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# Towards Sustainable Mental Health Using the Finnish Mood Scale

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**Abstract:** The interest in mental health in a sports context has increased in recent years. However, there is no scientifically sound measurement tool for assessing sport-related mental health symptoms in the Finnish language. One of the most frequently used measurement tools for such symptoms in English is the Brunel Mood Scale (BRUMS). The purpose of the present study was to adapt and validate a Finnish version of the BRUMS, referred to as the Finnish Mood Scale (FIMS). The 24-item, 6-factor FIMS was administered to 445 Finnish participants concurrently with Finnish versions of the Depression, Anxiety, and Stress Scale (DASS-21) and the Psychobiosocial States Scale (PBS-S). The sample consisted of 259 females (58.2%), 177 males (39.8%), and 9 who did not disclose their gender (2%), aged 16 to 75 years (M = 35.65, SD = 13.70). Sixty-two participants (13.9%) reported being a competitive athlete, 273 (61.3%) were regular exercisers, and 109 (24.5%) did not exercise regularly. A six-factor modified CFA model indicated an adequate fit to the data (CFI = 0.944, TLI = 0.934, RMSEA = 0.060). Concurrent measures correlated with FIMS in line with theoretical predictions, supporting convergent and divergent validity. Males reported significantly more positive mood scores than females. Physically active participants reported significantly more positive mood scores than inactive individuals, endorsing the mental health benefits of physical exercise. Findings indicate that the FIMS is a suitable measurement tool to screen mood modalities in Finnish populations aged 16 years and older. FIMS may be useful for the early detection of mental ill-health, thus, promoting sustainable mental health.

**Keywords:** FIMS; BRUMS; mood profiling; mental health; Finland

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## 1. Introduction

Interest in the mental health of athletes has increased in recent years [1–3], resulting in the International Olympic Committee initiating a program focusing on standardised procedures to identify mental health issues and targeting treatment for mental disorders [2]. In particular, the prevalence of depression and anxiety has increased within athletic populations [1,4]. Mental health issues among athletes are common in Finland. A survey conducted by the Finnish Society of Sport Sciences revealed that, of 259 current and former elite Finnish athletes, 23% have experienced depressive symptoms, 36% anxiety, 17% eating problems, and 61% have had traumatic experiences [5]. This suggests that depressive symptoms are now more prevalent among athletes than among the non-athlete population (5–7%) in Finland [6]. Only a limited number of studies have investigated the mental health of Finnish athletes, and they have often used a combination of psychometric diagnostic tools in both English and Finnish [6–8]. These studies typically utilise complex combinations of the General Health Questionnaire [9], athlete burnout questionnaires [6,8], depression and anxiety assessments [7,8], behavioural measures [6,7], and various DSM-5 [6,10] evaluations to identify instances of mental ill-health among athletes. However, many of these tools lack a specific focus on prevention and the sports context [1,2]. To date, there is no scientifically validated measurement tool available to assess sport-related mental health symptoms in Finnish, which may also be a reason for the low amount of research conducted in the area.

The relationship between mood and mental health is apparent within sport and exercise domains, as well as in daily life [11,12]. Mood is commonly defined as a fluctuating set of feelings and emotions, varying in duration and intensity [10]. Mood states have shown a relationship with psychiatric disorders, and therefore mood research can be beneficial for potential preventative mental health actions. Mood profiling is a method of depicting commonly occurring mood combinations [12,13]. Based on various reported mood scores, individuals can be assigned to mood clusters that provide some degree of prediction of behavioural outcomes and potential issues [11,13,14]. Historically, one of the most frequently used instruments for mood profiling has been the Profile of Mood Scales (POMS; [15]), a self-report assessment of six dimensions of mood: Tension, Depression, Anger, Vigour, Fatigue, and Confusion. The POMS has been validated in a sports context and has shown good predictability of behavioural dimensions [16].

However, the original 65-item POMS has a relatively long completion time (8–10 min), and therefore a shorter version known as the Brunel Mood Scale (BRUMS) was developed, originally validated on adolescent athletes and schoolchildren but subsequently also validated for use with adult populations, assessing the same six subscales as the POMS [3,15]. Substantial cross-cultural research has identified six distinct clusters of mood profiles, referred to as the iceberg, inverse Everest, inverse iceberg, shark fin, surface, and submerged profiles [11,13,17–19] that are predictive of mental health and performance outcomes [18,20]. For example, the iceberg profile depicted by a high Vigour score and low scores for all other subscales, is typically associated with good mental health and above-average athletic performance [11,13,19,20]. Conversely, the inverse Everest profile, which is characterised by a low Vigour score and high to very high scores for all other subscales, indicates an elevated risk of mental health issues and potential underperformance [11,13,19].

The BRUMS is widely used for monitoring risk of mental health issues [3,19]. For example, it has been used to evaluate the risk of suicide in American adolescents [21] and screen for post-traumatic stress disorder among South African military personnel [22]. Furthermore, group comparisons have shown general differences in moods according to gender identity and physical activity. For instance, studies have shown that males typically report more positive moods than females [19,20]. This finding aligns with extensive cross-sectional research conducted in Europe, which shows that females report approximately twice the level of depressive symptoms compared to males [23]. Furthermore, physically active people typically report more positive moods than inactive people [11,14,20]. The positive relationship between physical exercise and mental health has been confirmed in a variety of research contexts [14,24–26]. Large cross-sectional studies have shown that regular exercise is associated with a reduced mental health burden in America [24], and in Finland [25]. Of particular relevance to the present investigation, Hassmen and colleagues [25] showed that, among the Finnish population, individuals who exercised at least two to three times a week experienced significantly fewer symptoms of mental ill-health than those exercising less frequently or not at all. The relationship between physical activity and mental health was particularly evident during the COVID-19 pandemic, when many self-care activities were restricted [14,26], highlighting physical exercise as a cost-effective way to promote sustainable mental health [26]. The BRUMS has the potential to be used to investigate sustainable mental health and explore factors that influence it. Ideally, factors that are efficacious in enhancing mental health, including the prevalence and specific types of physical exercise, can be identified in studies using the BRUMS, and recommendations could be provided for different populations [19,26].

The BRUMS has been translated and validated in at least 16 languages, including Lithuanian [20] and Italian [27], for example. As there is no specific assessment tool for sport-related mental health risk factors in Finnish, it is important to plan the translation of the BRUMS thoroughly. Translated psychometric tools are required to be validated in new cultural contexts to account for linguistic and constructive differences [28,29]. Therefore, the aim of the study was to translate and cross-culturally validate the Finnish translation of the BRUMS, referred to as the Finnish Mood Scale (FIMS, see Supplementary Materials).

The psychometric properties and factor structure were evaluated against the original measurement model of the BRUMS [17]. It was hypothesised that the FIMS subscale scores would positively correlate with concurrent measures of similar constructs (convergent validity) and minimally or inversely correlate with dissimilar constructs (divergent validity) [28,29]. Thus, it was hypothesised (H1) that negatively valenced FIMS subscales (Tension, Depression, Anger, Fatigue, and Confusion) would correlate positively with Depression Anxiety Stress Scales (DASS-21 [30]), subscales (Depression, Anxiety, and Stress), and dysfunctional psychobiosocial states (PBS-S [31]). It was also hypothesised (H2) that significant between-group differences in mood scores would be found, in that males would report more positive mood scores than females [19,20], and physically active individuals would report more positive mood scores than inactive people [14,27].

## 2. Materials and Methods

### *2.1. Participants*

A total of 445 Finnish-speaking participants aged 16 to 75 years (M = 35.65, SD = 13.70) completed an online survey. The sample consisted of 259 females (58.2%), 177 males (39.8%), and 9 who did not disclose their gender (2%). A total of 62 participants (13.9%) reported being a competitive athlete, 273 (61.3%) were regular exercisers, and 109 (24.5%) did not exercise regularly. Of the competitive athletes, 4.8% competed at regional level, 52.4% at a national level, and 42.9% at an international level, with ice hockey, volleyball, and floorball being the most common sports (six participants each). The modal duration of exercise ($n$ = 117) was 5–10 h. In some analyses, participants were grouped into physically active (competitive athletes and regular exercisers combined) and inactive groups (did not exercise regularly) for statistical comparison. The sample was heterogeneous demographically and in terms of physical activity level (see Table 1).

**Table 1.** Demographic distribution of the participants.

| Variable | Group | *n* | % |
|---|---|---|---|
| Gender ($n$ = 445) | Male | 177 | 39.8 |
| | Female | 259 | 58.2 |
| | Other | 9 | 2.0 |
| Physical activity ($n$ = 444) | Active | 335 | 75.2 |
| | Inactive | 109 | 24.5 |
| Residential state ($n$ = 441) | Uusimaa | 59 | 13.3 |
| | Southwest Finland | 31 | 7.0 |
| | Satakunta | 11 | 2.5 |
| | Kanta-Häme | 7 | 1.6 |
| | Pirkanmaa | 40 | 9.0 |
| | Päijät-Häme | 84 | 18.9 |
| | Kymenlaakso | 1 | 0.2 |
| | South Karelia | 13 | 2.9 |
| | South Savo | 2 | 0.4 |
| | North Savo | 4 | 0.9 |
| | North Karelia | 16 | 3.6 |
| | Central Finland | 139 | 31.2 |
| | South Ostrobothnia | 8 | 1.8 |
| | Ostrobothnia | 2 | 0.4 |
| | Central Ostrobothnia | 4 | 0.9 |
| | North Ostrobothnia | 12 | 2.7 |
| | Kainuu | 1 | 0.2 |
| | Lapland | 5 | 1.1 |
| | Outside Finland | 2 | 0.4 |

### *2.2. Measures*

#### 2.2.1. Brunel Mood Scale (BRUMS)

The BRUMS [17] is a 24-item questionnaire measuring mood descriptors on a five-point Likert-type scale (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, and 4 = extremely). Participants respond using the standard response timeframe of "How do you feel right now?" The measure has six subscales (Anger, Confusion, Depression, Fatigue, Tension, and Vigour), with each subscale containing four items. Total subscale scores range from 0 to 16. The BRUMS has demonstrated good internal consistency, with Cronbach alpha coefficients for the subscales ranging from 0.74 to 0.90 [17].

#### 2.2.2. Depression Anxiety Stress Scale-21 (DASS-21)

The Finnish version [30] of the DASS-21 [32] is a 21-item scale used in clinical and research settings to assess depression, anxiety, and stress. Items are rated on a four-point Likert-type scale (0 = did not apply to me at all, 1 = applied to some degree, or some of the time, 2 = applied to me a considerable degree, or a good part of the time, 3 = applied to me very much, or most of the time). Participants respond according to how they have felt "over the past week". Each subscale has seven items, with scores ranging from 0 to 21. The DASS-21 is validated for use with non-clinical populations, with an overall Cronbach alpha of 0.88 [32]. The DASS-21 was chosen because the instrument has been previously used for translation and validation processes of the BRUMS into other languages such as Italian [27].

#### 2.2.3. The Psychobiosocial States Scale (PBS-S)

Psychobiosocial states are viewed as the integrated psychological, biological, and social aspects that capture the holistic nature of performance-related subjective experiences [33]. Thus, the Psychobiosocial States Scale (PBS-S; [31]) consists of 20 items including synonym adjectives to assess eight modalities of psychobiosocial states encompassing psychological (emotional, cognitive, motivational, volitional), biological (bodily, motor-behavioural), and social (operational and communicative) aspects. Each modality is represented by two rows of descriptors, one for functional states and another for dysfunctional states. In addition, the emotional is measured with six items considering functionality (functional vs. dysfunctional) and valence (pleasant vs. unpleasant), resulting in functional pleasant states, dysfunctional pleasant states, functional anxiety, dysfunctional anxiety, functional anger, and dysfunctional anger. Participants are asked to choose one adjective per item to describe their states prior to performance, or alternatively they can choose none if adjectives are not descriptive of their pre-performance state. Then, participants rate the intensity of their states on a scale ranging from 0 (nothing at all) to 4 (very much). The measurement model of the PBS-S is validated for use with Finnish athletes (CFI > 0.90 and RMSEA < 0.06) [31].

### *2.3. Adaptation of the BRUMS into Finnish*

The FIMS was created using the translation-back translation method [28,34]. Firstly, a group of six dual linguists (i.e., university lecturers/teachers in sport and exercise psychology who were fluent in Finnish and English) translated the BRUMS items and instructions into Finnish. Then, a different group of eight dual linguists (i.e., sport psychology master's students who were fluent in Finnish and English) translated the Finnish version of the BRUMS back into English [28]. A comparison between the original and back-translation showed that only three items (i.e., downhearted, mixed up, and muddled) differed from the original item list. The translation process, highlighting the problematic items, was presented at a Finnish Association of Sport Psychology seminar attended by 52 delegates to resolve translation differences [35]. The same expert panel evaluated the substantive sense of the items and accurate translation of the instructions to ensure cultural adaptation [34,36]. The final list of 24 FIMS items was confirmed when this expert group reached a consensus on the translated word list and agreed that translated units accurately described the initial intent of the scale [34,35]. The translation process was supervised by the first author, who is fluent in both English and Finnish. All authors have experience of previous translation papers, and therefore cultural adaptation was a prime consideration throughout the process [20,27,31].

### 2.4. Procedure

The research protocol was initially approved by the Human Sciences Ethics Committee of the University of Jyväskylä, and subsequently by the Human Research Ethics Committee at the University of Southern Queensland (ETH2024-0444) following the Australian Code for the Responsible Conduct of Research. An online questionnaire was created by using Webropol, version 2.0 [37]. The questionnaire included demographic variables (i.e., gender, age, state of residence, physical activity level, sport participation, sport competition level, weekly exercise amount, and sport modalities), plus the FIMS and the Finnish versions of the DASS-21 [30] and PBS-S [31]. No personal identifying information was collected. Participants were recruited using a snowball sampling method via social media. Higher education institutions, sporting clubs, and companies were contacted throughout Finland to share the research information online. With the aim of recruiting a similar number of athletes, regular exercisers, and physically inactive participants, specific groups were targeted at different times. Initially, many regularly exercising students completed the survey. Subsequently, professional sporting clubs and sedentary industry workers were contacted with the aim of equalising the participant numbers in each group. Individuals aged 16 and older were eligible to complete the questionnaire. The data were collected over an 18-month period from December 2022 to May 2024. Informed consent was obtained from all participants involved in the study. Details of the study and consent form were presented to the participants via the research webpage, and consent was collected with the online questionnaire. Participation was voluntary and participants were free to withdraw at any time.

### 2.5. Data Analysis

Statistical analyses were computed using IBM SPSS (IBM Corp, Armonk, NY, USA) for Mac OS, version 29.0 [38] and AMOS Statistics (IBM Corp, for Windows, version 29.0) [39]. Data were screened for missing values, distributional properties, and possible outliers. Descriptive statistics were used to assess skewness and kurtosis. Mahalanobis distance was used to investigate multivariate outliers. The factorial validity of the FIMS was investigated using Confirmatory Factor Analysis (CFA) to test how the hypothesised measurement model of the BRUMS [17,40] would fit the depicted sample covariance matrix of the FIMS [41,42]. The adequacy of measurement model was explored with several fit indices. The Tucker–Lewis index (TLI) and the comparative fit index (CFI) were used as tests of model fit, where values $\geq 0.90$ represent an adequate fit and values $\geq 0.95$ represent a good fit [43,44]. The chi-squared to degrees of freedom ratio ($\chi^2$:df) was also used, with values $\leq 3$ signalling good model fit [44–46], and the root mean square error of approximation (RMSEA) was used as an indicator of discrepancies between covariances, where values $\leq 0.6$ represent good model fit to the data [42]. The Composite Reliability (CR), Average Variance Extracted (AVE), and Heterotrait–Monotrait (HTMT) Ratio were used to evaluate the construct reliability and validity of the FIMS [40,47]. The concurrent validity of the FIMS was evaluated by subscale correlations with the DASS-21 and the PBS-S. Finally, differences in mean scores were examined via multivariate analysis of variance (MANOVA) by gender (males vs. females) and physical activity level (active vs. inactive). After the preliminary analyses, raw scores from the FIMS were converted into T-scores by using the formula $T = 50 + (10 \times z)$ for normative comparison [40].

## 3. Results

### 3.1. Descriptive Statistics

Descriptive statistics and reliability values of the FIMS, DASS-21, and PBS-S are presented in Table 2. For the FIMS, all subscales displayed a high range of scores (at least 0–14 out of a possible range of 0–16). Anger, Confusion, Depression, Tension (FIMS), and Depression and Anxiety (DASS-21) were positively skewed [40], indicating a high proportion of low scores and fewer high scores, which is common for negative mood indices [3,19]. High kurtosis values were apparent for the same subscales, highlighting the long tail effect of mood scores [3,19]. Similar non-normality has been recorded in previous BRUMS translations [20,27], with adequate model fit being found without data transformations, therefore data were not transformed. The Mahalanobis distance test indicated 31 significant multivariate outliers ($p < 0.001$) in the dataset. A row-wise case inspection did not indicate any bias or extreme responding [40], and therefore all cases were retained [41]. All reliability coefficients (Cronbach's alpha and McDonald's omega) were above 0.80, displaying strong reliability [40,42]. The only exception was the Anxiety subscale in the DASS-21, which showed a reliability coefficient of 0.79, which is still adequate [40,41]. Thus, all the subscales appeared acceptable for further analyses.

**Table 2.** Descriptive statistics and reliability of FIMS, DASS-21, and PBS-S subscales.

| Scale | Variable | M | SD | Range | Skewness | Kurtosis | α | ω |
|---|---|---|---|---|---|---|---|---|
| FIMS | Anger | 1.87 | 2.45 | 0–14 | 1.88 | 3.87 | 0.82 | 0.83 |
| | Confusion | 2.30 | 2.66 | 0–14 | 1.45 | 1.92 | 0.80 | 0.80 |
| | Depression | 2.39 | 3.07 | 0–16 | 1.61 | 2.28 | 0.89 | 0.90 |
| | Fatigue | 5.30 | 3.72 | 0–15 | 0.60 | −0.49 | 0.87 | 0.87 |
| | Tension | 2.97 | 2.93 | 0–15 | 1.36 | 1.79 | 0.82 | 0.83 |
| | Vigour | 7.14 | 3.45 | 0–15 | −0.14 | −0.62 | 0.85 | 0.86 |
| DASS-21 | Depression | 4.20 | 4.42 | 0–21 | 1.51 | 1.91 | 0.90 | 0.90 |
| | Anxiety | 3.06 | 3.34 | 0–18 | 1.44 | 1.76 | 0.79 | 0.79 |
| | Stress | 5.25 | 4.07 | 0–19 | 0.78 | 0.02 | 0.84 | 0.85 |
| PBS-S | Functional States | 17.87 | 8.14 | 0–38 | −0.05 | −0.57 | 0.87 | 0.87 |
| | Dysfunctional States | 10.84 | 8.16 | 0–34 | 0.66 | −0.34 | 0.89 | 0.89 |

### *3.2. Confirmatory Factor Analysis*

Results of the CFA to evaluate the measurement model fit of the FIMS are shown in Table 3. Combining all items into a one factor model produced a poor fit (CFI = 0.654, TLI = 0.621, RMSEA = 0.158) [40,42–44]. The six-factor default model approached the adequate level of fit (CFI = 0.907, TLI = 0.892, $\chi^2$:df = 3.58, RMSEA = 0.076) with the Tucker–Lewis index (TLI), chi-squared to degrees of freedom ratio ($\chi^2$:df), and root mean square error of approximation (RMSEA) falling just short of acceptable levels [40,42–46]. Modification indices indicated that the measurement model could be significantly improved by allowing two items (bitter and angry) in the Anger subscale to covary, along with sleepy and tired in the Fatigue subscale, and confused and mixed-up in the Confusion subscale. Similar covariance pathways have been identified in previous translation and validation studies [3,20,27], and are encouraged to be used to exclude overlapping bias [41,44]. After these modifications, the six-factor modified model (see Figure 1) indicated adequate fit in all indices (CFI = 0.944, TLI = 0.934, $\chi^2$:df = 2.58, RMSEA = 0.06) [44,45].

**Table 3.** CFA Model testing of the FIMS ($n$ = 445).

| Group | $\chi^2$ | df | $\chi^2$/df | CFI | TLI | RMSEA | 90% CI |
|---|---|---|---|---|---|---|---|
| One-factor default model | 2534.65 | 252 | 10.06 | 0.654 | 0.621 | 0.143 | [0.138, 0.148] |
| Six-factor default model | 847.80 | 237 | 3.58 | 0.907 | 0.892 | 0.076 | [0.071, 0.082] |
| Six-factor modified model | 602.76 | 234 | 2.58 | 0.944 | 0.934 | 0.060 | [0.054, 0.065] |

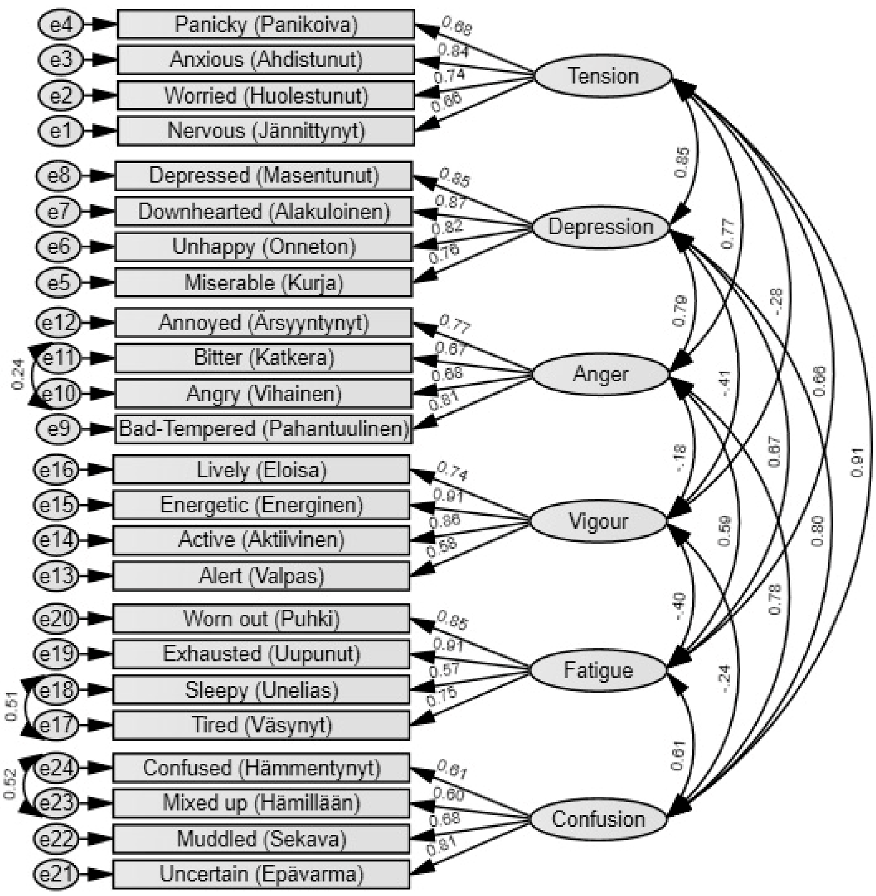


**Figure 1.** Six-factor measurement model of the FIMS.

### *3.3. Construct Reliability and Validity*

The Composite Reliability (CR), Average Variance Extracted (AVE), and Heterotrait-Monotrait (HTMT) Ratio for the FIMS are presented in Table 4. Construct reliability is deemed adequate, as all CR values exceed the minimum benchmark of 0.7 [40,41]. However, the AVE for the Confusion subscale raises slight concerns about convergent validity, as it falls just below the acceptable threshold of 0.50 [40,47]. Nevertheless, this is mitigated by the fact that the CR for the Confusion subscale exceeds the psychometrically sound value [40,41]. The HTMT ratio of correlations was utilised to assess the discriminant validity of the FIMS [47]. Since all HTMT values are below the threshold of 0.90, the FIMS is considered as demonstrating discriminant validity [47]. As construct validity is typically evaluated through convergent and discriminant validity, the FIMS appear to meet the criteria for both construct reliability and validity [40,41,45,47]. Furthermore, the final standardised factor loadings presented in Figure 1 were all significant at the $p < 0.05$ level.

**Table 4.** Composite Reliability (CR), Average Variance Extracted (AVE), and Heterotrait–Monotrait (HTMT) Ratios of the FIMS subscales ($n$ = 445).

| | CR | AVE | HTMT | | | | |
|---|---|---|---|---|---|---|---|
| | | | Tension | Depression | Anger | Vigour | Fatigue |
| Tension | 0.823 | 0.540 | | | | | |
| Depression | 0.897 | 0.685 | 0.884 | | | | |
| Anger | 0.825 | 0.542 | 0.811 | 0.861 | | | |
| Vigour | 0.862 | 0.616 | −0.226 | −0.430 | −0.181 | | |
| Fatigue | 0.859 | 0.610 | 0.682 | 0.689 | 0.552 | −0.402 | |
| Confusion | 0.771 | 0.461 | 0.857 | 0.799 | 0.755 | −0.203 | 0.555 |

### 3.4. Concurrent Validity

Given that the distribution of the subscale scores was non-normal, non-parametric correlational analyses using Spearman's rho (ρ) were used. Correlations between the FIMS, DASS-21, and PBS-S subscales are shown in Table 5. All correlations except one (FIMS Anger and FIMS Vigour; $p = 0.004$) were significant at the $p < 0.001$ level, similar to previous validation studies [20,27]. DASS-21 subscales showed at least a moderate positive correlation ($0.40 \leq \rho \leq 0.69$) [40] with five subscales of the FIMS (Anger, Confusion, Depression, Fatigue, and Tension), and weak negative correlation with ($-0.10 \leq \rho$ $-0.39$) [40,48] with Vigour. It can be highlighted that the strongest correlation (ρ = 0.73) was between the FIMS Depression and DASS-21 Depression subscales. Additionally, the PBS-S Dysfunctional states showed moderate positive correlations with all negatively valenced FIMS subscales, and the PBS-S Functional states showed weak negative correlations [40,48] with negatively valenced FIMS subscales. FIMS Vigour correlated moderately positively (ρ = 0.66) [46,48] with the PBS-S Functional states and weakly negatively (ρ = −0.38) with PBS-S Dysfunctional states.

**Table 5.** Correlations between FIMS, DASS-21, and PBS-S subscales.

| Variable | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. FIMS Anger | | | | | | | | | | |
| 2. FIMS Confusion | 0.59 *** | | | | | | | | | |
| 3. FIMS Depression | 0.57 *** | 0.57 *** | | | | | | | | |
| 4. FIMS Fatigue | 0.43 *** | 0.45 *** | 0.54 *** | | | | | | | |
| 5. FIMS Tension | 0.59 *** | 0.67 *** | 0.66 ** | 0.51 | | | | | | |
| 6. FIMS Vigour | −0.14 ** | −0.17 *** | −0.33 *** | −0.36 *** | −0.20 *** | | | | | |
| 7. DASS-21 Depression | 0.47 *** | 0.57 *** | 0.73 *** | 0.46 *** | 0.58 *** | −0.35 *** | | | | |
| 8. DASS-21 Anxiety | 0.41 *** | 0.55 *** | 0.50 *** | 0.46 *** | 0.54 *** | −0.19 *** | 0.55 *** | | | |
| 9. DASS-21 Stress | 0.48 *** | 0.60 *** | 0.58 *** | 0.53 *** | 0.61 *** | −0.23 *** | 0.65 *** | 0.62 *** | | |
| 10. PBS-S Functional states | −0.20 *** | −0.22 *** | −0.36 *** | −0.33 *** | −0.18 *** | 0.66 *** | −0.41 *** | −0.17 *** | −0.24 *** | |
| 11. PBS-S Dysfunctional states | 0.55 *** | 0.63 *** | 0.63 *** | 0.57 *** | 0.66 *** | −0.38 *** | 0.64 *** | 0.55 *** | 0.63 *** | −0.26 *** |

Note: *** $p < 0.001$, ** $p < 0.01$.

### 3.5. Between-Group Comparisons

MANOVA was used to investigate group differences in FIMS responses, when grouped by gender (male vs. female) and physical activity level (active vs. inactive). Results are presented in Table 6. Significant differences [48] in mood responses overall were reported for gender (Hotelling's $T = 0.089$, $F$ [6, 429] = 6.38, $p < 0.001$, $\eta^2 p = 0.082$), accounting for 8.2% of the variance, and for physical activity (Hotelling's $T = 0.082$, $F$ [6, 437] = 5.95, $p < 0.001$, $\eta^2 p = 0.076$), accounting for 7.6% of the variance. Males reported significantly higher scores for Vigour and lower scores for Confusion, Fatigue, and Tension subscales than females. For the Anger and Depression subscales, females also reported higher scores than males, but the difference was only significant at the $p < 0.05$ level. Physically active participants reported significantly lower scores in four of five negatively valenced mood descriptors (Anger, Depression, Fatigue, and Tension) and higher scores in Vigour than inactive. Physically inactive participants reported higher scores in Confusion, but the difference was significant only at the $p < 0.05$ level.

**Table 6.** MANOVAs of FIMS subscales by gender and physical activity.

| | Gender ($n$ = 436) | | | | | |
|---|---|---|---|---|---|---|
| | Male | | Female | | | |
| Subscale | M | SD | M | SD | F | $\eta^2 p$ |
| Anger | 1.58 | 2.23 | 2.05 | 2.58 | 3.92 * | 0.01 |
| Confusion | 1.74 | 2.18 | 2.61 | 2.85 | 11.68 ** | 0.03 |
| Depression | 1.94 | 2.64 | 2.62 | 3.25 | 5.26 * | 0.01 |
| Fatigue | 4.32 | 3.14 | 5.93 | 3.94 | 20.67 ** | 0.05 |
| Tension | 2.15 | 2.35 | 3.46 | 3.12 | 22.25 ** | 0.05 |
| Vigour | 7.75 | 3.35 | 6.86 | 3.38 | 7.13 *** | 0.02 |

**Table 6.** *Cont.*

| | Physical activity ($n$ = 444) | | | | | |
|---|---|---|---|---|---|---|
| | Active | | Inactive | | | |
| Subscale | M | SD | M | SD | F | $\eta^2p$ |
| Anger | 1.68 | 2.18 | 2.49 | 3.07 | 9.15 *** | 0.02 |
| Confusion | 2.13 | 2.48 | 2.80 | 3.14 | 5.20 * | 0.01 |
| Depression | 2.08 | 2.79 | 3.35 | 3.65 | 14.54 ** | 0.03 |
| Fatigue | 4.93 | 3.47 | 6.41 | 4.22 | 13.40 ** | 0.03 |
| Tension | 2.69 | 2.68 | 3.86 | 3.44 | 13.64 ** | 0.03 |
| Vigour | 7.61 | 3.31 | 5.74 | 3.44 | 25.57 ** | 0.06 |

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

## 4. Discussion

The main purpose of this study was to cross-culturally validate the Finnish translation of the BRUMS, referred to as the Finnish Mood Scale (FIMS), with the data collected from 445 Finnish participants. The six-factor model (see Figure 1) was supported by fit indices from a CFA with three covariate modifications computed. Factor intercorrelations showed a positive correlation between the five negatively valenced subscales (Anger, Confusion, Depression, Fatigue, Tension) and collectively showed negative correlations with Vigour, as expected [3,19]. Construct reliability and validity of the FIMS were supported by CR, AVE, and HTMT analyses [40,47]. As hypothesised, concurrent validity was explored and supported by predicted correlations with concurrent measures, similar to previous studies [18,19]. Thus, negatively valenced FIMS subscales correlated positively with DASS-21 subscales and Dysfunctional states assessed on the PBS-S. Conversely, Vigour correlated negatively with DASS-21 subscales, demonstrating divergent validity. Between-group differences were identified that were consistent with earlier studies [14,19,20]. Overall, the psychometric properties of the FIMS appeared to be close to the original BRUMS [3,14].

The development of the FIMS creates research opportunities in Finnish-speaking contexts, as no such tool currently exists [2,5–8]. Given the International Olympic Committee's program emphasizing standardised procedures for identifying mental health issues, it is crucial to develop an effective tool for this purpose [2]. The thorough translation process and evidence of the psychometric integrity of the FIMS [17,28] provides an opportunity for exploration of mood and performance connections [11], and the early prevention of mental ill-health towards sustainable psychosocial stability [3].

The high range (at least 0–14) on every FIMS subscale shows that extreme negative mood scores are likely to be evident in the Finnish population. Another future research direction in a Finnish context would be the use of cluster analysis to investigate six predictive mood profiles (the iceberg, inverse Everest, inverse iceberg, shark fin, surface, and submerged) for the FIMS, which have been identified previously in several cultures [13,18–20]. Extreme negative mood score profiles such as the inverse Everest profile, characterised by a low Vigour score and high-to-very high scores in all other subscales (Tension, Depression, Anger, Fatigue, and Confusion) [3,13], indicate an elevated risk of mental health issues, and these individuals can be directed to preventative treatments [1].

The relationship between physical activity and psychological wellbeing is well established [1,18,20,24]. The BRUMS, and now the FIMS, offer a tool to investigate the relationship further and longitudinally. In the present study, active participants reported significantly more positive moods than inactive people, in line with previous studies [18,20]. It would be interesting to explore the type and prevalence of physical activity that is associated with the most functional mood profiles, as physical activity has been shown to be an effective treatment for mental ill-health [20,25]. Thus, specific exercise protocols can be suggested for promoting sustainable psychosocial functioning [20,25]. Additionally, future studies could seek to identify which mood profiles are associated with better sports performance to examine the predictive validity of the tool in a Finnish context. Moreover, longitudinal intervention research using FIMS-generated mood profiles can edify a mood enhancement program to modify mood from a dysfunctional profile (e.g., inverse Everest) to a more functional one (e.g., iceberg profile) [11,19].

Significant gender differences in mood scores were identified, with males reporting more positive moods than females, in line with previous studies [19,27]. It has been suggested that gender differences in mood might be explained by more prevalent hormonal fluctuations among females [49] or social inequality [50], resulting in greater mood disturbance. This difference is also evident in the Finnish population, with females reporting more mental health issues than men [5,25]. Males reported higher scores in Vigour, and lower scores in Tension, Depression, Anger, Fatigue, and Confusion compared to female participants. Therefore, different normative scores should be provided for males and females, in line with previous translations [20,27]. Previous studies have also proposed different normative scores for athletes and non-athletes [3,20]. The generation of separate norms would require a larger, more equally distributed sample, but should be a focus for future research. Future research could also focus on measurement invariance across gender and physical activity groups to test whether the measurement model remains the same across such groups. Alternatively, future research could explore the reasons why females tend to report more symptoms of depressed mood [19,20], as well as further investigate the prophylactic and treatment effects of physical activity for mental health issues [2,19,25].

Limitations of the study include the age of participants and lack of test–retest reliability. All the participants were 16 years old or older, which indicates that the tool is not yet validated for younger individuals. It may be beneficial to screen younger individuals for mental health risk factors, especially in sport, since athletes have reported that their mental health issues started in adolescence and wish they could have had some screening or support earlier [1,6]. Test–retest reliability for tools measuring moods is somewhat complex due to the changeable nature of emotions and feelings that underpin mood states [11,12]. Yet, the overall reliability of the FIMS could be assessed using repeated measures [40].

Furthermore, the high positive correlations between the Dysfunctional states measured on the PBS-S and negatively toned FIMS subscales, as well as the Functional states and FIMS Vigour subscale, suggests that these two measures could be used together for screening risk factors in mental health and predicting performance in Finland. Given that the PBS-S scale assesses non-emotional (e.g., motivational, volitional, bodily, communicative) alongside emotional aspects of individuals' subjective experiences, research integrating both measures can provide a more comprehensive and nuanced understanding of individuals' overall experiences and their fluctuations over time. This could help identify potential risk factors and underlying mechanisms that contribute to sustainable mental health [1,3,33], which could be helpful in developing and monitoring the effectiveness of interventions [6,51]. In addition, recommendations for prevalence and type of physical activity may be provided for optimising sustainable mental health benefits [19,20]. Thus, early recognition and prevention of mental health issues would be important, especially for athletes, as their mental health issues appear to be increasingly prevalent in Finland [6].

## 5. Conclusions

Overall, the results of this study support the factorial structure, internal consistency, as well as convergent and divergent validity, of the FIMS in a sample of Finnish participants. Psychometric properties of the scale appeared similar to the original. Therefore, FIMS is an adequate measurement tool to screen mood modalities in a Finnish population. Notwithstanding the problematic nature of accurate mood and emotion measures, the FIMS can provide a tool for investigating mental ill-health risk factors, optimally resulting in the elevated possibility of sustainable mental health.

**Supplementary Materials:** The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su16219379/s1, Table S1: The Finnish Mood Scale (FIMS).

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