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Constructing and Validating of the COVID-19 Fear Scale: Psychometric Evidence and Optimal Cut-Off Score from Palestine

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Constructing and Validating of the COVID-19 Fear Scale: Psychometric Evidence and Optimal Cut-Off Score from Palestine

بناء مقياس الخوف من كوفيد-19 والتحقق من صلاحيته: الأدلة السيكومترية ودرجة القطع المثلى من فلسطين

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Abstract

Background: Various corona-phobia scales have been constructed to measure the levels of fear related to COVID-19. However, probably these scales were established based on the individualistic perspective, without pay attention to fear for others' destiny. **Objective:** The current study is addressing the fear of COVID-19 in light of collectivistic values. **Method:** The present study constructed and validated a new scale measuring fear of COVID-19 among Palestinians (C-19FSP) based on a sample size of (885) respondents. Further, this study was designed to provide an optimal cut-off score for diagnosing corona-phobia. The study was carried out through two phases using a convenient sampling method and online surveys. **Results:** Factorial validity using EFA and CFA revealed a consistent and stable structure with a four-factor solution covered 13 items measuring (a) Fear about Others due to COVID-19, (b) F2: Virus Threat and Dangerousness, (c) F3: Pessimism about COVID-19's Course, and (d) F4:

Infection Phobia. Based on a cut-off of ≥ 52 on the C-19FSP produced good results regarding sensitivity and specificity (75% and 80% respectively). The AUC equals. 91 (p < .001, 95% CI = .88-.93). Age had a significant effect on the fear of the COVID-with a small effect size. Results revealed that those individuals aged more than 53 years old have less fear of COVID-19 compared to younger individuals. Place of residence had also a significant effect on the fear of COVID-19 with a large effect. Citizens from Gaza Strip have more fear of COVID-19 compared to citizens from the West Bank and Jerusalem. In addition, the difference in fear between the citizens from the West Bank and Jerusalem was in favor to those from Jerusalem. Meanwhile, gender, educational level, and marital status had not significant effects on the fear of COVID-19. **Conclusion:** The C-19FSP proved to be a good measure to identify cases of Coronavirus phobia among Palestinians with moderate accuracy.

Keywords: Fear of COVID-19 Scale; Optimal Cut-Off, Occupied Palestine.

ملخص

الخلفية: تم بناء العديد من مقاييس رهاب فيروس كورونا المستجد، لتقييم مستويات الخوف المتعلقة بـ(كوفيد-19)؛ ويبدو أن هذه المقاييس تم بناؤها من منظور فردي؛ والتي تركّز على الخوف على الذات فقط من خطر الإصابة بفيروس كورونا المستجد، دون الالتفات إلى الخوف على مصير الآخرين. **الهدف:** وبالتالي فإن الدراسة الحالية تتناول الخوف من (كوفيد-19) من منظور جماعي؛ أي الخوف على الآخرين جراء الإصابة بالفيروس؛ لذلك سعت الدراسة الحالية إلى بناء مقياس الخوف من (كوفيد-19) والتحقق من صلاحيته في فلسطين، وتم تسمية المقياس (C-19FSP). **الطريقة والمنهجية:** لتحقيق أغراض الدراسة؛ تم اختيار عينة بلغ حجمها (885) مشاركاً، وعلاوةً على ذلك كشفت الدراسة عن قيمة القطع المثالية لتشخيص اضطراب رهاب فيروس كورونا، وأجريت الدراسة على مرحلتين باستخدام عينة متيسرة وتم تصميم استبانة إلكترونية لجمع البيانات لمعرفة الخصائص السيكومترية للمقياس. **النتائج:** كشفت نتائج التحليل العاملي الاستكشافي (EFA) والتوكيدي (CFA) عن استقرار البنية العاملية، وتم اشتقاق أربعة عوامل توزّع عليها (13) فقرة، والعوامل هي (أ) الخوف على الآخرين من خطر الإصابة، (ب) تهديد الفيروس وخطورته، (ج) التشاؤم حول مصير الوباء، (د) رهاب العدوى، وتم اعتبار قيمة القطع ≥ 52 محكاً للفصل بين أولئك المصابين باضطراب الخوف من كوفيد-19، وأولئك غير المصابين، فعند هذه القيمة اتسم المقياس بالحساسية والتحديد (75% و80% على التوالي)، وبلغت المساحة تحت المنحنى 0.91 (p < .001, 95% CI = .88-.93)، وتبيّن أن متغير العمر يؤثر في الخوف من كوفيد-19 بحجم تأثير صغير، إذ أن الأفراد الذين تتجاوز أعمارهم (53) عاماً أقل

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خوفاً من الفيروس مقارنةً بالأصغر سناً، كما أن متغير مكان الإقامة يؤثر في ذلك وبحجم أثر كبير، فالسكان في قطاع غزة أكثر خوفاً من الفيروس مقارنةً بسكان الضفة الغربية والقدس، كما أن سكان القدس أكثر خوفاً من الفيروس مقارنةً بسكان الضفة الغربية، أما متغيرات الجنس والمستوى التعليمي والحالة الاجتماعية لم تؤثر في الخوف من كوفيد-19. **خلاصة:** عليه اتسم مقياس (C-19FSP) بقدرته الجيدة ودقته المقبولة لتحديد الحالات المصابة بفوبيا فيروس كورونا بين الفلسطينيين.

الكلمات المفتاحية: مقياس الخوف من كوفيد-19؛ قيمة القطع المثلى، فلسطين المحتلة.

Introduction

The COVID-19 pandemic was confirmed in Palestine on 5 March 2020, where the first diagnostic tests for COVID-19 were conducted in the West Bank in Bethlehem, which resulted in the confirmation of seven infected cases among Greek tourists (Hawari, 2020). Then the Palestinian National Authority [PNA] declared an emergency state and imposed a lockdown on Bethlehem to decrease the spread of COVID-19. The PNA also announced restrictions across the West Bank, including restrictions on traveling and moving between regions and the closing of public spaces and educational institutions. On March 22, following a steady increase in cases, the PNA declared a shutdown and curfew across the West Bank and the Gaza Strip (Alabsi, 2020; Hawari, 2020). Until early January 2021, the total number of confirmed infected cases in the West Bank and Gaza Strip 163,573 with 17,693 active cases and with 1,684 deaths cases (World Health Organization [WHO], 2021). These numbers indicate the COVID-19 still spreading so quickly and resulting in more death cases among Palestinians. In addition to the COVID-19 pandemic outbreak; Palestine is a war and conflict zone. According to many western authors; Palestinian people have complicated, difficult, and miserable conditions; accordingly, they face many threats. The most important and critical threat is the political challenge represented in the chronic Israeli military occupation, its violence against the Palestinian people since 1948, and apartheid policy (Cook, 2013; Satgar, 2019; Sfard, 2018).

The Israeli military occupation resulting in hundreds of thousands of victims, destroying the Palestinian economy and infrastructures, restricting

the movement of people and goods, land seizure, building settlement and the separation wall, population transfer, deportations, the suffocating siege on the occupied Palestinian territories [oPt] specifically on Gaza Strip, and thousands of prisoners continue to suffer in Israeli jails (Kohlbry, 2016; Natali, 2019; Sfard, 2018). Consequently, there is no hope to achieve peace, ending the occupation, and establishing the Palestinian state until now (Greenstein, 2020). According to B'Tselem (2020) the Israeli information center for human rights in the occupied territories that strives to end Israel's occupation; the period between 19 January 2009 and 31 December 2020, Israeli forces killed 3,570 in the oPt, and just in 2019, about 15 thousands of Palestinians were injured, and at least 36% of them were of children and despite lockdown and home quarantine for several months due to the COVID-19 pandemic since March 2020 in the oPt, Israeli forces killed 27 Palestinians; seven of them were minors and also destroyed at least 729 Palestinian buildings including 273 homes.

Occupied Palestine is a lower-middle-income economy with a GDP per capita of USD 3 072 in 2017 (constant prices 2015) (FAO, 2020) and a population, in 2018, of 4.92 million people, 1.96 million of whom live in the Gaza Strip and 2.95 million in the West Bank (Palestinian Central Bureau of Statistics [PCBS], 2020). After the COVID-19 pandemic, hundreds of thousands of Palestinian workers have been facing a complete loss of income either who work in the oPt or in Israel and Israeli settlements (Samour, 2020). Workers in Israel are a major source of income for the Palestinian economy and providing tens of thousands of families with their subsistence. In 2019, there were 133,000 Palestinians working in Israel and Israeli settlements, as of 1 May 2020, the number of workers in Israel and Israeli settlements dropped sharply to 25,000 workers, that after Israel's strategy for restraining the spread of COVID-19 including the imposition of a full security lockdown over the oPt (Al'Sanah & Ziadah, 2020).

At the same time, workers in Israel and Israeli settlements did not receive any health care services, clear health directives, or guidelines about work conditions during the pandemic outbreak (Al'Sanah & Ziadah, 2020). Although Palestinian workers play a vital role in the Israeli

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economy, they have been exposed to the risk of COVID-19 without any support from the Israeli side. Where, Palestinian workers who showed COVID-19 symptoms did not receive medical tests and in some cases, their employers simply dumped them at checkpoints (Al'Sanah & Ziadah, 2020; BBC, 2020; Samour, 2020). Workers who were coming back to their families in the oPt are exposing themselves and their families to the COVID-19 infection transmission. Because the epidemiological situation in Israel is more dangerous than in the oPt; where the great majority (about 74%) of the COVID-19 infected cases among Palestinians are working in Israel and Israeli settlements (Al'Sanah & Ziadah, 2020; BBC, 2020; WHO, 2020; Samour, 2020). The first registered Covid-19 death in the oPt has been reported was the mother of a Palestinian worker from East Jerusalem who was working at an Israeli settlement (Al'Sanah & Ziadah, 2020).

Regarding the Palestinian health system, the political, economic, and humanitarian situations are complicated and play an important role in the health system's ability to face the COVID-19 pandemic outbreaks (AlKhaldi, *et al.*2020). The bad humanitarian conditions in the oPt include dire living situations, poor socioeconomic, and a crippled health system that in turn minimizing the ability to respond to the COVID-19 (AlKhaldi, *et al*. 2020; Hammoudeh, Kienzler, Meagher, & Giacaman, 2020; Hawari, 2020). Accordingly, Occupied Palestine is confronting COVID-19 from a reality of Israeli military occupation, which weakens the ability to respond effectively to the deadly virus. Based on the aforementioned regarding the Palestinian conditions and context; Palestinian people are confronting many dangers, difficulties, and challenges in their daily life that of course negatively and significantly reflects on their mental health (Ghandour, *et al*. 2020; Hammoudeh at al., 2020). The COVID-19 pandemic and the imposed countrywide lockdown lead to the exacerbation of the difficult living situation and exposing Palestinian people to further vulnerabilities and stress. Therefore, the Coronavirus pandemic has had a major impact on individuals' lives and health-related issues and affecting them physically, economically, socially, psychologically, politically, and spiritually. As a result, it is logical to conclude that fear and anxiety among

the Palestinians is spreading as quickly as the COVID-19 itself (Mahamid, *et al*. 2022).

Recent evidence from over the world supports this argument. The findings show significantly elevated symptomatology levels in fear, stress, anxiety, and PTSD related to COVID-19 (Ahorsu, *et al.* 2020; Fitzpatrick, Harris, & Drawve, 2020; Lazzerini, *et al.* 2020; Mamun & Griffiths, 2020; Pakpour, & Griffiths, 2020). The current study has focused on fear since it is the main component of anxiety and related disorders. Fear is an emotion induced by a perceived threat or danger and fear in human beings may occur in response to a certain stimulus occurring in the present, or in anticipation or expectation of a future threat perceived as a risk to oneself (Bourke, 2015). Fear is defined as "a reaction to immediate danger and psychologists focus on the "immediate" aspect of fear versus the "anticipated" aspect of anxiety-fear tends to be about a threat that is happening now, whereas anxiety tends to be about a future threat" (Kring & Johnson, 2018, p.162). Fear is a human survival reaction and negative emotion that comes from a real or perceived threat so it is an adaptive response essential to coping with danger and threat. Fear is judged as rational or appropriate and irrational or inappropriate, and irrational fear is called a phobia (Olsson & Phelps, 2007). Many researchers have considered phobia or excessive and persistent fear is maladaptive, leading to disability, it is the main component of anxiety and related disorders, and it is the major factor impeding peace of mind (Davis, 2014; Otto, Smits, & Reese, 2003; Shin & Liberzon, 2010; Starkstein, 2016). Excessive or persistent fear appears in different pathological symptoms and occurs in a number of neuropsychiatric disorders (Pedrosa, *et al.* 2020). Symptoms including different kinds of anxiety disorders, PTSD, obsessive-compulsive disorder, chronic stress reactions, confusion, loneliness, anger, frustration, insomnia, despair, and may contribute to depression and suicidal thoughts or attempts (Blessing, *et al.* 2015; Dubey, *et al.* 2020; Khademi, Moayedi, & Golitaleb, 2020).

In relation to the COVID-19, it has been known to cause fear of death, fear of losing loved ones, fear of losing jobs and incomes, fear of stigmatization due to infection, and fear of not finding treatment or

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effective vaccine (Ahorsu, *et al.* 2020; Arpaci, *et al.* 2020a; Arpaci, *et al.* 2020b, Chi, *et al.* 2020; Huarcaya-Victoria, *et al.* 2020; Pakpour, & Griffiths, 2020). Asmundson and Taylor (2020) asserted that various negative emotional states, such as, intolerance to ambiguity, psychological fragility, perceived susceptibility to illness, and disproportional fear or anxiety during the Coronavirus pandemic may manifest itself as corona-phobia. DSM-5 defines phobia as a disproportional fear reaction to an anxiety or fear-provoking object or situation (American Psychiatric Association, 2013). Accordingly, many researchers have suggested the term corona-phobia to describe excessive and persistent fear due to COVID-19 meaning that fear in this case irrational, maladaptive, and pathological (Arora, *et al.* 2020; Asmundson & Taylor; 2020; Lee & Crunk, 2020; Lee, *et al.* 2020; Naguy, Moodliar-Rensburg, & Alamiri, 2020). Accordingly, Individuals who likely to develop corona-phobic show severe reactions because of fear of infection, stigmatization, death, losing loved ones, losing jobs and incomes, the ultimate fear of future uncertainty, and an overall deterioration in every aspect of life.

In the Palestinian context and under the circumstances of ambiguity, uncertainty, threats, and negative anticipation which are considered the master of the situation, as well as the interaction among the pandemic outbreak, Israeli military occupation for decades, and living in bad conditions for a long time; Palestinians might develop phobic reactions toward the COVID-19 more than others. From another perspective, because the Palestinians are living under Israel's oppressive occupation perhaps they have developed different coping strategies to overcome fear, anxiety, and stress reaction. Before the COVID-19 and for several years, Palestinians have experienced curfews, movement restrictions, and lockdowns, therefore these conditions are not unfamiliar to most. For decades, Palestinian people have been forced to live under miserable conditions and Israeli military occupation. As a result, Palestinians perhaps developed a culture of resilience or Sumud (Giacaman, 2020; Hammad & Tribe, 2020).

'Sumud' is a Palestinian idea that is interwoven with ideas of personal and collective resilience and steadfastness. It is also a socio-political

concept and refers to ways of surviving in the context of occupation, chronic adversity, lack of resources, and limited infrastructure (Marie, Hannigan, & Jones, 2018). Therefore, and based on the Sumud's idea the current study supposes Palestinians have normal and adaptive fear against the COVID-19. By being aware of these two perspectives (a) Palestinians might develop phobic reactions toward the COVID-19 more than others and (b) Palestinians perhaps develop a culture of resilience or Sumud consequently they have normal and adaptive fear against the COVID-19. Therefore, it is important to specify and identify the COVID-19 phobia in Occupied Palestine in order to provide suitable counseling and psychological services for individuals with phobic reactions against the COVID-19 and to prevent pathological symptoms for people living under military occupation for many decades. This major goal could be achieved by constructing a valid scale measuring fear of the COVID-19 in the Palestinian context. Furthermore, this study was designed to provide an optimal cut-off score for diagnosing corona-phobia by targeting a big sample size in order to obtain more accurate findings from the Palestinian context.

Various corona-phobia scales have been constructed to measure the levels of fear, phobia, or anxiety related to the pandemic (eg. Ahorsu, *et al.* 2020; Asmundson & Taylor, 2020; Cavalheiro & Sticca, 2020; Fitzpatrick, *et al.* 2020; Masuyama, Shinkawa, & Kubo, 2020; Pakpour & Griffiths, 2020; Perz, Lang, & Harrington, 2020; Soraci, *et al.* 2020). However, probably these measurement tools were established based on the individualistic perspective, where the focus was on fear for oneself destiny, without pay attention to fear for others' destiny either loved ones, family members, relatives, friends, colleagues, or all human beings. Thus, to fill this gap, the current study is addressing fear in light of collectivistic values. Since we cannot fear for ourselves without fearing for others. In this regard, the Palestinians are Arabs and the majority of them are Muslim. Islam has asserted that fear and love for humanity is an important component of faith. Furthermore, Arabic culture promotes a sense of 'We' rather than a sense of 'I' because it belongs to collectivism (Gregg, 2005).

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Method

Design

Two phases were conducted to develop the COVID-19 Fear Scale for Palestinians. In the first phase, exploratory factor analysis [EFA] was conducted to test the underlying factors structure and in the second phase, confirmatory factor analysis [CFA] was used to validate the measurement scale. A cross-sectional with a descriptive study design was used for evaluating the psychometric properties of the COVID-19 Fear Scale for Palestinians in the two Phases.

Participants

A total of 885 respondents participated in this study and completed the survey (n_1 = 251 respondents in the first phase and n_2 = 634 respondents in the second phase). All participants were from oPt with a mean age of 32.8 years (SD = 16.14, range = 14-63 years). Three of the respondents reported that they have been diagnosed with the COVID-19. The participants' sociodemographic characteristics in this study are presented in Table 1.

Table (1): Descriptive statistics of the participants in the two phases.

Gender	Phase 1	Phase 2	*N =885*
	n_1 = 251	***n_2 = 634***	
Male	73 (29.1%)	164 (25.9%)	231 (26.1%)
Female	178 (70.9%)	470 (74.1%)	654 (73.9%)
Age			
Less than 24	49 (19.5%)	129 (20.3%)	193 (21.8%)
24-33	105 (41.8%)	277 (43.7%)	384 (43.1%)
34-43	58 (23.1%)	132 (20.8%)	178 (20.1%)
44-53	27 (10.8%)	67 (10.6%)	90 (10.2)
54 and more	12 (4.8%)	29 (4.6%)	40 (4.5%)
Education			
Secondary school and less	22 (8.8%)	52 (8.2%)	81 (9.2%)
Diploma and Bachelor	149 (59.4%)	384 (60.6%)	539 (60.9%)

Continue table (1)

Gender	Phase 1	Phase 2	*N =885*
	n_1 = 251	*n_2 = 634*	
Ma and Ph.D.	80 (31.9%)	198 (31.2%)	265 (29.9%)
Marital status			
Single	146 (58.2%)	370 (58.4%)	500 (56.5%)
Married	98 (39%)	242 (38.2%	359 (40.6%)
Other (divorced or widowed)	7 (2.8%)	22 (3.5%)	26 (2.9%)
Place of residence			
West Bank	152 (60.6%)	372 (58.7%)	539 (60.9%)
Jerusalem	25 (10%)	76 (12%)	101 (11.4%)
Gaza Strip	74 (29.5%)	186 (29.3%)	245 (27.7%)

Procedure

The COVID-19 Fear Scale for Palestinians [C-19FSP] is a self-report tool that was constructed to assess the level of fear due to the COVID-19. Many procedures were carried out to develop the scale. Reviewing the relevant literature regarding fear of pandemics and three online focus group interviews by Zoom were conducted. The focus group participants were eight from the Gaza Strip, seven from Jerusalem, and ten from the West Bank. Those participants were psychologists, counselors, and social workers working in psychological and counseling services centers. The role of experts was to determine and identify nature of COVID-19 fear construct among Palestinians. After reviewing the literature and conducting the focus group interviews, 34 items were captured. These items reflected four initial components: (a) F1: Fear about Others due to COVID-19, (b) F2: Virus Threat and Dangerousness, (c) F3: Pessimism about COVID-19's Course, and (d) F4: Infection Phobia. The initial pool of 34 items was reduced to 18 items based on the ratings of five social and clinical psychology experts at [edited out for blind review]. A pilot study was conducted in order to check the participants' understanding of the items; the 18 items were administered to 37 students from [edited out for blind review]. Items followed a 5-point scale (5= very much like me vs 1=

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not at all like me). The data collection for the final sample started in the first week of April 2022 and lasted till the last week of July 2022.

An online questionnaire was administered as it was difficult to reach participants physically because of the social distancing due to the COVID-19 pandemic. For the same reason, the researchers used a convenient sample technique. The study was approved by the IRB of [edited out for blind review]. The study procedures complied with ethical standards.

The study was divided into two phases. In the first phase, exploratory factor analysis [EFA] was conducted on a sample of 251 participants to test the underlying factors structure and in the second phase, confirmatory factor analysis [CFA] was used on a sample of 634 participants to validate the measurement scale. Convergent and concurrent validities were assessed using the Fear of COVID-19 Scale [FCV-19S] (Ahorsu, *et al.* 2020) and Coronavirus Anxiety Scale [CAS] (Lee, 2020). The researcher adapted both scales to the Palestinian context and he benefited from recommendations of Pan and Dae La Puente (2005) method in translating and adapting scales which includes five steps of translating scales, preparation, translation and back translation, pretesting, revision, and documentation. The translated (Arabic) scales were reviewed by five experts from the psychological and medical fields and by two specialists in Arabic and English languages working at [edited out for blind review]. Because no gold standard or optimal cutoff score has been established to diagnose pathological fear due to the COVID-19 among Palestinians. Thus, the aim of this study was to specify the appropriate cutoff point to carefully define and distinguish individuals with extreme or severe fear of Coronavirus from those with a normal fear reaction.

Measures

Seven items of the FCV-19S (Ahorsu, *et al.* 2020) was used for assessing convergent validity. FCV-19S has acceptable corrected item-total correlation (.47 to .56) and strong factor loadings (.66 to .74). FCV-19S was evaluated using Rasch model (item response theory) and classical test theory. FCV-19S reliability values were higher than the recommended value of .70 where internal consistency was .82 and test–retest reliability

was .72. On the other hand, concurrent validity was achieved by CAS for Lee (2020). CAS has five items measuring dizziness, sleep disturbance, tonic immobility, appetite loss, and nausea or abdominal distress. CAS was well constructed using EFA] and CFA and its reliability coefficient was .93.

Data analysis

To discover factor structure of the C-19FSP, the EFA was conducted by principal component analysis with promax rotation using SPSS (version 23) on the data collected in the first phase study. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and the Barlett test were used also. In order to specify the estimation method in CFA; multivariate normality and outliers were checked, univariate normality was utilized for the multivariate normality inspection, and skew and kurtosis were utilized to examine univariate normality (Kline, 2015). To check whether the variable of interest has significant skew or kurtosis; Tabachnick, Fidell, and Ullman (2007) recommended dividing the skewness or kurtosis value by its corresponding standard error; this ratio is interpreted as a z-test of skew or kurtosis. Ratios greater than 1.96 would have a p-value less than .05, and ratios greater than 2.58 would have a p-value less than .01, indicating significant skewness or kurtosis. On the other hand, outliers are very unusual or extreme cases that can bias the results. Cases can be univariate or multivariate outliers. Univariate outliers have extreme scores on one variable and can be detected by examining z-scores; cases with z-scores greater than 3.0 in absolute value are unusual and maybe outliers (Kline, 2015). Moreover, Mahalanobis distance was used to identify multivariate outliers. A p-value less than .001 ($p < .001$) is recommended for statistical significance in this multivariate outlier test (Tabachnick, *et al.* 2007). AMOS 22 was used to inspect multivariate outliers of the data. Furthermore, to validate the measurement scale structure equation modeling [SEM] using CFA was conducted utilizing the maximum likelihood estimation method [ML] in AMOS 22. In addition, receiver operating characteristic [ROC] method was used to define cutoff value for the C-19FSP scale in relation to findings of the FCV-19S.

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Results

Exploratory factor analysis

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was .84 and the Barlett test (χ^2 (78) = 1551.28 p < .001) indicated significant sampling adequacy for performing EFA. The EFA uncovered a four-factor solution (See Table 2). Factors with eigenvalues lower than 1 and items with factor loading less than .40 were ignored. Items with factor loadings on multiple factors with .30 or more were also eliminated. The obtained four factors (13 items out of 18 items) with an Eigenvalue of more than one explained 69.24% of the total variance. This indicated good construct validity for the scale. The first factor accounted for 42.35% of the total explained variance while the second factor accounted for 10.34%, the third accounted for 8.84%, and the fourth accounted for 7.71% of the variance. Communalities, ranged from .56 to .81. For Factor 1, which consisted of four items measuring Fear about Others due to COVID-19, Cronbach's alpha was .81. For Factor 2, which consisted of four items reflected Virus Threat and Dangerousness, Cronbach's alpha was .79. For Factor 3, which consisted of three items reflected Pessimism about COVID-19's Course, Cronbach's alpha was .78. Finally, for Factor 4, which consisted of two items measuring Infection Phobia, Cronbach's alpha was .74. For the total scale, including all 13 items, Cronbach's alpha was reported as .88. This indicated high internal consistency of the scale.

Table (2): Factor loadings of each item of the C-19FSP *(n_1* = 251).

Items	F1	F2	F 3	F 4
7. Are you scared about your family member getting infected with the Coronavirus?	.69			
8. Are you worried about your relatives, friends, or colleagues getting infected with the Coronavirus?	.84			
9. Do you caution others and warn them about the risks of infection by Coronavirus?	.72			

Continue table (2)

Items	F1	F2	F 3	F 4
13. Are you feeling depressed because of the increasing number of people infected with the Coronavirus?	.99			
2. Do you feel frustrated and desperate because of the Coronavirus outbreak and the inability to control it?		.65		
3. Do you think that the Coronavirus vaccine is an impossible task?		.76		
4. Do you feel anxious about your future due to the Coronavirus outbreak?		.54		
11. Do you think that all humanity has become threatened due to the Coronavirus and the future will be tragic?		.91		
6. In the coming months, do you think that the Coronavirus will be worse and become more virulent?			.83	
10 In the coming weeks, do you think that the Coronavirus will spread more widely?			.82	
12. Do you think that economy and health services will collapse due to the Coronavirus pandemic?			.69	
1. Are you afraid for your life or for the lives of your family member due to the Coronavirus outbreak?				.92
5. Do you feel panic when you think about the Coronavirus outbreak?				.90
Eigenvalue	5.51	1.34	1.15	1.00
Percent variance	42.35	10.34	8.84	7.72

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Normality and outliers

In the current study, the results revealed that all of the skewness and kurtosis values are smaller than 1.96, which indicate good evidence that univariate and multivariate normality are presence and based on the cut-point of three, there were no univariate outliers. Using Mahalanobis distance test seven outliers in the sample ($p < .001$, Kline, 2015) were observed. The percentage of the outlier cases was less than .01% (7/885) which considered very small. Therefore, the researcher preferred to keep all cases including the outliers to get realistic results. To conclude, no factors in the suggested scale violated the univariate and multivariate normality assumptions. Therefore, the maximum likelihood estimation method [ML] was a good choice (Kline, 2015) since the data did not violate the assumptions of SEM. Accordingly, the ML method was used to estimate the parameters of study variables (See Table 3).

Table (3): Skewness, kurtosis Indices, and z-scores for the COVID-19 Fear Scale for Palestinians.

Factor	Skewness	S.E.	Ratio	Kurtosis	S.E.	Ratio	Min.*	Max.**
F1	-.15	.08	-1.79	.23	.16	1.41	-1.94	2.11
F2	-.13	.08	-1.52	-.10	.16	-1.14	-2.05	1.75
F3	-.11	.08	-1.39	-.01	.16	-.02	-1.38	2.40
F4	-.16	.08	-1.93	-.14	.16	-.82	-1.87	1.92
C-19FSP	-.14	.08	-1.64	.12	.16	.71	-2.13	2.51

F1: Fear about Others due to COVID-19, F2: Virus Threat and Dangerousness, F3: Pessimism about COVID-19's Course, F4: Infection Phobia, S.E.: Standard Error.

* Min.: Minimum z-score, Max**: Maximum z-score

Confirmatory factor analysis

CFA was performed to test the validation of the C-19FSP resulted in EFA. CFA measures variables related to the latent factors by factor loading estimates. When each measured variable loads highly on a specified factor and has smaller loadings on other factors, and then it is associated with the highest loading factor (Murtagh & Heck, 2012). In CFA, the investigator specifies both the number of factors and which measured variables will load highly on a particular factor (Murtagh & Heck, 2012). In this study,

CFA was used to confirm the existence of the four-factor structure fit of the C-19FSP: Fear about Others due to COVID-19, Virus Threat and Dangerousness, Pessimism about COVID-19's Course, and Infection Phobia. Therefore, the data collected in the second phase was analyzed using CFA with ML method. As shown in Table 4, the measurement model revealed excellent model fit (χ^2 (57) = 187.12, p < .001, CMIN/df = 3.28, SRMR = .05, RMSEA = .06, CFI = .95, GFI = .96, and AGFI =.94) in accordance with recommended criteria in the relevant literature (Kline, 2015; Tabachnick, *et al.* 2007).

Table (4): Model fit indices for the measurement model (n_2 = 634).

Fit indices	Recommended value	Measurement model	Decision
Relative chi-square (CMIN/df)	< 5	3.28	Accepted
Root mean squared error of approximation (RMSEA)	≤.06	.06	Accepted
Standardized root mean square residual (SRMR)	< 10	.05	Accepted
Goodness of fit index (GFI)	≥.90	.96	Accepted
Adjusted goodness of fit (AGFI)	≥.80	.94	Accepted
Normed fit index (NFI)	≥.90	.94	Accepted
Comparative fit index (CFI)	≥.90	.95	Accepted

The diagram of CFA is shown in figure 1. The results of Cronbach alpha coefficients were obtained for C-19FSP and its subscales; Fear about Others due to COVID-19, Virus Threat and Dangerousness, Pessimism about COVID-19's Course, and Infection Phobia .92, .84, .81, .79, and .76, respectively that demonstrated the internal consistency of the C-19FSP. Total scores for the C-19FSP ranged from 13 to 65.

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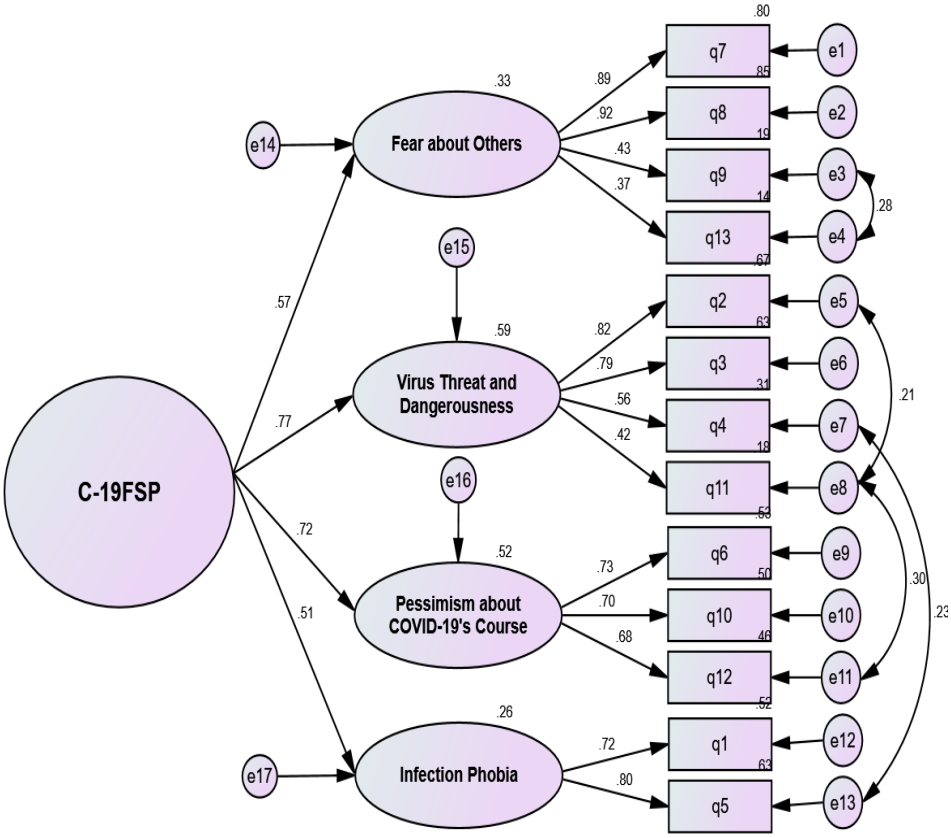

Figure (1): Measurement model.

Convergent and concurrent validity

FCV-19S was used for assessing convergent validity. The findings revealed that the C-19FSP was correlated positively and significantly with FCV-19S ($r = .66$, $p < .001$). On the other hand, concurrent validity was achieved by CAS for Lee (2020). The findings revealed that the C-19FSP was correlated positively and significantly with CAS ($r = .47$, $p < .001$). Results of convergent and concurrent validity are shown in Table 5.

Table (5): Convergent and concurrent validity (n_2 = 634).

	Mean	S.D.	F1	F2	F3	F4	C-19FSP
F1	17.38	2.09	-				
F2	13.81	2.89	.56**	-			
F3	10.80	2.16	.44**	.52**	-		
F4	6.85	1.61	.37**	.44**	.38**	-	
C-19FSP	48.84	6.41	.79**	.86**	.74**	.65**	-
FCV-19S	25.26	13.54	.74**	.77**	.65**	.56**	.66**
CAS	8.87	6.05	.56**	.60**	.44**	.49**	.47**

** $p < .001$

Effects of the demographic variables

Descriptive statistics for the C-19FSP means and standard deviations were calculated. In order to determine whether the C-19FSP means have a significant difference according to gender, age, educational level, marital status, and place of residence five-way ANOVA was conducted on the C-19FSP scores as the dependent variable and the demographic variables as independent variables. Age had a significant effect on the fear of the COVID-19 ($F_{(4, 622)} = 4.33$, $p = .002$, $\eta^2 = .027$) and the effect size was small. Place of residence had also a significant effect on the fear of the COVID-19 ($F_{(2, 622)} = 182.69$, $p = .000$, $\eta^2 = .370$) and the effect size was large. Meanwhile, gender, educational level, and marital status had not significant effects on the fear of COVID-19. Post Hoc tests were performed for the fear of COVID-19 in light of age and place of residence. Results revealed that those individuals aged more than 53 years old have less fear of the COVID-19 compared to younger individuals. On the other hand, citizens from Gaza Strip have more fear of the COVID-19 compared to citizens from the West Bank and Jerusalem. In addition, the difference in fear between the citizens from the West Bank and Jerusalem was in favor to those from Jerusalem.

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The optimal cut-off value for C-19FSP

This study aimed to provide an optimal cut-off score for the C-19FSP among the Palestinians. Receiver operating characteristic [ROC] method was used to define cutoff values for the C-19FSP scale in relation to findings of the FCV-19S. FCV-19S was considered as external criterion or gold standard for the following reasons: (a) FCV-19S was well constructed and validated using item response theory and classical test theory, (b) FCV-19S has been utilized in the literature, (c) FCV-19S was supported by various scales measuring anxiety, depression, and phobia (Soraci, *et al.* 2020), (d) FCV-19S was developed using a sample from Iran (n = 717) which more culturally close to the Palestine (collectivist), and (e) FCV-19S correlated significantly and positively with the C-19FSP ($r = .66$, $p < .001$). Scores on the FCV-19S were converted to dichotomous based on a cut-off point of (16.5) as recommended by Nikopoulou, *et al*. (2020). Individuals who scored more than 16.5 were considered to have Coronavirus phobia and those below this cut-off point were considered as having a normal fear reaction. The Youden Index method was used to determine the optimal cut-offs for the C-19FSP, and sensitivity and specificity were calculated. Youden Index equals (sensitivity + specificity – 1) (Dunstan & Scott, 2020). Where sensitivity refers to the probability that respondents are accurately diagnosed with a fear of COVID-19, whereas specificity refers to the probability that healthy respondents were diagnosed with no pathological fear, the larger the value of sensitivity and specificity indicate a better diagnosis (Tan, *et al.* 2018).

Using the ROC method, the result showed that 93 out of 538 (17.3%) participants were considered to have Coronavirus phobia. ROC curve was performed to explore the predictive validity of the C-19FSP. A cutoff point of ≥ 52 (percentile: 68th) based on ROC analysis revealed a significant predictive power of the C-19FSP scale for the FCV-19S scale. The area under the curve [AUC] equals .91 ($p < .001$, 95% CI = .88-.93), sensitivity .75, and specificity .80. A positive predictive value equals 75% where among those who had positive results on the C-19FSP and FCV-19S, the probability of COVID-19 phobia was 75%. On the other hand, a negative predictive value equals 74.9%, where among those who had negative

results on both scales; the probability of having a normal reaction of fear was 74.9% (see Table 7 and Figure. 2).

Table (7): Predictive validity of the C-19FSP.

State scale	Test scale	Percentile	Sensitivity	Specificity	AUC	95% CI**	Y.I.*
FCV-19S ≥ 16.5	C-19FSP ≥ 52	The 68th	.75	.80	.91	.88-.93	.55

* Y.I: Youden's Index
** $p < .001$

Table (6): The summary of the four-way ANOVA results (n_2 = 634).

Source	Df	MS	F-value	P-value	η^2
Gender	1	.175	1.166	.281	.002
Age	4	.649	4.334	.002**	.027
Educational level	2	.195	1.301	.273	.004
Marital status	2	.417	2.785	.062	.009
Place of residence	2	27.366	182.687	.000**	.370
Error	622	.150			
Total	634				
Corrected total	633				

** $p < .001$

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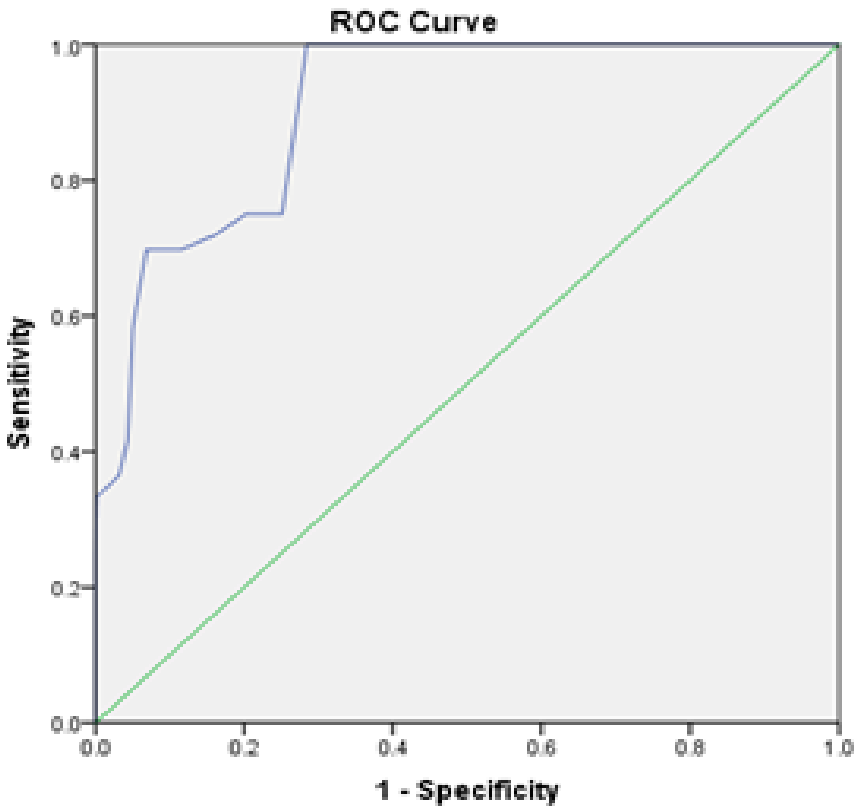

Figure (2): ROC curves of the C-19FSP in relation to the FCV-19S.

Discussion

The purpose of this study was to develop a scale for assessing fear of COVID-19 pandemic among Palestinians. The EFA on the initial 18 items resulted in a four-factor solution. The findings of the EFA of 18 items revealed that the scale contains 13 items. The items distributed on four dimensions of fear; Fear about Others due to COVID-19, Virus Threat and Dangerousness, Pessimism about COVID-19's Course, and Infection Phobia. The Cronbach's alpha coefficients for subscales and total scale indicated good internal consistency reliabilities. The four-factor solution explained 69.24% of the total variance, which indicated the C-19FSP is

well measuring common factor variance based on the threshold determined by Beavers, *et al*. (2013), where 50 % variance explained is acceptable in social and educational sciences. The Fear about Others due to COVID-19 factor accounted for 42.35% of the total explained variance meaning fear about others is a prominent emotion among Palestinians, which is common in collectivistic, Islamic, and Arabic cultures. Concern and worry about family members, relatives, elderlies, friends, neighbors … etc. are respected values among Palestinian especially under sharp crisis conditions like Coronavirus pandemic. On the other hand, the remaining three factors had somewhat similar proportion of explained variance with 10.34%, 8.84%, and 7.71% for Virus Threat and Dangerousness, Pessimism about COVID-19's Course, and Infection Phobia respectively. Thus, about 27% of the variation in responses was due to senses of dangerousness, pessimism, and fear of infection by COVID-19. Therefore, the current scale is considered as a good tool for measuring fear of COVID-19 among Palestinians with respecting their collectivistic, Islamic, and Arabic tendencies.

Evidence of the convergent and concurrent validity support the use of the C-19FSP, where the positive significant correlations between C-19FSP and FCV-19S and between C-19FSP and CAS were found meaning C-19FSP measures what it intended to measure, which indicates FCV-19S sufficiently assessing fear of COVID-19. In relation to the association between C-19FSP and FCV-19S, the convergent validity exceeded the correlation threshold of .50 as suggested by Carlson & Herdman (2012) and the given association ($r = .66$, $p < .001$) can be interpreted based on the items' content in the both scales where similarities were found. In addition, the C-19FSP significantly and positively correlated with Coronavirus anxiety CAS ($r = .47$, $p < .001$) as measured by CAS. The correlation between C-19FSP and CAS suggested a moderate association between fear and anxiety of COVID-19. Fear and anxiety of COVID-19 are closely related where fear includes feelings of present threat, current danger, and vulnerability and it is seen with feelings of anxiety and uncertain future of COVID-19 that limit the ability to confronting COVID-

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19. Thus, fear is kind of anxiety that is attached to a specific thing or circumstance (Horwitz, 2013).

The findings of CFA provided sufficient evidence for the construct of fear of COVID-19, which support using the C-19FSP in assessing the COVID-19 phobia in Occupied Palestine. The current findings are consistent with works of some researchers (Arpaci, *et al.* 2020a; Arpaci, *et al.* 2020b; Chi, *et al.* 2020; Huarcaya-Victoria, *et al.* 2020; Schimmenti, *et al.* 2020) that fear of Coronavirus is a multidimensional construct rather than unidimensional as Ahorsu, *et al*. (2020) suggested. Because fear of COVID-19 affects all parts of people's lives; psychologically, socially, and economically currently and in the future. The results of this study showed that older participants aged more than 53 years old had less fear of the COVID-19 compared to younger participants. Many explanations can be provided, it may be that older participants are more experienced than younger participants in dealing with crisis situations. Perhaps older participants have developed Sumud ability more than younger participants have. Older participants lived through the two Intifadas where they experienced fear and anxiety due to curfews, movement restrictions, and lockdowns, therefore these conditions are familiar for most of them. It is possible that older people have reached the wisdom stage that they can regulate their emotions and think rationally in times of crisis. In Islamic societies, elderly people tend to be closer to Allah "God" and have lower expectations of life to prepare themselves for the death that will come at any time, which makes them not aware of the crises going on around them. In Arab societies such as Palestine, older people receive social support and care more than other else.

The findings revealed citizens from Gaza Strip have more fear of the COVID-19 compared to citizens from the West Bank and Jerusalem. In addition, the difference in fear between the citizens from the West Bank and Jerusalem was in favor to those from Jerusalem. The Gaza Strip is a very small area (360 km^2) and one of the most densely populated region in the world with 5,046 people per square kilometer (PCBS, 2020). Comparing to the West Bank and Jerusalem, people in Gaza strip are in deep poverty with a gradual decline in economic growth especially after

three Israeli wars against the Gaza Strip and increasing in political instability and uncertainty. The Gaza Strip has been under blockade or suffocating siege for more than 13 years due to Israeli policies and the government restrictions, where work opportunities have always been limited before and during COVID-19 pandemic crisis.

Critical socioeconomic and security situations in the Gaza Strip put the healthcare system seriously at real crisis, which limit the health system's ability to face the COVID-19 pandemic outbreaks. Consequently, people in the Gaza Strip are confronting COVID-19 from a reality of restricting Israeli policies, suffocating siege, deep poverty, political instability and uncertainty, critical socioeconomic conditions, and weak healthcare system, which affect citizens in the Gaza Strip severely to response to the COVID-19 resulting in more fear arousal among them. As for Jerusalem, Palestinians suffer from discrimination against them in health services, which restricts them to confront the Corona virus pandemic. For decades, the Israeli authorities have deliberately neglected the healthcare needs of Palestinians in Jerusalem and currently prevent the free movement of Palestinian medical staffs to confront the pandemic. Israel has tried to empty Jerusalem of Palestinians where ten thousand of them have been forced to move out of the holy city that in order to Judaize Jerusalem. Moreover, the Israeli authorities have deliberately weakened the Palestinian medical system and created financial problems for it. Therefore, these conditions make Palestinians in Jerusalem in a state of threat to their health security and political future. Consequently, the Israeli policies and deliberately neglect have force Palestinian in Jerusalem to be more worried about their health and future before and after the pandemic.

In this study, the results revealed that a cut-off of ≥ 52 on the C-19FSP produced good results regarding sensitivity and specificity (75% and 80% respectively). The AUC equals .91 ($p < .001$, 95% CI = .88-.93) positive and predictive values equal 75% for both. Thus, the C-19FSP proved to be a good measure to identify cases of Coronavirus phobia among Palestinian with moderate accuracy. To date -as far as the researcher knows- no measurement tool related to COVID-19 fear is available in the Palestinian context and the need for this kind of scales is urgent. In comparison to

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previous studies, Nikopoulou, *et al*. (2020) aimed to specify appropriate cutoff scores for FCV-19S regarding scores on anxiety and PTSD scales as state variables. The AUCs ranged between .80 and .88, where sensitivities and specificities ranged between .76 and .94 and between .59 and .70 respectively. Furthermore, in Schimmenti, *et al*. (2020) study, the sensitivity was about 76% and specificity was nearly 62% for their scale that was constructed to measure COVID-19 related fears. In light of the previous studies and the current research findings, the C-19FSP seems to be promising tool.

Despite the current study provided empirical support for the C-19FSP, the sample size is relatively small to generalize findings to a greater population because data collection was through online survey, which limits the number of respondents. It is possible that the respondents in this study have technical experiences, social media accounts, smart phones, internet connections, and interested filling out the online survey for the scientific purposes and those who did not participate in the current study might have had different conditions. Furthermore, most of the respondents in this study were females with percentage of 74% versus 26% of males. Whereas in the general population of Palestine; where (49%) are females and (51%) are males (PCBS, 2020). Accordingly, the sample study did not represent the general population. Therefore, the study recommends to replicate this research with larger and representative samples. Second, the study encourages revalidating the C-19FSP structure across different cultures.

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Declarations

Conflict of Interest: The author declares that they have no conflict of interest. No funding was received for this study.

Ethical Approval: All procedures performed in this study involving human participants were following the ethical standards of [edited out for

blind review] Research Ethics Board, the American Psychological Association (APA, 2010) and the 2013 Helsinki Declaration.

Informed Consent: Informed consent was obtained from all participants.

The datasets generated during and/or analyzed during the current study are available in the OSF repository (https://osf.io/x8yqn/quickfiles).

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