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To cite this article: Roy David Samuel, João Aragão e Pina, Yair Galily, Bruno Travassos, Guy Hochman, Pedro Figueiredo & Gershon Tenenbaum (2022): The effects of the 2020–2021 Coronavirus pandemic change-event on football refereeing: evidence from the Israeli and Portuguese leagues, *International Journal of Sport and Exercise Psychology*, DOI: [10.1080/1612197X.2021.2025139](https://doi.org/10.1080/1612197X.2021.2025139)

To link to this article: <https://doi.org/10.1080/1612197X.2021.2025139>



Published online: 13 Jan 2022.



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The effects of the 2020–2021 Coronavirus pandemic change-event on football refereeing: evidence from the Israeli and Portuguese leagues

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ABSTRACT

Upon the emergence of the 2020 Coronavirus pandemic (CP), football referees were forced to cope with the interruption of leagues and experience quarantines, with a potential threat to their physical and psychological well-being. This study examined referees' perceptions of the CP change-event, particularly the effects on refereeing engagement and performance, in part to facilitate more effective support. For this study, an online inventory was circulated during January–February 2021 to 198 referees and assistants from Israel and Portugal, asking them to reflect on the CP in the context of their careers, and the potential effects on their refereeing engagement and performance. The results indicated that the CP was perceived as a moderate change-event in terms of significance, severity, and coping, although many participants did consider it as significant. The participants indicated just a minor reduction in their refereeing quality between the 2019–2020 and the 2020–2021 seasons. The main areas affected were training on a grass field, decision-making training, and financial status. Still, refereeing instruction (conducted mainly online) improved. The behavioural effects were more forceful among the non-professional referees, suggesting that Referee Associations must pay closer attention to support these populations. The participants' motivation, refereeing identity, and self-efficacy were actually improved. Finally, the absence of the crowd in matches allowed the referees to be more aware of their actions and better communicate with players and coaches, which related to better performance. These findings further emphasize the social aspect of football refereeing and the importance of having upright management and communication skills.

ARTICLE HISTORY

Received 12 July 2021

Accepted 19 December 2021

KEYWORDS

Officials; COVID-19; soccer; communication skills; absence of a crowd

The 2020 Coronavirus pandemic (CP) presented a unique career change-event (Samuel & Tenenbaum, 2011a) to various sports performers with several challenges (Stambulova

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et al., 2020; Webb, 2021). Samuel, Tenenbaum, et al. (2020) suggested that this change-event is longitudinal, multifaceted, unpredicted, and uncontrolled, with four distinct stages: (a) a pre-Coronavirus stage with unique career contextual conditions (i.e., stable engagement or a transitional period), (b) Coronavirus stage-A accompanied by instability and confusion, emotional response, and cognitive appraisal, (c) Coronavirus stage-B characterised by active coping or regression, and (d) Coronavirus stage-C; instability endures or decreases, depending on career trajectory. Specifically, in the second and third stages, physiological adjustments along with modifications in self-identity, social relations, and motivation were required to adapt to the “new reality” of confinement and social restrictions. Changes were also evident in organisational-occupational, and micro- and macro-cultural dimensions requiring adjustments in the day-by-day and sport life (see Samuel, Tenenbaum, et al., 2020).

Football (i.e., association football or soccer) referees, among others, were potentially experiencing a “detraining syndrome,” as they were forced to gradually or abruptly (i.e., depending on their global location) change their typical training regimen due to lockdowns, quarantines, and sickness. The reduced activity could have resulted in reductions in aerobic capacity, speed, and sensorimotor coordination (Jukic et al., 2020). More specific to refereeing tactics and decision-making, due to the lack of competition and specific training, a potential reduction in the ability to move fluently on the field of play while making numerous sequential decisions was expected (Hossner et al., 2019). For example, Grazioli et al. (2020) found that in 23 professional football players, a 67-day quarantine period resulted in significant increases in body mass, body fat mass, 10- and 20-meters sprint times, and decreases in countermovement jump height in comparison with after off-season assessments. To examine whether a similar effect occurred in football referees, Preissler et al. (2021) collected physiological indices of 10 referees and 19 assistants from the professional staff A in the Soccer Federation of Rio Grande do Sul (FGF). They were monitored in the first match officiated following the off-season (i.e., 37 days without active refereeing) and in the first match after 128 days of quarantine due to COVID-19. All participants reported that they underwent individual training in the quarantine period to maintain physical fitness. The results showed that the total distance, average, and maximum heart rate did not change significantly between the pre- and post-quarantine time for both referees and assistants.

Despite the above, many referees were unable to exercise as usual, and with the uncertainty regarding the future, referees might also have felt restless, experiencing somatic anxiety and negative mood (Jukic et al., 2020), and akin to athletes (e.g., di Fronso et al., 2020; Pillay et al., 2020) potentially felt a high sense of frustration. These forced modifications could also influence referees’ self-efficacy beliefs. According to Guillén and Feltz (2011), referees’ efficacy is determined by mastery experiences, significant others, preparation, and partner qualifications. It could be argued that many of these aspects were somewhat influenced during the pandemic.

Elite referees were also confronted with issues such as governmental-imposed lockdowns and quarantine, time away from families and loved ones, a lack of ongoing contact with colleagues, cancellation and/or postponement of matches, international travel restrictions, and fiscal concerns (Chen & Horne, 2021; Webb, 2021). Within this context, many referees were not in a full-professional occupational status, and consequently, the new situation presented organisational and financial ramifications for

them (Webb, 2021). Indeed, referees experienced a major disruption of the 2019–2020 and the 2020–2021 seasons. Samuel, Tenenbaum, et al. (2020) propositioned that one potential psychological response of referees was to distance themselves from the refereeing role because of reduced motivation and inability to actualise their season's achievement goals (i.e., officiating in the influential matches of the playoffs). A study on 14 elite athletes who were unable to train or compete due to lockdowns found that the athletes' time away from sport encouraged them to reflect on their athletic identity and to make life changes that would protect their wellbeing during the rest of the lockdown period and upon returning to activity (Woodford & Bussey, 2021). Likewise, a study on 10 competitive elite athletes from various countries found that the participants indicated a loss of identity caused by the prevailing psychosocial conditions. They hinted at a sense of reduced accomplishment due to the COVID-19 reality and the corresponding loss of cognitive and social utilizations of the athletic identity (Gupta & McCarthy, 2021). However, to the best of our knowledge, there is no current data concerning football referees' psychological responses to the pandemic. Moreover, a previous study involving Israeli football referees showed that career change-events that affect the referee's professional status (e.g., receiving an international badge or a transition to a higher league) are perceived as highly significant (Samuel et al., 2017). Research indicated that referees' motivation and intentions to quit officiating are mostly influenced by organisational factors, including lack of support, inadequate training, and lack of performance feedback (Dell et al., 2016). Thus, a global event, such as the CP, with multi-dimensional impact, was expected to pose strong adverse effects on referees' careers. Also, upon returning to active officiating, referees were required to quickly adapt to a new terrain – matches played without a crowd, under physical distancing considerations. This new situation could have resulted in heightened stress, as experienced by athletes who returned to compete during or following lockdowns or quarantines (e.g., Ruffault et al., 2020).

Potential influence of CP on football refereeing

Considering the CP's effects on Brazilian football referees, Boschilia et al. (2021) described the South American Football Confederation (CONMEBOL) protocols concerning medical recommendations for training, travel, and competitions. These included COVID-19 testing of teams and referees along with various behavioural restrictions designed to minimise the risk of infection (e.g., prohibiting group celebrations after a goal). All personnel other than players and referees were asked to wear masks and modifications were made in the VAR operation room. In addition, the refereeing instruction was modified to include online sessions and the referees were given guidelines concerning exercise in confined locations. They also received educational sessions concerning psychological issues, such as anxiety and resilience. Despite these proactive measures, many referees were financially affected as they could not officiate matches during the stoppage of the various leagues. Similar measures, including home-based training guidelines and online education, were provided to referees by the Asian Football Confederation (AFC, Chen & Horne, 2021).

When league play resumed, a significant change in football refereeing was the absence of crowds in the stands. The impact of spectators on performance is complex. Specifically,

while spectators' presence facilitates simple (well-learned) tasks, it might impair the performance of complex tasks (not well-trained) (see Strauss, 2002). However, the findings concerning the crowd's influence on sports performance are mixed and inconclusive, suggesting that additional research must be conducted to determine the crowd's presence behavioural consequences (e.g., Böheim et al., 2019; Reade et al., 2020). As suggested by Strauss (2002), the type of task determines whether performers can be positively or negatively affected by crowd presence. Concerning the football refereeing performance task, it is comprised of numerous sequential decisions, with physical (e.g., running), tactical (e.g., game management), technical (law criteria), and mental (e.g., attention) underlying mechanisms (Aragão e Pina et al., 2018; Samuel et al., 2021). Thus, physically exertive tasks might be positively influenced by the presence of a crowd and debilitated because of the crowd's absence. On the other hand, making match infringement-related decisions, such as penalties, might be more complex and thus negatively influenced by the presence of a crowd. Eysenck and Wilson (2016) suggested that the presence of a crowd could increase a performer's fear of failure if expecting to get booed for making a mistake. This can be of high relevance for refereeing.

Under the condition of crowd absence, where social pressure was reduced, the referee's decision-making performance was expected to improve (Webb, 2021). Crowd density and noise were found to be significant factors that may influence referees' decision-making (e.g., Picazo-Tadeo et al., 2017), and consequently result in a decreased "home advantage effect" (Lovell et al., 2014). This contention received support in several European football domestic leagues and major competitions (e.g., McCarrick et al., 2021; Reade et al., 2020). For example, McCarrick et al. analysed 11 European leagues that finished the 2019/20 season without an audience. Their analysis indicated that before COVID-19, teams won on average 0.39 points per game more at home than away, but the home advantage was almost half (i.e., .22 points more) when matches were played without a crowd. Concerning refereeing decisions, while typically the home team received fewer yellow/red cards and fouls, in the post-COVID-19 period (without a crowd), there were virtually no differences in the yellow and red cards between home and away teams while a small difference was present in the number of fouls; the referees called more fouls against the home teams, while the number of fouls against the away teams remained similar. While team dominance was considered as a moderating factor, McCarrick et al. argued that these findings propose that referees' decision-making can be influenced by the absence of the home crowd.

In addition, the novel atmosphere in the stadiums (e.g., no crowd noise) potentially influenced game management and social interactions (i.e., verbal and non-verbal communication) among referees, players, and coaches. Communication was identified as a key component in refereeing (Aragão e Pina et al., 2018; Araújo e Pina et al., 2019). Webb (2021) proposed that players and coaches become aware of their potentially abusive language towards the match official and adapt their behaviour accordingly, resulting in a beneficial impact for the referee. It is also reasonable to assume that referees have adjusted their match preparation and game management approach (Cunningham et al., 2018; Mascarenhas et al., 2006) to assume control over the participants in the new social environment. Game management is manifested in referees' attempts to establish players' trust, convey positive body language, and communicate with players and managers (Slack et al., 2013). To successfully control the match, referees need to

manage the players and coaches, in terms of “selling” their decisions (Schnyder & Hossner, 2016) and reacting to player vocalizations (Lex et al., 2015). This may become more challenging when players’ verbal vocalizations and non-verbal gestures become more noticeable. It is also possible to expect that due to the relatively low noise condition in the stadium, offensive remarks from team owners and affiliates in the stands have become more audible. Also, due to the physical-social distancing required by COVID-19, some changes might occur in referees’ communication style, in terms of proximity and touching.

The studies’ findings reported herein indicate a complex effect of the closed-door situation on football refereeing. This can be potentially manifested in the effort invested by the referee, his or her decision-making, and game management strategies. Changes might also have occurred in the referees’ self-efficacy beliefs. Important efficacy dimensions such as decision-making skills, psychological and strategic skills, communication/control, physical fitness, and referee team communication might have been affected by the CP change-event (Aragão e Pina et al., 2021; Guillén & Feltz, 2011).

In addition, as suggested by Samuel, Tenenbaum, et al. (2020), in evaluating the impact of the CP on referees’ engagement, the sub-cultural context must be considered. Both in Israel and in Portugal, as in other countries, the 2019/2020 regular football season was interrupted. In Israel, all Israeli football leagues were suspended on March 13th, 2020. On April 13th, it was decided to end the season in the Premier League, the second division and the third division, with the teams that were in first place rising and the relegations being frozen; The youth leagues, including the youth football Premier League and the women’s leagues, also ended. Most of the training and physical preparation of the professional players and referees were held online during that period. However, at the beginning of June 2020, the two senior leagues resumed play without a crowd, with two matches played each week in the top playoffs to end the season as early as possible. The 2020/2021 season was started only for the first top-two divisions in September 2020; however, in January 2021 the leagues were again suspended due to the sizable spread of the virus. Then, in February 2021 all Israeli football leagues resumed play, initially without supporters in the stands. During this period, all players, staff, and referees were required to undergo regular pre-match virus testing as well as permanent use of masks. In Portugal, football matches were suspended in mid-March 2020. Only professional competitions in the first division (Primeira Liga) were resumed in early June 2020. As a result, they ended only on the last weekend of July. Subsequently, the 2020–2021 season, which usually begins in mid-August, started in mid-September. For the competitions’ restart, it was essential to implement a wide range of measures. From the outset, the public was absent in all stadiums. All players, staff, and referees were (and are) required to undergo regular pre-match COVID-19 testing. All sports facilities were under hygiene and cleaning control. Training and physical preparation of the professional referees was administered in small groups or online.

Therefore, the present study aimed at examining the perceptions of Israeli and Portuguese football referees of the CP change-event, particularly the effects on refereeing engagement and performance. Capturing the potential effects of the change-event on football referees is vital for the specific Israeli and Portuguese contexts (i.e., providing effective support) and for providing general conclusions concerning the role of this

change-event in referees' careers. To that end, the following research questions were examined:

- (1) How did the referees perceive the CP as a change-event in the context of their careers?
- (2) What were the behavioural aspects affected by the CP in referees' training and fitness levels, pre-match preparation, infection-prevention, social distancing, isolation and lockdown, and organisational closeness?
- (3) What were the psychological aspects affected by the CP (and the lack of crowd presence) in motivation for refereeing, refereeing identity, self-efficacy in refereeing, and stress?
- (4) What were the professional refereeing aspects affected by the CP (and the lack of crowd presence) in decision-making and game-management strategies?
- (5) Are there any level-based, position-based, or culturally based differences among referees in these domains?

Methods

Design

A cross-sectional and retrospective design was used in this study. Data were collected during January and February 2021. We sampled referees and assistants from different levels, reflecting diverse experiences concerning the CP as a career change-event. Because the change-event was manifested in each country somewhat differently (e.g., quarantine and lockdown protocols), we also sampled participants from two countries, Israel and Portugal. By making these sampling decisions, we aimed at creating a more comprehensive perspective of this change-event, which obviously and significantly changed the world of refereeing.

Participants

A power analysis was conducted (G* Power 3, Faul et al., 2009) to determine the number of participants required for the study. For the primary analyses (i.e., two-way MANOVAs), using $f^2_{(v)} = .35$, $\alpha = 0.05$, $1 - \beta = 0.80$, with four groups, two independent variables, and 34 dependent variables, the power analysis indicated that the total sample size recommended was 132. The sample included 198 referees and assistant referees from the Israel and Portugal football associations (M age = 31.85, $SD = 8.61$) with 12.82 years ($SD = 6.70$), on average, of refereeing experience. The Israeli sample included 55 referees and 50 assistant referees representing the fourth through the first divisions in the Israel Football Association (Ligat Ha'al, Liga Leumit, Liga Alef-Beit). The Portuguese sample included 23 referees and 70 assistant referees representing the two professional leagues in the Liga Portugal (Liga NOS, Liga Portugal SABSEG) and the amateur league in the Portuguese Football Federation (Campeonato de Portugal). In general, 29 participants (14.6%) held an international badge. Referees and assistants from the first two Israeli and Portuguese leagues were categorised as "professional" whereas the others as "non-professional."

Measures

For this study, a reflective online inventory (i.e., using Google Forms) was developed due to the lack of inventories to measure the study's variables. Some of the items were adopted from the Change-Event Inventory (CEI; Samuel & Tenenbaum, 2011b) and others were developed in line with the Referee Self-Efficacy Scale (REFS; Myers et al., 2012). The inventory was originally developed in English. Thus, a back-translation procedure was applied, in line with Weeks et al.'s (2007) recommendation, translating it to Hebrew and Portuguese. The research team was sensitive to culturally- and jargon-based terminology (Sidani et al., 2010).

The resulting inventory used consisted of three sections. The initial demographic section contained 13 items concerning the referees' professional background in refereeing and their experience with the CP. Specifically, they were asked about their age, position (i.e., referee or assistant), international badge status, years of refereeing experience, and league in which they officiated. Moreover, they were asked whether they had been infected by COVID-19 during the 2019–2020 or 2020–2021 seasons and if they were quarantined (and if this was as a result of refereeing). Then, they were asked whether their family or close-ones were considered "at risk population," whether they were negatively influenced financially or vocationally by the Coronavirus crisis, and how many matches they had officiated without crowd (due to COVID-19) during the 2019–2020 season Playoffs and the 2020–2021 season. In the second section (six items in total) the participants were asked to rate their refereeing quality prior to COVID-19, during the 2019–2020 Playoffs, and in the 2020–2021 season to date, using 5-point Likert-type scales (1 = *poor*, 3 = *moderate*, 5 = *excellent*). They were then asked about the perceived significance of the CP as a change-event in their refereeing careers, to what degree this was a positive or negative change-event, and how they coped with the CP as a referee so far. These three items were rated by using 5-point Likert-type scales, similar to the CEI (Samuel & Tenenbaum, 2011b). The third section used 7-point Likert-type scales (–3 = *very negative influence*, 0 = *neutral influence*, 3 = *very positive influence*), designed to measure the referees' perceptions concerning the CP's effects on their refereeing engagement. It focused on four main areas: (a) eight items concerning training routine and sportive lifestyle (e.g., "to what degree did the CP influence your regular aerobic training routine?"), (b) eight items pertaining to motivation for refereeing (e.g., "to what degree did the CP influence your self-identity as a referee – I am a football referee?"), (c) five items concerning aspects related to COVID-19 (e.g., "to what degree did the CP influence your apprehension to get infected in matches?"), and (d) 36 items describing refereeing in actual matches. Specifically, these items (i.e., in section d) evaluated decision-making, game management, stress management, and performance evaluation effects (e.g., "to what degree did the CP influence your ability to communicate effectively with players, verbally and body language?"). As advocated in other COVID-19 related research (e.g., Ruiz et al., 2021), the application of single-item measures with high face validity, used in this case, has received strong support (Tenenbaum et al., 2007), especially when aiming to reduce respondent burden and increase administration simplification. Still, each of the inventory sections indicated a high internal consistency index, with Cronbach's alpha ranging from .82 to .98.

Procedure

The study received a University Research Ethics Committee (IRB) approval by the Reichman University, Israel. Potential participants were recruited through the research team's contacts within the Israel Referee Association and the Portugal Football School. A short message describing the study's objectives and producers together with a link to the online inventory (including the consent form) was circulated using Email and WhatsApp applications. An online circulating measure was chosen because, at that period, face-to-face administration was highly complicated in both countries due to social distancing restrictions. Online administration in change-event studies is an accepted procedure (see Samuel, Basevitch, et al., 2020) and was recently used in various Coronavirus-related studies (e.g., Pillay et al., 2020; Ruiz et al., 2021). The online procedure allowed participants to access the inventory at their convenience, further enhancing reliable responses which reflected their genuine personal opinions. Completion of the online survey took approximately 10 min. All ethical guidelines concerning data collection, including participants' anonymity, data security, and voluntariness of participation were maintained. Participants were initially asked to declare their consent to participate in the study. They were able to withdraw from the study at any point or refuse to share their responses, with no negative repercussions.

Data analysis

Preliminary data analyses included data inspection, statistical assumption testing, internal consistency evaluations, descriptive statistics, and crosstabs analyses. The skewness values were relatively small and did not indicate major normality distribution violations, whereas the kurtosis values for a few variables were larger than 3. Based on the Kolmogorov–Smirnov and Shapiro–Wilks tests, the study variables did not indicate a normal distribution. We then transformed the third section of the inventory from a $-3-3$ scale to a $1-7$ scale for statistical convenience. Standard statistical analyses were subsequently used, including correlations, non-parametric tests, multiple linear regressions, and two-way multivariate analyses of variance (MANOVA). We detected and removed outliers, using the Mahalanobis distance with $p < .05$ (Tabachnick & Fidell, 2019). When MANOVA was applied, the Bonferroni correction was used to account for the multiple univariate analyses. Pillai's Trace was used in the case that the assumptions of homoscedasticity or homogeneity of variance-covariance matrices were violated. Cohen's d coefficients were used to estimate standardised differences between pairs of means with values of 0.2, 0.5, and 0.8 interpreted as small, moderate, or large effects, respectively (Ellis, 2010).

Results

Demographic data

Demographic information and refereeing-related characteristics of the two samples are presented in Table 1. Ninety-six referees and assistants reported being active during the 2019–2020 season Playoffs, while the others resumed their refereeing activity during the 2020–2021 season. Few referees and assistants in the non-professional

Table 1. Referee characteristics and COVID-19 related demographics.

	Israeli Sample (<i>n</i> = 105)				Portuguese Sample (<i>n</i> = 93)				Total (<i>n</i> = 198) All (<i>M, SD</i>)
	Professional		Nonprofessional		Professional		Nonprofessional		
	Referees (<i>M, SD</i>)	Assistants (<i>M, SD</i>)	Referees (<i>M, SD</i>)	Assistants (<i>M, SD</i>)	Referees (<i>M, SD</i>)	Assistants (<i>M, SD</i>)	Referees (<i>M, SD</i>)	Assistants (<i>M, SD</i>)	
N	25	24	30	26	6	40	17	30	198
Age	32.68 (6.59)	34.63 (6.26)	22.23 (2.62)	25.65 (4.95)	40.17 (4.53)	39.80 (10.17)	29.76 (2.99)	32.82 (4.36)	31.85 (8.61)
Years of Experience	16.24 (6.24)	15.96 (6.15)	5.58 (2.23)	6.33 (3.95)	22.50 (3.51)	16.50 (4.95)	11.59 (3.14)	14.20 (5.63)	12.82 (6.70)
Matches officiated in 2019–2020 Playoffs	5.50 (2.06)	5.10 (2.88)	0.93 (2.23)	2.54 (4.64)	5.67 (1.21)	5.80 (4.66)	1.77 (3.29)	0.90 (2.64)	3.39 (3.96)
Matches officiated in 2020–2021 so far	8.00 (3.55)	10.70 (5.55)	7.30 (5.78)	11.36 (9.20)	11.17 (6.56)	14.73 (3.88)	11.12 (4.08)	10.33 (5.62)	10.74 (6.06)
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Infected by COVID-19	3 (12.0%)	2 (8.3%)	1 (3.3%)	2 (7.7%)	2 (33.3%)	16 (40.0%)	2 (11.8%)	7 (23.3%)	35 (17.7%)
Quarantined due to COVID-19	9 (36.0%)	13 (54.2%)	16 (53.3%)	16 (61.5%)	3 (50.0%)	21 (52.5%)	7 (41.2%)	13 (43.3%)	98 (49.5%)
Quarantined as a result of officiating	5 (20.0%)	3 (12.5%)	0	3 (11.5%)	3 (50.0%)	17 (42.5%)	4 (23.5%)	3 (10.0%)	38 (19.2%)
Close ones at risk of COVID-19	17 (68.0%)	14 (58.3%)	17 (56.7%)	13 (50.0%)	4 (66.7%)	25 (62.5%)	11 (64.7%)	13 (43.3%)	114 (57.6%)
Financially or vocationally affected by COVID-19	11 (44.0%)	16 (66.7%)	14 (46.7%)	17 (65.4%)	3 (50.0%)	24 (60.0%)	10 (58.8%)	19 (63.3%)	114 (57.6%)

category officiated matches during the 2019–2020 season Playoffs, in both countries. Also, while 17.7% of the sample got infected by the COVID-19 virus, higher percentages were directly influenced by it, either through quarantine (49.5%), effects on close ones (57.6%), or financial/vocational repercussions (57.6%). The data further indicated that overall, professional referees and assistants got infected by COVID-19 more frequently than non-professional participants.

Descriptive data

The descriptive data are presented in Table 2. Overall, participants perceived the CP as a moderately significant ($M = 3.32$, $SD = 1.19$, range = 4) and moderately severe ($M = 3.19$, $SD = 1.09$, range = 4) change-event in their careers and felt that they had coped with it moderately effective ($M = 3.09$, $SD = 1.19$, range = 4). Looking more closely it was evident that many of the participants (39%) perceived the CP as a significant or a very significant event in the context of their careers, and that the coping response equally indicated negative, moderate, and positive effects. Moreover, they perceived their refereeing quality over the 2019–2020 season (excluding the playoffs) and the 2020–2021 season as moderate-to-good ($M = 3.88$, $SD = 0.75$ vs. $M = 3.70$, $SD = 0.79$, respectively). This small decrease was significant, $t(197) = 2.64$, $p < .01$, Cohen's $d = 0.18$. Non-significant difference was noted in perceived refereeing quality between the 2019–2020 regular season and the Playoffs for the professional participants ($M = 3.80$, $SD = 0.72$ vs. $M = 3.80$, $SD = 0.68$, respectively).

Nation and professional status effects on the perception of the CP

To determine any nation- or professional status-related differences in participants' perception of the CP as a change-event, a two-way multivariate analysis of variance (MANOVA) was conducted. The effects of nation [Israeli ($n = 104$) and Portuguese ($n = 93$)], professional status [professional ($n = 94$) and non-professional ($n = 103$)], and their interaction on the perceptions of the CP as a change-event (i.e., significance, severity, coping) were tested. A significant main effect was evident for the nation, *Pillais' Trace* = .47, $F(3, 191) = 55.35$, $p < .001$, $\eta^2 = 0.47$. Univariate ANOVAs were then conducted for each of the dependent variables. The Portuguese participants perceived their coping efforts as less effective than their Israeli colleagues (Cohen's $d = 1.69$). Likewise, a significant main effect was obtained for professional status, *Pillais' Trace* = .08, $F(3, 191) = 5.25$, $p < .01$, $\eta^2 = 0.08$. Univariate ANOVAs were then conducted for each of the dependent variables. The non-professional referees perceived the CP as a more significant and more positive change-event compared with professional referees (Cohen's $d = 0.51$ and Cohen's $d = 0.26$, respectively). Still, professional referees perceived their coping more effectively with this change-event than the non-professional ones (Cohen's $d = 0.28$). The interaction on the dependent variables was also significant, *Pillais' Trace* = .04, $F(3, 191) = 2.84$, $p < .05$, $\eta^2 = 0.04$. Univariate ANOVAs detected a significant interaction effect for the perceived severity variable. The professional status effect was different for Israeli and Portuguese referees; the Portuguese professional referees perceived this change-event more negatively than their non-professional colleagues (Cohen's $d = 0.68$). These data (for the whole sample) are presented in Table 2.

Table 2. Descriptive data of the Coronavirus pandemic as a change-event and influence on referees' performance, routines, and careers.

	Referees (<i>M, SD</i>)	Assistants (<i>M, SD</i>)	Israeli (<i>M, SD</i>)	Portuguese (<i>M, SD</i>)	Professional (<i>M, SD</i>)	Non- professional (<i>M, SD</i>)	Total (<i>M, SD</i>)
The significance of the CP as a career change-event ^b	3.37 (1.20)	3.28 (1.19)	3.32 (1.23)	3.31 (1.15)	3.03 (1.03)	3.58 (1.27)	3.32 (1.19)
The severity of the CP as a career change-event ^c	3.05 (1.14)	3.28 (1.05)	3.08 (1.03)	3.31 (1.15)	3.06 (0.92)	3.31 (1.22)	3.19 (1.09)
Coping with the CP ^c	3.39 (1.06)	2.89 (1.23)	3.81 (0.87)	2.67 (0.95)	3.26 (1.12)	2.92 (1.23)	3.09 (1.19)
Refereeing quality prior to CP, during the 2019–2020 season ^a	3.85 (0.79)	3.91 (0.72)	4.01 (0.78)	3.74 (0.69)	3.80 (0.72)	3.96 (0.77)	3.88 (0.75)
Refereeing quality during the 2019–2020 season playoff ^a	3.64 (0.72)	3.74 (0.72)	3.82 (0.79)	3.57 (0.61)	3.80 (0.68)		3.70 (0.72)
Refereeing quality in the 2020–2021 season ^a	3.60 (0.71)	3.76 (0.83)	3.91 (0.74)	3.45 (0.77)	3.79 (0.56)	3.62 (0.94)	3.70 (0.79)
Aerobic training routine ^d	4.17 (1.69)	3.27 (1.69)	4.20 (1.82)	2.97 (1.39)	3.82 (1.66)	3.44 (1.80)	3.62 (1.74)
Strength training routine ^d	3.76 (2.04)	3.26 (1.86)	3.84 (2.11)	3.02 (1.64)	3.46 (1.88)	3.45 (2.01)	3.46 (1.95)
Running training on a grass field ^d	3.39 (1.82)	2.97 (1.25)	3.86 (1.85)	2.31 (1.30)	3.36 (1.70)	2.92 (1.85)	3.13 (1.77)
Nutrition routine ^d	4.08 (1.59)	3.71 (1.40)	3.95 (1.71)	3.74 (1.88)	4.01 (1.30)	3.71 (1.64)	3.85 (1.49)
Sleep routine ^d	4.15 (1.36)	4.13 (1.36)	4.19 (1.42)	3.85 (1.15)	4.10 (1.25)	3.97 (1.37)	4.03 (1.31)
Decision-making and tactics training ^d	3.03 (1.63)	3.63 (1.62)	3.66 (1.47)	1.80 (1.18)	2.90 (1.61)	2.68 (1.65)	2.78 (1.63)
Instruction of refereeing ^d	4.92 (1.65)	4.82 (1.80)	4.65 (1.88)	5.10 (1.55)	4.97 (1.72)	4.76 (1.76)	4.86 (1.74)
Readiness for matches ^d	4.19 (1.42)	4.67 (1.53)	4.23 (1.51)	3.99 (1.46)	4.42 (1.35)	3.84 (1.56)	4.12 (1.48)
Refereeing career promotion ^d	4.06 (1.66)	3.78 (1.63)	4.17 (1.72)	3.57 (1.51)	4.41 (1.34)	3.41 (1.76)	3.89 (1.65)
Financial status	2.95 (1.31)	2.87 (1.37)	3.19 (1.39)	2.57 (1.20)	3.39 (1.14)	2.45 (1.36)	2.90 (1.34)
Closeness and connection with the Referee Association ^d	3.62 (1.35)	3.34 (1.61)	3.85 (1.42)	3.00 (1.50)	3.47 (1.54)	3.43 (1.50)	3.45 (1.52)
Social connection to other referees and the refereeing world ^d	3.69 (1.35)	3.35 (1.55)	3.94 (1.60)	2.97 (1.28)	3.54 (1.34)	3.44 (1.60)	3.50 (1.50)
Apprehension to get infected in matches ^d	3.77 (1.55)	3.22 (1.44)	3.73 (1.73)	3.11 (1.11)	3.50 (1.30)	3.37 (1.67)	3.49 (1.48)
Apprehension to get close to players ^d	3.50 (1.58)	3.03 (1.56)	3.64 (1.70)	2.74 (1.28)	3.21 (1.42)	3.22 (1.71)	3.22 (1.58)
Apprehension to stay near a "positive" person and get quarantined ^d	3.50 (2.11)	2.90 (1.59)	3.74 (2.08)	2.46 (1.51)	3.13 (1.84)	3.15 (2.04)	3.14 (1.94)
Apprehension to get infected and infect others ^d	3.76 (1.94)	3.36 (1.64)	3.70 (2.14)	3.31 (1.19)	3.62 (1.58)	3.42 (1.93)	3.52 (1.77)
Refereeing motivation ^d	4.95 (1.59)	4.26 (1.60)	5.00 (1.64)	4.00 (1.45)	4.74 (1.42)	4.33 (1.78)	4.53 (1.63)
Refereeing identity ^d	4.97 (1.50)	4.42 (1.43)	5.06 (1.50)	4.16 (1.31)	4.79 (1.30)	4.50 (1.63)	4.63 (1.48)
Refereeing self-efficacy ^d	4.59 (1.53)	4.24 (1.36)	4.75 (1.49)	3.96 (1.26)	4.54 (1.34)	4.23 (1.52)	4.38 (1.44)
Stress related to active refereeing ^d	3.54 (0.94)	3.50 (1.04)	3.67 (1.00)	3.34 (0.97)	3.76 (0.74)	3.29 (1.14)	3.52 (1.00)
Stress about refereeing from my workplace ^d	3.59 (1.17)	3.73 (1.19)	3.52 (1.29)	3.85 (1.02)	3.97 (0.90)	3.41 (1.33)	3.68 (1.18)

^aThe scale is 1 (very poor) to 5 (excellent). ^b The scale is 1 (not at all) to 5 (very much). ^c The scale is 1 (very negatively) to 5 (very positively).

^dThe scale is 1 (influenced very negatively) to 7 (influenced very positively).

Behavioural effects

CP's effects on behavioural variables: Descriptive data

Referring to the descriptive data in Table 2, most of the potential modifications in the participants' training routine and sportive lifestyle due to the CP change-event were perceived as neutral-to-negative. The situation somewhat negatively influenced their running training on a grass field ($M = 3.13$, $SD = 1.77$). Moreover, while the participants felt that their training of decision-making and tactical skills ($M = 2.78$, $SD = 1.63$) were negatively influenced, they indicated a rather positive effect in the general refereeing instruction ($M = 4.86$, $SD = 1.74$). In addition, the participants indicated a negative influence of the CP change-event on their financial status ($M = 2.90$, $SD = 1.34$). Interestingly, in terms of their refereeing career promotion, their relationships with the refereeing world, and their apprehension about COVID-19, the participants indicated neutral perceptions. Moreover, the participants indicated a somewhat negative influence concerning their apprehension to stay near a person "positive" for COVID-19 and get quarantined ($M = 3.14$, $SD = 1.94$).

Nation and professional status effects on physical and behavioural variables

A two-way multivariate analysis of variance (MANOVA) was conducted to test the nation [Israeli ($n = 97$) and Portuguese ($n = 92$)], professional status [professional ($n = 92$) and non-professional ($n = 97$)], and their interaction on behavioural variables. The interaction on the dependent variables was non-significant ($p = 0.11$). However, a significant main effect was found for nation, *Pillais' Trace* = .54, $F(16, 170) = 12.34$, $p < .001$, $\eta^2 = 0.54$. Univariate ANOVAs were then conducted for each of the dependent variables. The Portuguese participants indicated a more negative perception of the CP change-event than their Israeli colleagues regarding the influence on aerobic (*Cohen's d* = 0.72), strength (*Cohen's d* = 0.41), and running training routines (*Cohen's d* = 0.95), as well as for the decision-making and tactics training (*Cohen's d* = 1.56) (all effects $p < .001$). Similarly, the Portuguese referees and assistants indicated more negative perceptions than the Israeli ones for the influence on financial status ($p < .01$, *Cohen's d* = 0.46), career promotion ($p < .05$, *Cohen's d* = 0.35), closeness to the refereeing world ($p < .001$, *Cohen's d* = 0.62), and apprehension about COVID-19 ($p < .001$, *Cohen's d* = 0.54). Likewise, a statistically significant MANOVA main-effect was found for the "professional status" factor, *Pillais' Trace* = .25, $F(16, 170) = 3.56$, $p < .001$, $\eta^2 = 0.25$. Univariate ANOVAs were then conducted for each of the dependent variables. Significant effects revealed that non-professional participants indicated more negative influence than their professional colleagues in running training routine ($p < .05$, *Cohen's d* = 0.29), physical and professional readiness for matches ($p < .001$, *Cohen's d* = 0.47), financial status ($p < .001$, *Cohen's d* = 0.84), and career promotion ($p < .001$, *Cohen's d* = 0.74). These data are presented in Table 2.

Psychological effects

CP's effects on psychological variables: Descriptive and correlational data

Noted in Table 2, the participants indicated small positive influences of the CP change-event on their refereeing motivation ($M = 4.53$, $SD = 1.63$), refereeing identity ($M = 4.63$,

$SD = 1.48$), and refereeing self-efficacy ($M = 4.38$, $SD = 1.44$). Their perceptions of stress concerning active refereeing during this period ($M = 3.52$, $SD = 1.00$) and stress related to their workplace ($M = 3.68$, $SD = 1.18$) were rather neutral-to-negative. The referees' stress concerning active refereeing during this period moderately correlated with their motivation $r(198) = .38$, $p < .001$ as well as with their refereeing identity $r(198) = .37$, $p < .001$. Moreover, there were positive moderate correlations between the influence of the CP on the participants' refereeing identity and the influence on their closeness to the Referee Association as well as their social connection to other referees, $r(198) = .33$, $p < .01$ and $r(198) = .40$, $p < .01$, respectively.

Nation and professional status effects on psychological variables

A two-way multivariate analysis of variance (MANOVA) was performed to test the nation, professional status, and their interaction with the behavioural variables. The nation by professional-status interaction effect on the dependent variables was non-significant, $p = 0.31$. A significant effect was found for nation, *Pillais' Trace* = .16, $F(5, 186) = 7.01$, $p < .01$, $\eta^2 = 0.10$. Univariate ANOVAs conducted for each of the psychological variables revealed that Israeli referees and assistants indicated a more positive influence of the CP change-event than did Portuguese participants (all effects $p < .01$) for the referees' motivation for refereeing (*Cohen's d* = 0.66), refereeing identity (*Cohen's d* = 0.63), refereeing self-efficacy (*Cohen's d* = 0.58), and stress related to active refereeing (*Cohen's d* = 0.43). Moreover, a statistically significant main-effect emerged for the professional status factor, *Pillais' Trace* = .10, $F(5, 186) = 4.34$, $p < .01$, $\eta^2 = 0.10$. Univariate ANOVAs for each of the psychological variables resulted in a significant effect for stress related to active refereeing ($p < .001$, *Cohen's d* = 0.50) and stress about refereeing from their workplace ($p < .01$, *Cohen's d* = 0.50). Specifically, non-professional referees expressed a stronger negative influence of the CP event than their professional colleagues in stress-related components. These data are presented in [Table 2](#).

Professional effects

CP's effects on professional variables: Descriptive and explanatory data

In almost all aspects of their actual refereeing (i.e., tactical knowledge, technical skills, decision-making, and game management) the referees reported neutral influences of the CP change-event and the absence of crowds. They noted, however, a minor positive influence on: "being conscious of myself and my actions throughout the match" ($M = 4.47$, $SD = 1.28$), and "communicating effectively with players" ($M = 4.39$, $SD = 1.29$) and "with coaches" ($M = 4.41$, $SD = 1.24$). "Being conscious of myself and my actions" was positively and strongly correlated with the referees' communication with the players and coaches, $r(198) = .83$, $p < .01$ and $r(198) = .78$, $p < .01$, respectively. The referees also reported a minor positive influence on their general performance ($M = 4.31$, $SD = 1.32$). Interestingly, more than twice as many referees reported a positive than a negative effect.

A multiple linear regression using a step-wise procedure was performed to account for the general refereeing performance variance by the referees' perceptions concerning the influence of the CP change-event. The predictors were: (a) being conscious of myself and my actions throughout the match, (b) communicating effectively with players, and (c) communicating effectively with coaches. The analysis revealed two explanatory variables

that accounted for a significant proportion of the variance of the general refereeing performance, $F(2, 191) = 270.34$, $p < .001$, $R^2 = .74$. The two variables which accounted most were: "Being conscious of myself and my actions throughout the match" ($\beta = .51$), followed by "communicating effectively with players" ($\beta = .39$).

Nation and role effects on professional variables

To compare Israeli ($n = 86$) and Portuguese ($n = 82$) participants as well as referees ($n = 61$) and assistants ($n = 107$) in the professional variables, a two-way multivariate analysis of variance (MANOVA) was conducted. The nation by role interaction effect was non-significant, $p = 0.46$. Likewise, the main effect for the role was non-significant, $p = 0.24$. Still, a significant effect was found for nation, *Pillais' Trace* = .38, $F(34, 131) = 2.38$, $p < .001$, $\eta^2 = 0.38$. Univariate ANOVAs were then conducted for each of the dependent variables. The Israeli participants indicated a more positive perceived influence of the CP change-event on their refereeing performance than the Portuguese colleagues in various areas of the refereeing task, including refereeing technique, game management, mental skills, decision-making, and general performance (all effects $p < .05$). These significant mean differences can be seen in [Figure 1](#).

Discussion

The COVID-19 pandemic presented (and continues to present) the world of sports with a unique global and longitudinal change-event (Samuel, Tenenbaum, et al., 2020). Recent conceptual papers and empirical studies focused on how athletes emotionally responded and adapted to the new situation (e.g., di Fronso et al., 2020; Pillay et al., 2020; Stambulova et al., 2020). However, research concerning sport referees and the Coronavirus is scarce (e.g., Chen & Horne, 2021; Webb, 2021) and most empirical studies focused on the implications of the lack of crowd on referees' decisions (e.g., Leitner & Richlan, 2021). It is unclear, therefore, how the changes associated with this era were perceived by referees as well as affected referees' careers, their daily routines, and actual refereeing performance. Therefore, in this study, we intended to examine how football referees perceived this new situation in the context of their careers and how it influenced their refereeing engagement and performance. As this situation might manifest differently, depending on the country and sport context (e.g., Taku & Arai, 2020), we sampled referees from different nations, professional status, and roles. In doing so, we acknowledge that the participants' responses might have been influenced by their specific individual status (e.g., infected by COVID-19, "at risk population," in quarantine or lockdown, financial status). Still, it is imperative to evaluate referees' perceptions of the situation during such a complex experience in their careers.

The demographic findings of the present study indicated that referees were impacted by the pandemic in several ways. First, many could not officiate matches during the 2019–2020 Playoffs due to lockdowns and quarantines, (i.e., especially in the non-professional leagues). Also, many participants underwent isolation and quarantine periods and suffered from the negative financial-vocational ramifications of the pandemic. Moreover, many participants experienced the risk that close ones would get infected which potentially created uncertainty and anxiety when officiating the matches. The professional referees got infected more frequently, perhaps as they returned to active officiating

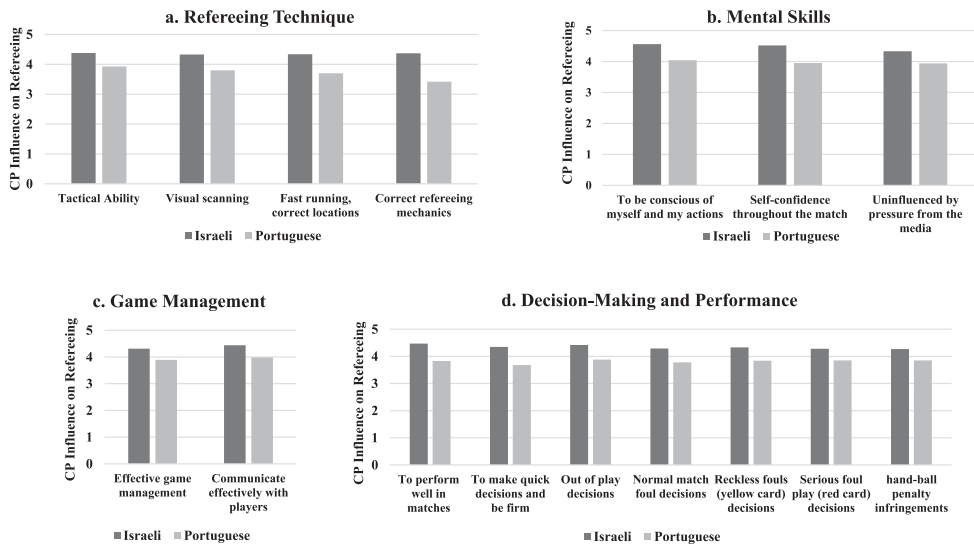


Figure 1. Mean ratings of perceived refereeing techniques, mental skills, game management, decision-making, and performance by Israeli and Portuguese referees during the COVID-19 pandemic. * All mean differences are significant ($p < .05$).

earlier when infection rates were high, and a vaccine was still unavailable. As data in this study were collected during January and February 2021, the referees in Israel and Portugal were not fully vaccinated, and thus the risk of infection was eminent. Since then, the populations in both countries were given the opportunity to be vaccinated. Yet, with the rising of the Omicron variant, it seems that the question of vaccination (and receiving additional vaccine boosters) remains a challenge. In this context, the NBA basketball referees were forced to get fully vaccinated in order to be approved for active refereeing (Deb, 2021). Such demand may potentially pose organisational stress to referees.

On average, the referees in this study perceived this change-event as moderately significant and severe in the context of their careers. Still, there was variance among the participants in their perception of this change-event, with many of them perceiving this change-event as significant. Previous studies have indicated that change-events that influence refereeing careers, such as the transition to the Premier League and receiving an international badge, are typically perceived as highly significant (Samuel et al., 2017). Studies on athletes' adaptation to the COVID-19 pandemic indicated it was a significant change-event that affected their basic needs, threatened their athletic development, elicited feelings of loss and incongruence, and required them to adapt their routines and re-evaluate their motivation and athletic identities (Gupta & McCarthy, 2021; Woodford & Bussey, 2021). It is possible, therefore, that the measurement timing influenced the participants' perception of this change-event. We collected the data in January-February 2021. We can assume that during this period the participants had already begun their adaptation to the situation as they had returned to active refereeing. As suggested by Samuel, Tenenbaum, et al. (2020), the CP presented a four-stage longitudinal change-event beginning from the initial pre-Coronavirus stage to Coronavirus stage-C in which instability endures or decreases, depending on career trajectory.

Therefore, it is also probable that there was a mixture of feelings and responses concerning this change-event. Examining the subjective responses of 21 Austrian athletes concerning the Tokyo 2020 Olympic Games postponement also revealed a complex response, with main themes of confusion, disappointment, and relief (Oblinger-Peters & Krenn, 2020). Likewise, in Woodford & Bussey's (2021) study, the elite athletes used the first lockdown period to reflect on their athletic career, considering its place in their lives. Some engaged in a cost–benefit evaluation of their participation with regards to the impact it had on their wellbeing. Therefore, we must consider the option that some of the referees in this study perceived the forced break from officiating not as a devastating situation and used this time to “recharge their batteries” and reflect on their motivation for officiating and career trajectory.

It was also evident that referees indicated a mixed coping response to this change-event, that might have moderated their perception of the situation. Moreover, relying on self-reports, they were able to maintain just a minor reduction of their refereeing quality between the 2019–2020 and the 2020–2021 seasons; thus, suggesting that positive professional adaptation had potentially occurred, at least from their perspective. In Gupta and McCarthy's (2021) study, elite athletes from different origins and sports engaged in a positive reframing and challenge appraisal, which signaled the start of their facilitative resilience response upon CP emergence. The athletes' resilience responses progressed along stages but often oscillated back and forth based on time and situational factors in their psychosocial reality.

The participants in this study did not identify major modifications in their training routine and sportive lifestyle due to the CP, much like the Brazilian referees in Preissler et al's (2021) study. Still, their ability to train on a grass field and to activate their decision-making skills was somewhat impaired. In both Israel and Portugal there were several nationwide lockdowns (up to February 2021) and the regular operation of the football leagues, as well as referee training, were disrupted. Referees in Israel and Portugal alike, especially in the March–April 2020 lockdown, were confined to their homes and could not train on a grass field. Nevertheless, the participants recognised an improvement in the quality of refereeing instruction with the transition to smaller groups and online-based education. This is an interesting finding, suggesting that the Referee Associations in both countries were successful in being innovative and providing the referees with adequate educational solutions. In addition, the interruption of the leagues caused the referees to lose some of their income. The majority of participants were financially damaged by this situation, either in their workplace or in their refereeing engagement. These findings echo the experiences of South American and Brazilian referees (Boschilia et al., 2021).

Samuel, Tenenbaum, et al. (2020) suggested that to psychologically protect themselves from the longitudinal stressful situation and the uncertainty concerning the future of the football leagues, referees might have begun to distance themselves from the sports performer's role. In Oblinger-Peters and Krenn's (2020) study of Austrian Olympic athletes, distancing from the sport emerged as a leading coping response. Similarly, the athletes in Gupta and McCarthy's (2021) study indicated a loss of identity caused by the prevailing psychosocial conditions. While the present study's data indicated that the referees' closeness and connection with the Referee Association as well as their social connection to other referees and the refereeing world were somewhat decreased, their motivation, refereeing identity, and self-efficacy were not. In a longitudinal study on athletes'

coping with a severe injury, Samuel et al. (2015) found that maintaining high motivation and athletic identity served as a psychological buffer against the potentially debilitating effects of the injury. Therefore, it seems that the referees in this study were able to maintain their positive psychological relationship to refereeing, despite experiencing some negative psych-social influence of the situation. In this context, those participants who experienced a positive influence of the CP on their refereeing identity also maintained stronger connections with the Referee Association and their fellow referees.

Looking at the context aspect, the Portuguese participants, as well as the non-professional ones, perceived their coping as less effective and reported more significant behavioural modifications compared with the Israeli and professional participants. di Fronso et al. (2020) found that elite/expert athletes reported lower perceived stress and higher functional psychobiosocial state scores than novice performers as a result of the emergence of the CP (following the Italian first lockdown), potentially reflecting their more attuned coping resources. The Italian athletes mostly reported being in contact via the web with their coaches or other professionals, emphasizing the importance of “staying connected.” Likewise, Clemente-Suárez et al. (2020) found no significant impact of the Spanish quarantine on the anxiety responses of Olympic athletes. This could be attributed to the coping skills and experience of these high-performance athletes in coping with anxiety. This might indicate that the CP was not necessarily associated with high perceived stress for all sports performers and that the context in which they were engaged had an impact on their responses. In this study, we found that the Israeli and professional participants experienced more positive effects than the Portuguese and non-professional referees, respectively. These effects might be attributed to the higher volume of psychological support provided to the professional referees, in both Israel and Portugal. The professional referees in both countries received extensive direct support to moderate potentially negative behavioural changes. Likewise, because Israel is a smaller country, and referees in the first two leagues typically receive weekly training in the national football centre, they were able to maintain a better physical status during the pandemic. This, perhaps, also facilitated their social and emotional connection to the refereeing domain. These differences might explain why the referees in Portugal, as well as the non-professional referees, felt that they had coped less effectively with this change-event than Israeli and professional referees, respectively. It is possible that this support allowed the professional referees to maintain a more positive approach towards their refereeing engagement. As the proportion of professional referees was higher in the Israeli sample, this might also explain the Nation-related effect.

Considering the CP's effects, and particularly the absence of a crowd, on actual refereeing performance, we found only minor influence. The referees in this study did not report significant changes to their refereeing technique, including their running and locations. These findings were in line with those of Preissler et al. (2021) who had attributed the lack of reduced physiological performance in their study to the Brazilian referees' individual training routines during the lockdown period. Also, although research indicated a potential reduction in players' performance following lockdowns (Grazioli et al., 2020), the fact that more player substitutions were allowed per match (i.e., five substitutions instead of three, IFAB, 2021) somewhat moderated this effect and maintained the match physically demanding for referees.

In addition, participants felt that the absence of a crowd had a positive influence on their performance. Research concerning the influence of crowds on sports performance has indicated a complex effect (Strauss, 2002). While exerting effort in achieving optimal field locations might be debilitated by the absence of the crowd, decision-making performance may improve (Webb, 2021). Evidence indicated that in several European football domestic leagues and major competitions the home advantage was significantly reduced (e.g., Leitner & Richlan, 2021; McCarrick et al., 2021). Moreover, Webb (2021) suggested that the absence of the crowd and relative silence in the stadium would influence social interactions among referees, players, and coaches. The results of the present study indicated that the main effects on refereeing performance in the Israeli and Portuguese leagues, at least from the referees' perspective, were reflected in their awareness of their actions and their communication with players and coaches. The first two factors were also predictive of the improvement in referees' performance. Therefore, the referees, in general, did not identify major changes to their decision-making performance but did recognise that the absence of the crowd allowed them to be more aware of their actions and to establish effective communication. In this context, it was suggested that becoming conscious of oneself and actions might lead to reduced performance (Hill et al., 2010). However, it seems that for the referees, being more conscious of their actions was mainly related to better communication with the players and coaches, perhaps as the media could pick on any indiscretion. Philippe et al. (2009) found that harmonious passion for refereeing was associated with flow experiences in matches and that obsessive passion for refereeing was associated with the experience of negative emotions in matches. Thus, it is possible that the lack of social pressure in matches allowed the referees to maintain their harmonious passion and be less focused on worry of making errors, thereby facilitating more flow-related feelings.

Cunningham et al. (2018) advocated that referees communicate under time pressure in dynamic circumstances that demand spontaneous responses with players by adapting and modifying identity and messages (i.e., maintaining various social "faces") appropriately for different players and contexts. Thus, the absence of the crowd has forced referees and players to adapt their mutual communication to preserve match integrity and their social "face." Also, the Israeli referees reported more positive effects on their performance than their Portuguese colleagues. This finding might be related to the more profound behavioural and psychological effects reported by the Portuguese referees, indicating that the CP might have created different challenges for referees in each country (Samuel, Tenenbaum, et al., 2020).

This study had several limitations. First, while the sample was large, it was not fully balanced for both the Israeli and the Portuguese leagues and roles. The majority of participants in the Portuguese professional status were assistants, which might have affected some of the comparative multivariate analyses. Also, the inventory was administered in January-February 2021, and thus not closer to the outbreak of the CP, which could have influenced participants' perceptions of this situation. Depending on the specific date on which participants completed the inventory, the participants experienced a unique state (e.g., medical, financial), that could have influenced their responses. Moreover, the performance evaluation consisted of the referees' self-assessments; match observer's marks could have provided a more objective measure of performance. Finally, while an online-based survey was the most practical and appropriate measure

for the present study, considering the current mobility restrictions, it is possible that face-to-face administration could have been more accurate. Still, the inventory indicated adequate internal reliability indices.

Conclusions and practical implications

This was the first study, to our knowledge, that examined perceptions of football referees concerning the CP's effects on refereeing engagement and performance. A strength of this study is the collection of data in two countries and in different professional levels, that allowed identifying noticeable differences. The results indicated that although the CP was perceived as a significant change-event by many referees, in general, its perception was relatively moderate. The referees did not identify areas that were eminently affected by the new situation, other than their ability to train on a grass field and maintain adequate decision-making skills, as well as their financial status. Still, the behavioural effects were more potent among the non-professional referees, suggesting that Referee Associations must pay closer attention to support these populations. Initiating financial support funds for future pandemic periods or augmenting referees' salaries through additional activities (e.g., educating young players, refereeing in the community) may be a good practice for Referee Associations. In addition, the findings of this study support those of few other studies conducted on football referees (e.g., Chen & Horne, 2021; Preissler et al., 2021), emphasizing the importance of referees' ability to regularly train during lockdowns and quarantines. Akin to the players they officiate (e.g., Grazioli et al., 2020), referees must maintain their physiological fitness during such restrictions to be able to officiate matches adequately while minimising their risk of injury. Referee Associations should develop relevant home-based training protocols to allow referees to maintain their athletic physiological status. Also, they should insist that if teams are allowed to travel for training purposes, so would the referees, to allow training on a grass field and also exercise decision-making skills. It is also advised to use technologically based decision-making training methods (see Kittel et al., 2021) to overcome periods of isolation and quarantine. Moreover, the benefits of online-based meetings and educational seminars, that initiated as a forced necessity during the pandemic, have now become a useful tool to engage more efficiently and should continue also in the future. Still, it seems that face-to-face interactions of referees and instructors is pertinent, also to maintain strong refereeing identity during socially and professionally challenging periods. In this context, the psychological response presented by participants was also not that negative, suggesting that they were able to maintain a positive outlook of the situation and engage in adaptation. Finally, the absence of the crowd in matches allowed the referees to be more aware of their actions and better communicate with players and coaches, which related to better performance. These findings further emphasize the social aspect of football refereeing and the importance of having good management and communication skills. Practitioners working with referees should facilitate referees' adaptive efforts to respond effectively to a continuously changing football world.

Acknowledgments

The authors would like to thank the Israel Referee Union in the Israel Football Association, the Portuguese Referees Committee and Portugal Football School for supporting this study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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