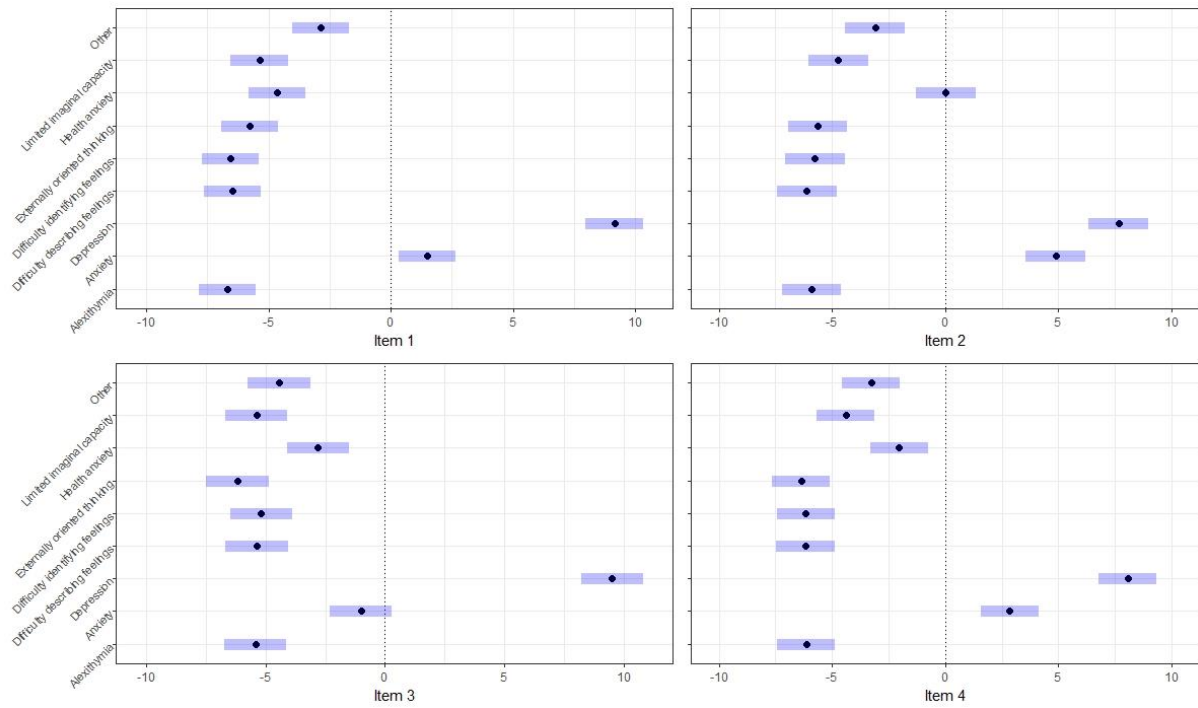


Figure 3: The outcome scores of each of the PD items for all constructs.

### 3.1.3. SHAI

Estimated marginal means and their associated 95% CI are depicted in Figure 4. All items had significantly positive scores for *health anxiety* and *anxiety*. Again, crucially, all items had significantly higher scores on *health anxiety* than on *anxiety* (all  $|t| > 4.33$ ,  $p < .001$ ).

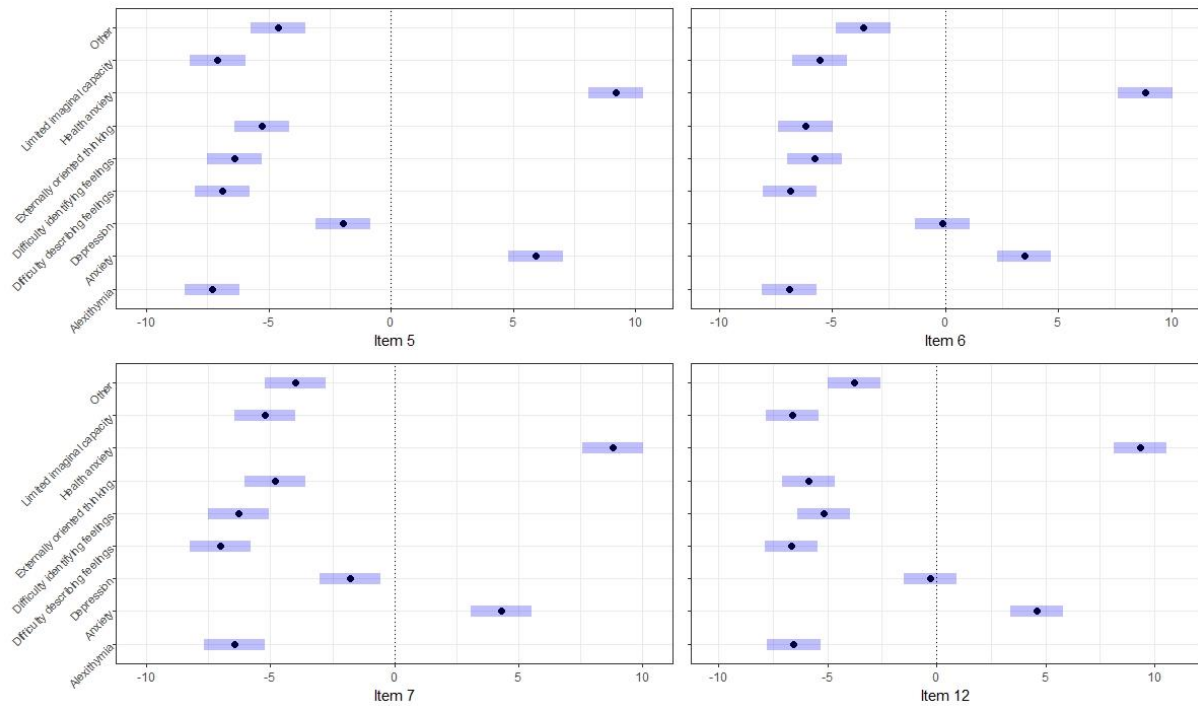


Figure 4: The outcome scores of each of the SHAI items for all constructs.

#### 4. Discussion

Current study investigated the content of the TAS-20, the most widely used self-report measure of alexithymia. Using the DCV method (Johnston et al., 2014), participants rated the extent to which each TAS-20 item was relevant for measuring *alexithymia* and its features (*difficulty identifying feelings*, *difficulty describing feelings*, *limited imaginal capacity*, and *externally-oriented thinking*), or other related constructs (*anxiety*, *depression*, and *health anxiety*). The results can be readily summarized. First, results showed that only half of the TAS-20 items were perceived by participants as measures of *alexithymia*, all of these considered to be pure items, that is, demonstrating discriminant content validity with measures of *anxiety*, *depression*, and *health anxiety*. Two TAS-20 items were perceived as measures of *health anxiety*, of which one was also found to measure *anxiety* and the other was also found to measure *difficulty identifying feelings*. The other TAS-20 items were not perceived by participants as measures of any of the overarching constructs. Second, findings indicated that vast majority of TAS-20 items of the difficulty identifying feelings and difficulty describing feelings scale were found to measure both the *difficulty identifying feelings* and the *difficulty describing feelings* constructs. Only one item of the externally-oriented thinking scale was identified to measure the *externally-oriented thinking*

construct. Remarkably, none of the TAS-20 items (except item 3) showed content overlap with *anxiety* and/or *depression*. Current findings thus partly confirm the doubts raised about the content and discriminant content validity of the TAS-20 (e.g., Bermond et al., 2015; Lane et al., 2015).

To our knowledge, this study is the first to empirically investigate the (discriminant) content validity of the TAS-20, i.e. that is whether it measures alexithymia in a relevant and comprehensive manner without contamination from related constructs (see Dixon & Johnston, 2019). Until now content validity (which is rather test-based) has been largely neglected and overlooked at the expense of other forms of validity (which are rather score-based), such as construct (i.e. convergent and discriminant validity) and criterion validity (i.e. predictive, concurrent, and retrospective validity). In this context, many studies have tested the factor structure of the TAS-20 (e.g., Parker, Taylor, & Bagby, 2003) and examined whether a multitude of variables posited to be related to alexithymia correlate with the TAS-20 (e.g., Lumley et al., 2007). The lack of studies that investigate the (discriminant) content validity of the TAS-20 is surprising as content validity is a fundamental property of each measure of any theoretical construct (Sireci, 1998; Terwee et al., 2007, 2018). Indeed, (discriminant) content validity is important for theory testing, intervention design, and practical applications (Dixon & Johnston, 2019).

In the context of a multifaceted construct, such as alexithymia, besides overall (discriminant) content validity (i.e. does the item content reflects alexithymia and not other related constructs), it is also important to investigate whether the TAS-20 captures all features of the construct (i.e. does the item content reflects the intended feature and not other features). This multifaceted character may be one of the reasons why researchers have neglected to examine the (discriminant) content validity of the TAS-20. Indeed, besides the original view on alexithymia, also alternative views exist. For example, Vorst and Bermond (2001) included an additional emotionalizing feature, defined as ‘reduced experiencing of emotional feelings’ (p. 415). Taylor et al. (2000, p. 311-312) however argued that ‘emotionalizing is not part of the original definition of the construct and should be considered a correlate of alexithymia’ (see also Watters et al., 2016). They further state that awareness of emotional feelings is assessed by the difficulty identifying feelings and the difficulty describing feelings factors, and the definition of emotionalizing as such remains controversial because it ‘suggests differences in degrees of physiological arousal rather than differences in awareness of feelings’ (Bagby et al., 2009, p. 413).

In any case, existing content validity studies have highlighted the importance of precise construct definitions (e.g., Johnston et al., 2014). In the current study we adopted the Oxford living dictionary definition of alexithymia, a definition that is in line with how the construct is understood in lay terms, but also with scientific literature (Taylor et al., 2016). Furthermore, we formulated the alexithymia features according to the original view of alexithymia which has been the most influential in contemporary theory and research (Taylor et al., 1997).

The results of the current content analysis ask reflection. In particular, we discuss two main implications. First, the TAS-20 showed to have some problems with its content validity. Only 10 out of 20 TAS-items were understood as measuring *alexithymia*. This proportion was unexpectedly low. The fact that only half of the items of the TAS-20 are content valid puts a serious threat on the interpretation of earlier and future findings with the TAS-20. Furthermore, these TAS-20 items that have been identified to measure the *alexithymia* construct focused mainly on both the *difficulty identifying feelings* and *difficulty describing feelings* constructs. Merely two items (i.e. item 12: “People tell me to describe my feelings more.”; item 17: “It is difficult for me to reveal my innermost feelings, even to close friends.”) were identified to solely measure their intended *difficulty describing feelings* construct. The finding that the TAS-20 primarily measures the first two alexithymia features is not surprising. If we return to history to find out what’s in the name ‘alexithymia’ from its early conception until now we see that its definition does not encompass all four main features. Sifneos’ (1973, p. 256) stated that ‘for lack of a better term’, he proposed the term ‘alexithymic’ (from Greek stems *a* = lack, *lexis* = word, and *thymos* = mood or emotion) to denote ‘the most striking characteristic’ that was observed in the systematic investigation of interviews with classic psychosomatic patients, namely the inability of these patients to find appropriate words to describe their feelings (Nemiah & Sifneos, 1970). Although the literal meaning of the term alexithymia - ‘without words for feelings’ - refers to this particular characteristic, Sifneos made repeatedly clear that the term ‘alexithymia’ is the name of a construct that encompasses multiple characteristics (e.g., Nemiah et al., 1976; Sifneos, 1994, 1996). Therefore, to define the *alexithymia* construct in our study, we chose not to use the literal meaning but instead turn to the definition that is currently used in scientific literature (Taylor et al., 2016) and understood in lay terms (Oxford living dictionary) - ‘The inability to recognize one's own emotions and to express them,

especially in words.’ Despite this definition has a broader scope, also here one focusses on only two out of the four main features, the *difficulty identifying feelings* feature refers to the inability to recognize and the *difficulty describing feelings* feature refers to the inability to express. In line with this reasoning, we see a plausible explanation for the finding that none of the externally-oriented thinking items were identified to measure the ‘*alexithymia*’ construct by the participants in our study. However, by including each of the definitions of the features, we expected that the externally-oriented thinking items could be identified as measures of the *externally-oriented thinking* construct or as indirect measures of the *limited imaginal capacity* construct. This was not the case. Only one item (item 20: “Looking for hidden meanings in movies or plays, distracts from their enjoyment.”) of this scale was perceived as a measure of *externally-oriented thinking*. This finding is important as it may signal that items designed to measure *externally-oriented thinking* need to be rewritten to represent its construct more accurately. The present results suggest caution in using the TAS-20 in its entirety as the *externally-oriented thinking* construct is not represented in the items.

Furthermore, we observed that the majority of difficulty identifying feelings and difficulty describing feelings items are largely indistinguishable based on the current analysis. Hereby it should be noted that those items that were developed to measure *difficulty identifying feelings* had higher scores on the *difficulty identifying feelings* construct than on the *difficulty describing feelings* construct and vice versa, items that were developed to measure the *difficulty describing feelings* construct had higher scores on the *difficulty describing feelings* construct than on the *difficulty identifying feelings* construct. However, scores did not significantly differ from each other. This finding is in accordance with the results of other studies showing that difficulty identifying feelings items and difficulty describing feelings items are closely related and subscale scores usually correlate highly (e.g.,  $r = .43-.80$ ; Kooiman et al., 2002). Some studies found that the subscales of these items merged into one single factor (Erni, Lötscher, & Modestin, 1997; Loas, Otmani, Verrier, Fremaux, & Marchand, 1996) and suggested that these scales probably represent the same aspect of alexithymia (Kooiman et al., 2002). Other studies provided support that these subscales form two correlated factors, supporting the view that these scales measure distinct, but related aspects of the alexithymia construct (e.g., Gignac et al., 2007). Rather than

making conclusions in either direction, we want to plea to further examine why the wording and phrasing of each of these items are perceived as measuring both constructs.

*Second*, the TAS-20 showed to have some problems with its discriminant content validity. In particular, two TAS-20 items of the difficulty identifying feelings scale that are developed to measure difficulty in differentiating between bodily feelings and emotions showed to measure competing constructs. One TAS-20 item showed content overlap with *health anxiety* (i.e. item 7: “I am often puzzled by sensations in my body”), the other item showed content overlap with both *anxiety* and *health anxiety* (i.e. item 3: “I have physical sensations that even doctors don’t understand.”). These TAS-20 items may give a misleading impression in patients with debilitating diseases such as cancer. Somatic symptoms that are considered to be characteristic of alexithymia, may in the cancer patient be viewed as secondary to the disease, and therefore unrelated to alexithymia. Due to disease-related somatic symptoms, cancer patients may score proportionally higher on items that have a somatic rather than a non-somatic content, leading to overestimation of the prevalence or severity of alexithymia in these patients. While the present discriminant content validity method does not offer direct guidance for scoring, it lends weight to the idea that when patients are confronted with debilitating diseases such as cancer, somatic TAS-20 items should at the very least be scored separately, and their contribution to the total score appreciated. The aforementioned findings are strengthened by our results showing that all items from the health anxiety measure assessed their intended construct well and scored significantly higher on the intended construct than on any other construct. This was also the case for the items of the included anxiety and depression measures. Contrary to our expectations, the TAS-20 did show discriminant content validity with these measures of anxiety (except item 3) and depression. This supports the idea that the TAS-20 is not merely a measure of negative affect. A possible explanation for the high correlations between alexithymia and negative affect may still be that a large part of the TAS-20 items are negative in value (e.g., item 14: “I often don’t know why I’m angry.”) and people high in negative affectivity tend to manifest a general tendency towards a self-effacing response style or self-criticism (see Lumley et al., 2000). However, this still has to be proven.

Some limitations of the current work should be noted. First, the (discriminant) content validity was investigated using psychology students in an online study. No experts or patients were involved.

Until now, no agreement exist in literature whether experts should be used who are familiar with the theoretical constructs or whether lay people should be used who are potentially the respondents of the measure under research (Dixon & Johnston, 2019). However, we believe that the nature of the discriminant validity method – that is participants need to judge the presented items against the construct definitions – is designed to allow lay people without scientific background (and thus knowledge biases) to judge whether items assess a certain construct. Second, the DCV method provides a quantitative analysis of content validity. Other methods are possible, and may provide insight in how participants mentally process and respond to items. One promising procedure to provide a qualitative analysis of content validity is cognitive interviewing (Beatty & Willis, 2007; Willis, 2015). Third, the DCV method is focused on the relevance of the items for the intended construct. Recently, a method is developed to address the representativeness, the other key component of content validity (Bell et al., 2017). Future studies may provide complementary results to the results of the current study by examining the degree to which the items of the TAS-20 are proportionally distributed to the features of the alexithymia construct (Haynes et al., 1995). Fourth, we have only included the most well-known and used self-report of alexithymia. Other measures exist such as the Bermond Vorst Alexithymia Questionnaire (BVAQ; Vorst & Bermond, 2001), the Psychological Treatment Inventory-Alexithymia Scale (PTI-AS; Gori et al., 2010), and the Perth Alexithymia Questionnaire (PAQ; Preece, Becerra, Robinson, Dandy, & Allan, 2018). Also these self-report alexithymia questionnaires have not yet been examined on their (discriminant) content validity. Fifth, we did not include other psychological constructs that may be confused with alexithymia such as ‘emotional intelligence’, ‘emotional competence’, and ‘emotion regulation’. So far, it has not been examined whether the TAS-20, and other self-report alexithymia measures show content overlap with measures of these closely related constructs.



## Appendix

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### TAS-20 items

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#### *Difficulty identifying feelings scale*

1. I am often confused about what emotion I am feeling.
3. I have physical sensations that even doctors don't understand.
6. When I am upset, I don't know if I am sad, frightened, or angry.
7. I am often puzzled by sensations in my body.
9. I have feelings that I can't quite identify.
13. I don't know what's going on inside me.
14. I often don't know why I am angry.

#### *Difficulty describing feelings scale*

2. It is difficult for me to find the right words for my feelings.
4. I am able to describe my feelings easily.
11. I find it hard to describe how I feel about people.
12. People tell me to describe my feelings more.
17. It is difficult for me to reveal my innermost feelings, even to close friends.

#### *Externally-oriented thinking scale*

5. I prefer to analyze problems rather than just describe them.
  8. I prefer to just let things happen rather than to understand why they turned out that way.
  10. Being in touch with emotions is essential.
  15. I prefer talking to people about their daily activities rather than their feelings.
  16. I prefer to watch "light" entertainment shows rather than psychological dramas.
  18. I can feel close to someone, even in moments of silence.
  19. I find examination of my feelings useful in solving personal problems.
  20. Looking for hidden meanings in movies or plays distracts from their enjoyment.
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