**Assessing the Reliability and Validity of the Fear of Covid Scale**

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Covid-19 has been a topic of intensive research since it ignited a global pandemic that has adversely affected day-to-day life for billions of people. In that time, psychological research relating to Covid-19 and its psychological impact on individuals – both directly and indirectly – has been extensive given the time relatively short period of time since the pandemic’s inception. Despite this, there are few resources that allow researchers to distinctly measure an individual’s fear of the disease itself. Thus, a new test has been developed known as the Fear of Covid Scale (FCV-19S; Ahorsu et al., 2020). This test attempts to fill the research gap by directly measuring individuals’ fear of Covid-19.

The FCV-19S contains seven items, with each question specified as pertaining to the Omicron variant of the coronavirus. This study aims to investigate the psychometric properties of the FCV-19S to ensure that it is a sound measure for use in further research. This is to be achieved by establishing two forms of reliability (test-retest and internal consistency) and two forms of validity (convergent and concurrent validity).

In order to test convergent validity, the Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995) was employed for comparison. This scale has demonstrated high reliability for measuring depression, anxiety, and stress (Henry & Crawford, 2005). Since predispositions towards these traits have each been correlated with fear of Covid-19 before (Taylor et al., 2020), it is sound that the DASS-21 is utilised to test the convergent validity of the FCV-19S.

To test the concurrent validity of the study, the International Personality Item Pool, Neuroticism subscale (IPIP-N; Goldberg, 1999) was employed. The IPIP-N provides solid groundwork for testing the concurrent validity of the FCV-19S since it is a well-established measure for neuroticism (De Hoogh & Den Hartof, 2009) – a trait correlated with fearful behaviours relevant to Covid-19 (Montag et al., 2021).

Test-retest reliability for the FCV-19S will be assessed by having participants undergo a second session of testing a week after the first. In this second session, they will only be required to complete the FCV-19S. The level of consistency in the results from this data compared to the first session would demonstrate whether or not the FCV-19S has high test-retest reliability.

Internal consistency reliability, demonstrated by Cronbach’s alpha, will be measured by comparing the score of each item on the scales used with the other items on the same scale. This is done with the aim of demonstrating that the items in the measures used are homogenous with each other and measure the same thing.

**Method**

**Participants**

Ninety-five undergraduate psychology students from Australian Catholic University underwent the first testing session of questionnaires. Of those ninety-five, 22 (22.90%) were male, 71 (74.00%) were female, and 3 (3.1%) were non-binary / third gender. The mean age of participants was 22.10, with participants’ ages ranging between 19 and 51 (SD=4.28).

Twenty-Seven of those participants concluded second testing session, with data from the remaining sixty-eight participants excluded listwise. Of those twenty-seven, 8 (29.6%) were male, and 19 (40.4%) were female. The mean age of those participants was 21.33, with their age ranging between 19 and 29 (SD=1.98).

**Measures**

The Fear of Covid Scale (FCV-19S). The FCV-19S is a self-report questionnaire that was designed to measure individual’s fear of the Omicron variant of Covid-19 (e.g. It makes me uncomfortable to think about coronavirus-19 (Omicron variant)). The items on the questionnaire were rated on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. These items were summed to a total score, with higher scores indicating a greater fear of Covid-19. The Cronbach’s alpha in this sample is highly reliable (α = .84), demonstrating high internal consistency reliability.

The Depression and Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report questionnaire that is a shortened form of the DASS-42. It is designed to measure depression, anxiety, and stress in an individual. There are seven items per subscale for each of these three states. The DASS-21 is shown to have highly acceptable psychometric properties, with high internal consistency validity in this sample (α = .94).

The International Personality Item Pool, Neuroticism subscale (IPIP-N). The IPIP-N is a 10-item self-report questionnaire designed to measure the personality trait of neuroticism (e.g. “I worry about things”). The items on the questionnaire were rated on a five-point Likert scale ranging from *Very Inaccurate* to *Very Accurate*. The Cronbach’s alpha in this sample shows high internal consistency reliability (α = .85).

**Procedure**

Participants were tasked with undergoing two testing sessions on Qualtrics. The first session consisted of descriptive questions – gathering participant ID (for use in testing session 2), age, gender, and ethnic group before being presented with the FCV-19S questionnaire on the same page. A later page then tasked participants with filling out the IPIP-N questionnaire, with the DASS-21 questionnaire on a page after that.

The second session had participants fill in their participant ID in order to align their data with that from the first round, before tasking them with filling out the FCV-19S questionnaire once more in order gather data for test-retest reliability. Participants were instructed to partake in the second testing session one week after the first session. Any participants who did not undergo the second testing session had their data excluded listwise when assessing test-retest reliability.

Data was automatically collected by Qualtrics, with the data from the first testing session being entered on SPSS. Outputs for the descriptive statistics of the participants were created, and reliability analyses were conducted on each scale to test their internal consistency reliability. Bivariate correlational analyses were also conducted comparing the DASS-21 and the IPIP-N with the FCV-19S in order to measure the direction, strength, and significance of the correlation between the scales.

The data from the second testing session was put into a separate SPSS data file, alongside the FCV-19S item score data from the first testing session. A bivariate correlation was then conducted between the total valid FCV-19S scores from the first testing session and the total FCV-19S score from the second testing session.

**Results**

**Table 1**

*Means and Standard Deviations of the FCV-19S, DASS-21, IPIP-N, FCV-19S Testing Session 1, and FCV-19S Testing Session 2.*

|  |  |  |
| --- | --- | --- |
|  | *M* | *SD* |
| FCV-19S | 15.08 | 4.9 |
| DASS-21 | 39.62 | 12.6 |
| IPIP-N | 28.57 | 7.8 |
| FCV-19S Testing Session 1 | 15.96 | 5.4 |
| FCV-19S Testing Session 2 | 14.15 | 5.3 |

**Table 2**

*Cronbach’s Alpha for the FCV-19S, DASS-21, and IPIP-N,, as well as Pearson Correlations with the FCV-19S.*

|  |  |  |
| --- | --- | --- |
| Scale | α | *r* |
| FCV-19S | .84 | 1.00 |
| DASS-21 | .94 | .37\*\* |
| IPIP-N | .85 | .30\*\* |

\**p*<.05. \*\**p*<.01.

As shown in a table 2, all scales had high internal consistency reliability. Furthermore, it shows that a Pearson correlational analysis revealed that both the DASS-21 and IPIP-N scores had a moderate positive significant correlation with the FCV-19S scores.

A bivariate correlational analysis conducted between the FCV-19S scores in Testing Session 1 and Testing Session 2. These were found to be strongly positively correlated, *r* = .768, *p*<.001.

**Discussion**

Reviewing the results of the Pearson correlational analysis demonstrated supporting evidence for both the convergent validity FCV-19S. Given the moderate significant relationships of the FCV-19S with the DASS-21, there is an evident overlap in the direction of the scores when assessing the same participants. Though there are different measures, this evidence indicates that they measure the same, if not similar, constructs. This further compounds and is supported by external research, which also indicates a link between fear of Covid-19 and the traits which the DASS-21 measure (Taylor et al., 2020).

The Pearson correlational analysis also revealed strong supporting evidence for the concurrent validity of the FCV-19S, with a moderate significant relationship between the FCV-19S and the IPIP-N. Thus, the scores from the FCV-19S agree with scores from a well-established measure of neuroticism (De Hoogh & Den Hartof, 2009) that has previously been shown to be related to fear of Covid-19 (Montag et al., 2021).

Furthermore, due to all three scales having a Cronbach’s alpha higher than .80 in the samples used, they all demonstrated high internal consistency reliability. This further emphasises the reliability of the concurrent and convergent validity tests, since it supports the notion that each item accurately measured the same constructs.

Since the first and second testing sessions’ scores were found to have a strong positive correlation, the FCV-19S appears to have robust test-retest reliability. Thus, this study provides strong evidence that the FCV-19S is a sound measure after two tests of validity and two tests of reliability, as it is demonstrated to meet the criterion for each of these.

However, there are still limitations to this study. There were a lack of participants that were able to provide valid ongoing data for the second testing session – with only twenty-seven valid data points in the end for test-retest reliability. Additionally, although participants were instructed to undergo the second testing session after one week (and participants before that seven day period were disregarded), participants were not limited as to when they could undertake the second testing session after that seven day period – short of the end date for the data collection itself. This introduces a potential confound when participants could have dramatically varying times between when they did underwent the second testing session. There is also the possibility that, due to the difference in time between tests, participants could be in a different mental state that could have further caused a shift in their scores, since differing depression, anxiety, or stress levels could influence how participants answer items related to fear (Taylor et al., 2020).

Nevertheless, this study provides solid evidence for the concurrent and convergent validity of the Fear of Covid Scale (FCV-19S), as well as demonstrating its internal consistency and test-retest reliability. This study therefore supports the notion that the FCV-19S is a robust measure for an individual’s fear of Covid-19.

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