

Research Article

Exploring the Relationships Between Digital Life Balance and Internet Social Capital, Loneliness, Fear of Missing Out, and Anxiety

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In today's interconnected world, the widespread use of the Internet necessitates an understanding of factors influencing individuals' ability to maintain a balanced relationship with technology. This study investigates digital life balance (DLB) by examining its associations with Internet social capital (ISC), loneliness, fear of missing out (FoMO), and anxiety levels. Five hundred and twenty participants (66% women; $M_{\text{age}} = 30.12$ years, $SD = 12.46$) took part in the data collection. Drawing upon the Psychology of Harmony and Harmonization framework, the study revealed negative correlations between DLB and ISC, loneliness, FoMO, and anxiety levels. Higher ISC was associated with lower DLB, suggesting that an extensive online network might lead to technological imbalance. Increased loneliness, FoMO, and anxiety were negatively associated with DLB, indicating possible disruptions between online and offline activities.

Keywords: anxiety; digital life balance; fear of missing out; Internet social capital; loneliness

1. Introduction

For several years now, the use of new Internet technologies has been one of the basic prerequisites for working, performing some of the basic functions of citizenship (e.g., online voting), finding news, spending free time watching movies or series, gaming, or staying in touch with others almost everywhere in the world [1, 2]. According to the Global Digital Overview, published by the We Are Social [3] agency, about five billion people in the world are now Internet users (i.e., 64.4% of the world's population), with 66 countries having Internet adoption rates exceeding 90%. The typical user logs onto social media sites like Facebook, YouTube, Instagram, and WhatsApp for more than 2.5 h every day [3].

The COVID-19 pandemic has accelerated the already growing trend towards the use of the Internet and remote networking, favoring work from home, online distance learning, and the promotion of communication platforms as an alternative and safe arena of interacting with others [4–6].

Beyond the needs due to the pandemic, the possible Internet uses have significantly changed over the years since the beginning of the Digital Revolution [7].

In 2023, a basic knowledge of Internet banking is essential to take full advantage of one's banking group, as is a basic knowledge of public health websites for scheduling appointments and booking tests or to verify one's identity through digital systems (e.g., SPID in Italy). Basic literacy will also be necessary for everyone to be able to work remotely, make various types of purchases online, and follow educational or training courses online.

As digital literacy provides access to the economic, political, and cultural spheres of society, the ability to access and use Internet-related technologies is now considered a basic human right [8].

However, psychology has been largely devoted to studying how the use of these technologies can be disruptive, given their mental health implications. In fact, the urge to use the Internet on a large scale can also have a negative impact on some people, similar to drug addiction, affecting

their psychological, social, school, and work health [9–12]. The literature reports that common outcomes associated with online addiction include emotional dysregulation, physical changes such as weight loss or frequent headaches, sleep disturbance, loss of concentration, a decrease in academic or work performance, higher levels of anxiety and depression, a decrease in general well-being and life satisfaction, personality changes and loss of interest in sex, and offline social bonds [13–16].

In a recent systematic review and meta-analysis that covered approximately 700,000 people from 31 countries, a weighted average prevalence of Internet addiction of 7.02% from 1996 to 2018 was found [17].

Based on the two lines of evidence described above, a very recent new approach, based on the Psychology of Harmony and Harmonization [18], has developed the construct of “digital life balance” (DLB) ([19]), which seeks to reconcile the dysfunctional and functional lines of research. Thus, the unbalance between online and offline life, which is rooted in the problematic use of and addiction to the Internet and new technologies, can be seen as a process of disharmonization. In this sense, the negative effects perceived by users are due to the imbalance and lack of harmony between online and offline life rather than the actual number of hours spent on the Internet [19], which, as described above, is a growing trend and does not necessarily describe a condition with negative effects. This is consistent with the literature, which sees an increase in the rate of Internet addiction over time [17] but with less growth than the sharp increase in the number of users and time spent online [3].

The DLB scale, which builds on the idea of work-life balance [20], uses four items to evaluate how well online and offline life are balanced [19]. The items have been modified and validated by the authors and can be found in full in Duradoni et al. [19]. The results of the validity analyses showed that the construct of DLB and its scale, in line with the literature, appeared to be positively associated with well-being measures (harmonic balance) and adversely associated with addiction measures (disharmonic balance), demonstrating their validity and reliability in assessing people’s harmonious and discordant use of the Internet [19].

2. Methods

2.1. Aim of the Study and Hypothesis Development. This paper is aimed at expanding the evidence on DLB by analyzing the motivations (i.e., antecedents) that can lead to a state of balance or imbalance. As confirmed by several studies, it has been shown that excessive use of social media can be a crucial factor in the onset of various problems, up to and including addiction to the technology itself [21–25]. Among the various antecedents considered, the literature has found that individuals addicted to the Internet have higher levels of loneliness [26, 27]. The feeling of loneliness, which can be found in any developmental period of human life, may have greater effects in adolescence and young adulthood [28]. In adolescents and young adults, loneliness is a risk factor for many psychosocial difficulties such as depression [29]. In fact, some significant relationships have been found

between adolescents’ sense of loneliness, problematic online gaming [30], and excessive Internet use [31]. Individuals’ sense of inadequacy and loneliness in social contexts becomes a motivating factor for participation in online communities [32, 33]; in fact, they tend to use online support networks as an alternative to offline relationships with which they are dissatisfied [34]. A similar result can be observed in a study conducted by Ayas and Horzum [35] in which the relationship between depression, self-esteem, loneliness, and Internet addiction was considered and the existence of a positive relationship between loneliness and Internet addiction is confirmed [35]. Furthermore, the literature suggests that FoMO (fear of missing out) can be considered a very relevant antecedent [36–38]. There are several studies that have demonstrated a relatively strong link between FoMO and problematic smartphone and Internet use (e.g., Gezgin [39], Wolniewicz et al. [40], Rogers and Barber [41], and Rozgonjuk et al. [42]). FoMO is defined as anxiety whereby a person is compulsively worried that he or she may miss an opportunity for social interaction, a rewarding experience, a profitable investment, or another satisfying event. The mediating role of FoMO linking deficits in psychological needs to the overuse of social media has been evaluated in several studies [36]. In addition, the use of social media can enable those with a high level of FoMO to meet basic needs for relationships, autonomy, and competence [43]. Finally, the literature shows how the existence of anxious states in people (measured with the State-Trait Anxiety Inventory (STAI) scale; [44]) can lead to problematic use of technology [45–48], emphasizing how social anxiety is related to Internet and social media addiction [49–51]. However, a state of imbalance may not result solely from the use of online as a coping strategy to cope with a “discomfort” (e.g., loneliness, FoMO, and STAI) but may result from the fulfilment of a need that is not necessarily a frustrating factor in real life. Considering studies that have looked at the use of online to expand one’s social capital [52], it has been found that when a person uses social media to build on preexisting offline social capital, their health improves. However, if online social connections are not correlated with offline social capital, this could be associated with Internet addiction, in which offline social life is “displaced” by overdependence on fragile online connections [53], resulting in negative health consequences [54], particularly psychological health [55].

2.2. Hypotheses. Given the literature above, our study had four main hypotheses.

- H1. As already known in the literature, the likelihood of problematic Internet use, and therefore an unbalanced use of new technologies, increases with the number of contacts and links people have online [56, 57]. So our first hypothesis (H1) was that the DLB scale negatively correlates with Internet social capital.

Several psychological factors were found to be associated with an increased likelihood of dysfunctional use of new technologies.

- H2. First, it is well documented that loneliness experienced by users has a positive relationship with the onset of technology-related addictions [26, 27, 58]. Based on this evidence, we hypothesized a negative correlation between the DLB scores and loneliness scores.
- H3. Moreover, our third hypothesis (H3) expected a negative correlation between FoMO and DLB, based on several studies in the literature that have well documented the association between FoMO, Internet addiction, and problematic Internet use [39, 40, 42].
- H4. STAI has also been shown to have a strong correlation with Internet addiction [45–48]; consequently, based on these findings, our fourth and last hypotheses expected a negative correlation between STAI and DLB.

2.3. *Measures.* To achieve the research objectives, an online questionnaire was created and administered, with the help of Google Forms. Basic sociodemographic information (i.e., age and gender) was primarily requested, followed by some validated scales:

- DLB scale [19] was composed of four items using a 7-point Likert scale, from *strongly disagree* (1) to *strongly agree* (7). Possible scores on the scale range from a minimum of 4 to a maximum of 28, and the higher the score, the better the balance between online and offline life. Examples of items are as follows: “I currently have a good balance between the time I spend online and the time I have available for offline activities” and “Overall, I believe that my online and offline life are balanced.”. The reliability of the DLB scale was measured using McDonald’s omega and was found to be excellent ($\omega = 0.89$).
- The Internet Social Capital Scale (ISCS) was used to measure Internet social capital [59]. The scale was composed of 20 items and used a 5-point Likert scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The scale had two factors: 10 items composed the bridging social capital (tentative relationships with little emotional support) and 10 the bonding social capital (strongly tied individuals sharing emotional support). For each form of social capital, scores for each participant were combined, and the range for bridging and bonding social capital was 10–50, with higher scores indicating higher Internet social capital. Examples of items are as follows: “There are several people online/offline I trust to help solve my problems” and “Online/Offline, I come in contact with new people all the time.” The reliability of the scale and subscale was measured using Cronbach’s alpha, and it was found to be optimal (Cronbach’s alpha = 0.86 and 0.85, respectively; [59]). For the purpose of our study, the items were translated into Italian using a back-translation method [60].

- The scale used to measure feelings of loneliness is the Emotional and Social Loneliness Scale [61], preliminary validated in Italian by Guazzini et al. [62]. The scale is a self-report questionnaire consisting of six items that capture three dimensions: general loneliness, emotional loneliness, and social loneliness. Each item uses a Likert scale of 1 to 5 (1 (*no*) to 5 (*yes!*)). Examples of items are as follows: “I experience a general sense of emptiness” and “I often feel rejected.”
- The FoMO scale [43] consists of 10 items that are rated on a 5-point Likert scale (from 1 (*not at all true for me*) to 5 (*extremely true for me*)). Examples of items are as follows: “I fear others have more rewarding experiences than me” and “When I go on vacation, I continue to keep tabs on what my friends are doing.” The scale items showed good consistency ($\alpha = 0.87$), as well as an acceptable distribution in terms of both skewness and kurtosis.
- The STAI-Y is a self-report questionnaire consisting of two 20-item scales that provide separate measures of state and trait anxiety [44]. The “Y” defines the version of the measure. For the purpose of our study, we used an already-validated Italian version [63]. State anxiety is a transient response to a perceived adverse event, characterized by feelings of tension, apprehension, nervousness, and worry. Trait anxiety, on the other hand, is a more stable predisposition to perceive stressful situations as dangerous or threatening. Accordingly, the State-Anxiety Scale includes 20 items that assess how the subject feels “right now, at this moment,” while the Trait-Anxiety Scale includes 20 items that assess how the subject feels “generally,” using a 4-point Likert scale (1–4). The total score for both scales ranges from 20 to 80, with higher scores indicating more severe anxiety [63]. Examples of items are as follows: “I am presently worrying over possible misfortunes” and “I feel that difficulties are piling up so that I cannot overcome them.” For the purpose of our study, we only administered the 20 items of the Trait-Anxiety Scale.

2.4. *Participants and Procedure.* To determine the appropriate sample size for our study, we conducted a power analysis using G*Power software [64]. The power analysis was specifically calculated for examining the relationship between DLB and hypothesized associated variables using Pearson correlations. The results indicated that a sample size of 509 participants would be required to achieve a statistical power of 0.80 (the minimum power required to accept the null hypothesis), assuming a relatively small effect size ($r = 0.11$) and a significance level of 0.05.

With a total of 520 participants recruited for our study, we deemed our sample size to be sufficient for our research purposes. We used several recruitment strategies. First, we exported the link to share the Google Forms survey, which was then shared in posts and stories on the Facebook and Instagram profiles of both the researchers and the laboratory they work in. A QR code linking to the online questionnaire

TABLE 1: Descriptive statistics of the collected variables.

Variable	Min-max	M	SD	Skew.	Kurt.
DLB	5-28	21.79	5.66	-0.79	-0.19
ISC bonding	10-47	18.59	6.57	0.80	0.55
ISC bridging	10-50	29.79	8.36	-0.65	0.16
FoMO	10-50	22.42	7.16	0.67	0.62
Social loneliness	5-25	12.12	4.23	0.52	0.02
Emotional loneliness	6-30	15.41	5.31	0.39	-0.37
STAI	21-80	46.36	11.03	0.31	-0.17

Abbreviations: FoMO = fear of missing out, ISC = Internet social capital, Kurt. = kurtosis, M = mean/average, SD = standard deviation, Skew. = skewness, STAI = State-Trait Anxiety Inventory.

was also created, allowing the researchers to personally recruit interested subjects from their personal and academic contacts. The only criteria for exclusion and inclusion in the study were being 18 years old or older and having a comprehension of the Italian language. We conducted the data collection process in accordance with Italian data protection regulations (Legislative Decree DL -101/2018), EU regulations (2016/679), and APA guidelines. All procedures performed in our study involving human participants were in line with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The final sample consisted of 520 participants, of which 66% were women, with an average age of 30.12 (SD = 12.46, age range = 14 - 72), all of whom actively participated in and completed the survey.

3. Results

In the initial step, we performed descriptive statistics to examine the data using the Statistical Package for Social Sciences (SPSS) software (version 19). For the relevant metric variables, we computed key statistical measures such as the minimum and maximum values, mean, and standard deviation, which are presented in Table 1. Furthermore, to assess the assumption of normality essential for parametric analyses, we evaluated the skewness and kurtosis levels for each distribution, which are also summarized in Table 1. Notably, none of the distributions exceeded the critical threshold of $-1/+1$, thereby allowing us to proceed with the anticipated correlation analysis, aiming to test our research hypotheses.

Subsequently, as none of the collected variables exhibited normality issues, we proceeded to explore the degree of association between the variables using the Pearson coefficient. In order to investigate the relationship between the variables of interest while controlling for potential effects of gender and age, we repeated the analysis using partial bivariate correlation. The results of this analysis are integrated into Table 2.

The data presented in Table 2 reveals a negative association between DLB scores and variables such as Internet social capital, FoMO, loneliness (both social and emotional), and anxiety. This implies that higher values of these variables correspond, on average, to lower values of DLB. Except

for the correlation with social loneliness, the effect sizes observed can be deemed as “typical” according to the range proposed by Gignac and Szodorai [65] for interpreting correlations in social sciences. The effect size serves as an indicator of the strength of the relationship between two variables. The greater its absolute value, the stronger the investigated relationship.

4. Discussion

We live nowadays in a world where the use of the Internet is becoming more and more widespread and when is almost imperative to have some basic online skills in order to be citizens who are active participants in the social and organizational life of their community. It is now essential to know how to vote using the Internet and a PC or a smartphone and to use them to verify our identity in order to book a visit or download a certificate, and almost all citizens of any age, gender, and culture had to have a literacy on how to work from home and to attend online courses and education [66-68]. In fact, it is well known that the trend in the use of the Internet and new technologies has increased enormously over the years [3], following the new needs created both by the constant transformation of information technologies and by the COVID-19 pandemic [4-6]. In the first months of 2023, the Internet had about five billion users which is 64.4% of the world’s total population.

Despite evidence of increased online technology use, rates of problematic and dysfunctional Internet use do not appear to have increased proportionately [3, 17]. The concept of DLB, proposed in this and a previous article [19], was born out of the need to explain why a significant increase in time spent online did not correspond to a proportional increase in Internet addiction rates. We state that problematic and dysfunctional Internet use can be seen, in the light of the Psychology of Harmony and Harmonization [18], as a process of disharmonization between online and offline life and duties [19].

The present study contributed to broadening the discussion in reference to the DLB construct, seeking to identify the antecedents that then lead to the process of disharmonization, as the imbalance between online and offline life can promote a dysfunctional use of new technologies and consequently lead to addiction [21-25, 69]. However, people can also use new technologies functionally [70-73]. So, in line with the principle that there can be dysfunctional and functional Internet use, DLB appeared to be negatively associated with addiction (i.e., disharmonic imbalance) and positively associated with well-being (i.e., harmonic balance) [19].

From the results of our study, there do not appear to be substantial gender differences in relation to DLB.

In line with the hypotheses proposed for this study, we have found that Internet social capital (i.e., the breadth and strength of the social links people have online) had a negative correlation with DLB scores in our sample. So our H1 was supported, confirming the evidence in the literature describing how increasing one’s online contacts increases the likelihood of developing an online addiction [56, 57].

TABLE 2: Full correlation matrix among the collected variables.

Variable	1	2	3	4	5	6
1. DLB						
2. ISC bonding	-0.21*** (-0.19***)					
3. ISC bridging	-0.19*** (-0.14**)	0.47*** (0.46***)				
4. FoMO	-0.26*** (-0.19***)	0.20*** (0.17***)	0.32*** (0.24***)			
5. Social loneliness	-0.11** (-0.12***)	-0.06 (-0.06)	-0.06 (-0.07)	0.10* (0.11*)		
6. Emotional loneliness	-0.25*** (-0.23***)	0.08 (0.07)	0.12** (0.09*)	0.38*** (0.36***)	0.62*** (0.62***)	
7. STAI	-0.26*** (-0.22***)	0.10* (0.10*)	0.13*** (0.09*)	0.50*** (0.44***)	0.37*** (0.38***)	0.59*** (0.58***)

Note: Between brackets, the results of partial correlation with age and sex as covariates.

Abbreviations: FoMO = fear of missing out, ISC = Internet social capital, STAI = State-Trait Anxiety Inventory.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

Moreover, our results showed a negative correlation between the scores of the DLB scale and those of the loneliness scale, also confirming our second hypothesis (H2). This finding is also consistent with the literature data, which reports an increase in the likelihood of addiction as the level of loneliness perceived by the user increases [26, 27, 58]. The H3 proposed for the study was also confirmed, showing that FoMO levels are negatively associated with the DLB scores. Based on this and on the evidence of the literature [39, 40, 42], it can be said that the more the person is worried about missing an opportunity for social interaction or being excluded from his or her social group, the more he or she might incur in a dysfunctional use of the Internet and there will be a process of disharmonization between online and offline life. Finally, in line with our last hypothesis (H4), it is confirmed that STAI scores had a negative correlation with the DLB scale. Therefore, the existence of anxious states in the individual may lead to problematic use of technology and an imbalance between online and offline life, confirming the literature evidence [45–48]. These results can be read in the light of already known and validated theories that describe the social needs that drive each of us to seek companionship, both online and offline. The needs and motivations for sociality were first described by Maslow [74] in his “theory of needs” and accompanied by the physiological needs of safety, esteem, and self-determination. Social motivations have been further explored by many other authors and include, among others, the need for intimacy and affiliation [75–78], which lead people to join groups more frequently and spend more time in them in order to have a high life satisfaction levels [79]. Some other theories come to the same conclusions, although they use different terms to define the motivations for sociality, for example, Fundamental Interpersonal Relations Orientation (FIRO model; [80]) or self-determination theory by Deci and Ryan [81] which states that it is important to feel part of a group and to be part of a social context where we weave networks and create sharing. Moreover, even the “need for control” (i.e., the belief in one’s ability to exert control over their environment) has an impact on everyone’s well-being [82].

The nonsatisfaction of such needs in a real context (i.e., the offline world) could have important implications for

individual well-being, leading to experiencing higher levels of loneliness, anxiety, and FoMO [26, 27, 39, 40, 42, 45–48, 58] and seeking fulfillment in the online world, increasing the likelihood of dysfunctional Internet use [56, 57, 79, 82, 83]. More specifically, our results have shown that frustration of sociality and control needs leading to dysfunctional Internet use was associated with lower levels of DLB and had a negative impact on well-being. In this case, the Internet becomes a central place for the fulfillment of important social and control needs and addiction becomes totalizing and prominent. Conversely, when needs were met and there was no dysfunctional use of the Internet, levels of DLB and well-being were within the norm. This is also consistent with the macro framework of the Psychology of Harmony and Harmonization [18], as the results of this study showed that compensating for unmet control and sociability needs in the offline world could lead to disharmonization between online and offline life.

A summary description of the relationship between social and control needs, antecedents (i.e., Internet social capital, loneliness, FoMO, and anxiety), DLB and outcomes (i.e., well-being and addiction) is shown in Figure 1.

4.1. Limitations of the Study and Future Research. It is essential to acknowledge and address several limitations inherent in this study.

- First, it is crucial to note that this study’s exploratory and cross-sectional design precludes establishing causal relationships between the variables. While our findings provide valuable insights into the associations observed, they do not offer definitive evidence of causation. Future research employing longitudinal or experimental designs could provide a more robust understanding of the causal mechanisms underlying the relationships between the variables.
- Another limitation of this study is the homogeneity of the sample, which solely consisted of Italian citizens. As such, caution should be exercised when generalizing the findings to other populations or cultural contexts. Future research should aim to include more

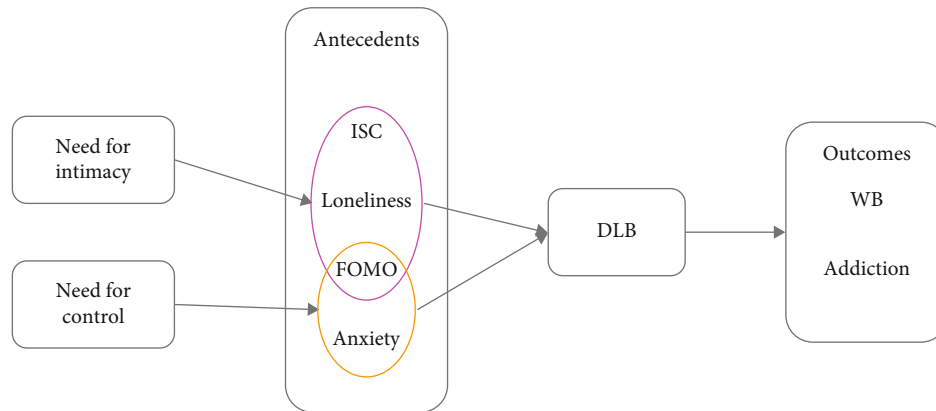


FIGURE 1: The theoretical relationship between social and control needs, antecedents, DLB, and outcomes (i.e., well-being and addiction).

diverse samples from different geographical locations to enhance the external validity of the findings and enable a more comprehensive understanding of the phenomenon.

- Lastly, despite our efforts to mitigate response bias by encouraging participants to reflect on their prior participation in the data collection, it is still plausible that some individuals may have provided multiple responses in good faith. While we implemented measures to detect and exclude duplicated or unreliable responses, we cannot completely rule out the possibility of response bias. Future research could employ additional measures, such as validation checks or identification verification, to minimize the potential impact of response bias on the results.

In addition to addressing the limitations inherent in the current research, future studies should delve deeper into the determinants that promote DLB, especially as the literature on risk factors becomes more elucidated. Among these potential promoting factors, one noteworthy area for investigation is self-regulation capacity (e.g., Tokunaga [84] and Billieux and Van der Linden [85]). Research could explore how individuals with higher self-regulation skills are more likely to achieve a balanced and healthy relationship with digital technologies, effectively managing their online and offline activities.

Furthermore, examining social factors that contribute to DLB could offer valuable insights. For instance, exploring how individuals with robust offline social networks and supportive relationships are better equipped to satisfy their social needs both online and offline [86, 87] could provide a better understanding of the dynamics involved. Additionally, future studies could investigate the role of individual characteristics, such as personality traits or cognitive abilities, in promoting DLB. Understanding how traits like self-efficacy, resilience, or mindfulness influence individuals' ability to maintain a healthy relationship with digital technologies (e.g., Craparo et al. [88], Robertson & Rapoza [89], and Song and Park [90]) can inform the development of targeted interventions and strategies for achieving DLB.

Moreover, it would be valuable to explore the influence of contextual factors on DLB. Factors such as work environment, educational settings, or cultural norms may shape individuals' attitudes and behaviors towards technology use [91, 92]. Investigating how these contextual factors interact with individual characteristics and contribute to DLB can provide a more comprehensive understanding of the phenomenon and guide the development of effective interventions at different levels.

5. Conclusion

In essence, this study delves into DLB and its correlation with Internet social capital, loneliness, anxiety, and FoMo. Elevated levels of these factors seem to be linked to a greater disparity between online and offline activities, potentially resulting in reduced well-being and an increased risk of dysfunctional technology use. This study suggests that frustration with sociality and control-related needs might drive unbalanced and potentially addictive technology use.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

Conflicts of Interest

The authors declare no conflict of interest.

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