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The Relationship between Reasons for Smartphone Use, Addictive Use Tendencies, Fear of Missing Out, Depression, and Life Satisfaction: A Qualitative and Quantitative Analysis

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Keywords
Reasons for smartphone use · Problematic smartphone use · Fear of missing out · Depression · Life satisfaction

Abstract
Introduction: In the present cross-sectional study, we investigated whether reasons for smartphone use are similar to those of social media use. Also, we explored links between reasons of smartphone use and mental health variables (problematic smartphone use, FOMO, depression symptoms, and life satisfaction) in Germany during the COVID-19 lockdown period. ***Methods:*** Overall, 571 smartphone users (M_{age} = 31.60, SD_{age} = 12.73) provided their reasons for smartphone use. The reasons were assigned to six categories by an inductive qualitative content analysis. ***Results:*** Five of six reasons were similar to those of social media described by previous research. "Search for social interaction" goes along with less problematic smartphone use and depression symptoms and more life satisfaction. "Search for positive feelings" is associated with lower life satisfaction. More depressed people, those with problematic smartphone use tendencies, higher FOMO, and lower life satisfaction tend to "escape from negative emotions." ***Discussion:*** Our results help to understand the relationships between reasons for smartphone use and mental health variables.

Introduction

In the year 2021, smartphone use is omnipresent for various reasons and has increased constantly [1]. Even though smartphone use can remarkably facilitate people's life, there is a need to discuss its impact on physical and mental health and especially its pathological component [2].

Reasons for smartphone use are manifold [3]. They offer an unlimited number of functions that are available almost any time and everywhere. It seems important to identify and understand the reasons of smartphone use since they do have an impact on the consequences of smartphone use [4, 5]. Reasons of use inform about internal and external motivational factors that contribute to the frequency and intensity of usage.

Especially people who use their smartphone to access social networking sites tend to develop an addictive user pattern [6]. The definition of problematic smartphone use

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is based on concepts of addictive behavior such as withdrawal, tolerance, continuous use despite evident harm, high time of consumption, neglect of other important activities, and subjective loss of control [7]. Horwood and Anglim [8] defined problematic smartphone use as a use pattern that cannot be controlled, is closely associated with fatal social and psychological consequences so that users might not manage their daily life. Problematic smartphone use is positively associated with less empathy, more neuroticism [9], and social phobia [6]. Moreover, it is moderately related to a self-reported decrease of productivity [10] and well-being [11]. Problematic smartphone use is further positively linked to the personality trait, sensation seeking [12], and lower mindfulness [13]. There is already much research on potential risk factors of problematic smartphone use [14, 15] as well as on external triggers of compulsive smartphone use such as unoccupied moments, tedious tasks, social awkwardness, and expectations of reactions [16]. However, there is still a need to investigate why people internally mainly use their smartphone to better understand the psychopathology, and to develop possible treatment plans for a psychopathological phenomenon that is still not acknowledged in the official diagnostic systems of psychopathology, although it seems to play an important role in mental health problems [17]. It should also be further discussed whether and in how far problematic smartphone use can be a clinical significant disorder.

Problematic smartphone use can lead to elevated tiredness and bad sleeping quality [18], which are both symptoms of depression [19]. Depression is positively associated with problematic smartphone use [20–23]. Brailovskaia et al. [24] identified depression symptoms as a negative predictor of searching positive emotions on social media. Despite these findings, it is still not investigated whether there is also a relationship between a specific reason of using a smartphone and depressive symptoms. Therefore, it is of great interest to investigate whether depressed people have a specific intention to use their smartphone. It may be hypothesized that the more depressed people are, the more they try to escape from negative emotions such as sadness by using their smartphone.

Fear of missing out (FOMO) is defined as the prevalent assumption that other people might have rewarding experiences from which one is deprived, which creates the wish for being constantly informed about their doings [25]. Previous research showed a positive link between problematic smartphone use and FOMO [26–28]. FOMO is negatively associated with social connectedness [29] and it mediates the link between envy and problematic smartphone use [30]. People with high negative affect were shown to be at higher risk of FOMO and problematic smartphone use [31, 32], whereas perceived social support goes along with less FOMO [33]. It is still unclear whether FOMO can predict a specific reason of smartphone use. It can be assumed that if there is a relationship, this could be a social-oriented reason of usage since people having FOMO seek for information about other people's doings.

The relationship between smartphone use and life satisfaction is ambiguous. While Chui [34] mentioned a positive link, other researchers found a negative correlation [35, 36]. Pearson Ba et al. [37] found that flow, defined as the optimal experience of high enough opportunities for action that are linked to an individual's personal capacities to act [38], mediates the relationship between problematic smartphone use and life satisfaction [37]. The relationship is also mediated by stress [39]. The constant use of a smartphone for work purposes seems to have an impact on the individual's life satisfaction and leisure time [40]. Life satisfaction has been shown to be an important protective factor against various addictions, such as internet or social media addiction [41]. Its links to the reasons of smartphone use are still not investigated and need further research. Smartphones were invented and implemented to facilitate people's life and therefore were supposed to increase their satisfaction with life. Identifying current reasons of smartphone usage is important for a better understanding of psychopathological consequences of the use. One could assume that people who are already satisfied with life have a lower need to search for positive emotions by using a smartphone.

In the dual-factor model of mental health, Greenspoon and Saklofske [42] suggested that assessing both dimensions, psychopathology and subjective well-being, leads to a better understanding of mental health. Consequently, in our present study, variables such as depression, FOMO, and problematic smartphone use are explored on the one hand, while on the other hand life satisfaction as a positive indicator of well-being is taken into account. Brailovskaia et al. [24] found that people mostly use social media for five main reasons: "search for information and inspiration," "social interaction," "beat of boredom and pastimes," "escape from negative emotions" (i.e., sadness, fear, anger), and "search for positive emotions" (i.e., happiness, excitement, comfort) [24]. Several studies demonstrated that smartphones are mainly used for social media purposes [43, 44]. Therefore, we hypothesize analogies between reasons for smartphone use and reasons for social media use [45, 46]. Since

there is still uncertainty about the reasons for smartphone use and their relationship with mental health variables such as depression symptoms, life satisfaction, FOMO, and problematic smartphone use, the following research questions should be investigated in the present study instead of hypotheses to avoid speculations:

Research question 1: are the five reasons for social media use transferable to general smartphone use?

Research question 2: are the reasons for smartphone use linked to depression symptoms, life satisfaction, FOMO, and problematic smartphone use?

As already mentioned, more and more studies show a worrying impact of smartphone use on mental and physical health problems that can have negative social and economic consequences [47]. Therefore, the findings of the present study should contribute to diagnostical and therapeutical measures on problematic smartphone use.

Materials and Methods

Participants

Overall, 571 smartphone users completed the online survey (68% women; M_{age} [SD_{age}] = 31.60 [12.73], range: 16–66). Almost half of the participants (49.9%) were students, while 46.9% were employees. Another group of participants (3.2%) comprised retired and unemployed people. Frequency distribution by age-group shows an asymmetric, right skewed distribution. The survey took place between April and June 2021, which marked the period of the COVID-19 lockdown in Germany. Participants were recruited via social media platforms (Facebook, Instagram) and flyers displaced at the university. All participants were properly instructed and gave online their informed consent to participate via an online form. The participation was voluntary and compensated by course credits for students. There were no missing data. The implementation of the present study has been approved by the responsible Ethics Committee.

Measures

Reasons for Smartphone Use

Participants were asked about their main reason for smartphone usage. Participants were not limited by prescribed categories or word limits. Thus, a wide range of possible reasons could be provided without being biased.

Problematic Smartphone Use

The level of problematic smartphone use was assessed by six items taken from the short version of the Bergen Social Media Addiction Scale (BSMAS) [48]. Following Brailovskaia et al. [24], the items were modified for problematic smartphone use by replacing the term "social media" with "smartphone" (e.g., "spend a lot of time thinking about smartphones or planning how to use it") [45]. They were rated on a 5-point Likert-type scale (1 = very rarely, 5 = very often). The current scale reliability was Cronbach's α = 0.84. Higher sum scores indicate a higher level of problematic smartphone use. Available research showed good scale reliability for the BSMAS with Cronbach's α ranging between 0.82 and 0.90 [49].

Fear of Missing Out

The ten items of the Fear of Missing Out Scale [25] measured the level of FOMO concerning smartphone use. The items were rated on a 5-point Likert-type scale (1 = not at all true of me, 5 = extremely true of me) (e.g., "I fear others have more rewarding experiences than me"). The current scale reliability was α = 0.83. A high sum score indicates a high level of FOMO [25]. A high internal consistency of α = 0.82 to α = 0.90 has been shown in earlier studies [25, 50].

Depression Symptoms

Depression symptoms were assessed by the depression subscale of the Depression Anxiety Stress Scales 21 (DASS-21) [51], which comprised seven items (e.g., "I could not seem to experience any positive feeling at all"). The items were rated on a 4-point Likert-type scale (0 = did not apply to me at all, 3 = applies to me very much or must of the time; current scale reliability: α = 0.90). The higher the sum score, the higher the depression symptoms [52].

Life Satisfaction

The Satisfaction with Life Scale (SWLS) [53] was used to measure life satisfaction with five items rated on a 7-point Likert-type scale (e.g., "in most ways, my life is close to my ideal"; 1 = strongly disagree, 7 = strongly agree). The current scale reliability was α = 0.89. A high sum score indicates a high level of life satisfaction [53]. All measure instruments have been adapted into German language.

Procedure

Brailovskaia et al. [24] found the following main categories of reasons for social media use using Mayring's inductive qualitative content analysis [24, 54]: "search for information and inspiration," "search for social interaction," "beat of boredom and pastimes," "escape from negative emotions," and "search for positive emotions." Following Brailovskaia et al. [24], in the present study, two trained psychologists independently matched the main reasons of smartphone use to these five categories (0 = reason does not belong to the category, 1 = reason belongs to the category) [24]. The interrater reliability, Cohen's kappa κ [55], was almost perfect for nearly all categories [56]: "search for information and inspiration": κ = 0.96; "search for social interaction": κ = 0.96; "beat of boredom and pastimes": κ = 1.00; "escape from negative emotions": κ = 0.96; "search for positive emotions": κ = 0.97. After the rating process, the responses were further discussed until an interrater agreement of 100% was reached. Thereby, a sixth category, "organization and availability," was formulated to fit the responses that were not suitable for the other five categories (κ = 0.80). In this category, answers often referred to working issues ("answer mails," "make appointments") or daily structure ("organize meetings"). Finally, the answers were discussed until an agreement of 100% was achieved in this category. To sum up, the qualitative analysis revealed six main categories of reasons for smartphone use represented as six dichotomous variables (0 = reason does not belong to the category, 1 = belongs to the category). The six main categories are presented in Table 1, as well as examples for reasons that belong to the categories and frequencies of enumeration.

Table 1. Categories of reasons for smartphone use, examples, and frequencies

Category	Example	Frequency, *n* (%)
(1) Search for information and inspiration	"Wish to be informed," "to get information"	54 (9.5)
(2) Search for social interaction	"Wish to talk," "to stay in contact"	253 (44.3)
(3) Beat of boredom and pastimes	"To fill free time," "to do nothing"	93 (16.3)
(4) Escape from negative emotions	"FOMO," "flee from loneliness"	79 (13.8)
(5) Search for positive emotions	"Positive experiences," "to have fun," "to accelerate mood"	62 (10.9)
(6) Organization and availability	"To be available," "to make appointments," "to answer mails"	27 (4.7)

Statistical Analyses

The statistical analyses were conducted by the Statistical Package for the Social Sciences (SPSS 27). G-power analysis was conducted to determine a minimum sample size. According to G-power analysis, a minimum sample size of 115 participants is necessary if the α error probability should not overcome 0.05 and a correlation of $r = 0.30$ or higher is expected. After descriptive statistics were assessed, the relationship between the six main reasons of smartphone use and problematic smartphone use, FOMO, depression symptoms, and life satisfaction was investigated by the calculation of bivariate zero-order correlations.

Results

As shown in Table 1, reasons for smartphone use assigned to the category "search for social interaction" were given by about half of the participants. One-sixth of the present sample's main reason for smartphone use was matched with the category "beat of boredom and pastimes" while about one-seventh was assigned to the category "escape from negative emotions." Around every tenth person provided a main reason that belonged to the categories "search for information and inspiration" and "search for positive emotions." Less than 5% of the given reasons matched the category "organization and availability."

Results of the correlation analysis are shown in Table 2 and refer to research question 2. There were no significant correlations between the category "search for information and inspiration" and the other variables. The category "search for social interaction" was significantly negatively correlated with problematic smartphone use (M [SD] = 13.15 [5.20]; range: 6–30) and depression symptoms (M [SD] = 4.45 [4.52]; range: 0–21). The correlation with life satisfaction (M [SD] = 25.46 [5.72]; range: 5–35) was significantly positive. The category "beat of boredom and pastimes" was significantly positively associated with problematic smartphone use and depression symptoms. "Escape from negative emotions" was significantly positively correlated with all investigated variables, except for life satisfaction. The correlation between this category and life satisfaction was significantly negative. The category "search for positive emotions" was significantly negatively associated with life satisfaction. Finally, the category "organization and availability" was significantly negatively linked to problematic smartphone use and FOMO (M [SD] = 22.60 [7.10]; range: 10–50).

Discussion

People frequently use their smartphone for various reasons, such as browsing social networks, surfing the Internet, or gaming [57]. The present study aimed to specify these reasons and to investigate their potential relationships with problematic smartphone use, depression, FOMO, and life satisfaction.

An inductive content analysis led to the following main categories of reasons for using a smartphone (see *research question 1*): "search for information and inspiration," "search for social interaction," "beat of boredom and pastimes," "escape from negative emotions," "search for positive emotions," and "organization and availability." While the first five categories reveal a replication of Brailovskaia et al. [24] who investigated reasons for social media use [24], the last category "organization and availability" seems to be specific for smartphone use.

In correspondence with previous research [58], a small rate of our participants revealed to use their smartphone to get information, to stay up-to-date, and to be inspired. Those answers fitted the category "search for information and inspiration" and might lead to the assumption that many of the participants might use other sources to get information.

The purpose to stay connected with other people was the mostly provided reason in our study (category "search for social interaction") and goes along with other researchers'

Table 2. Bivariate correlation analysis

	II	SI	BP	NE	PE	OA
Problematic smartphone use	−0.05	−0.20**	0.12**	0.20**	0.05	−0.10*
FOMO	−0.04	−0.04	0.05	0.09*	−0.01	−0.12**
Depression symptoms	−0.05	−0.16**	0.11**	0.18**	0.01	−0.08
Life satisfaction	0.04	0.11**	−0.07	−0.10*	−0.08*	0.07

$N = 571$. II, category "search for information and inspiration"; SI, category "search for social interaction"; BP, category "beat of boredom and pastimes"; NE, category "escape from negative emotions"; PE, category "search for positive emotions"; OA, category "organization and availability." $^{**}p < 0.01$, $^{*}p < 0.05$.

findings that smartphones are mainly used for social interaction [59]. The initial purpose of a phone, i.e., having the opportunity to call other people whenever and wherever, seems to be still relevant in 2021. Staying in touch, making new friends, or dating are coherent with evolutionary needs to stay in a group in order to survive [60]. Notably, extensive usage for social purpose is associated with a higher risk of problematic smartphone use [61].

Participants' responses in the third category "beat of boredom and pastimes" were to fill their free time, for example, in waiting situations or shortly before sleeping. In boring situations, individuals seek for quick stimulation offered by smartphone use and are more susceptible to external stimuli such as advertising content [62].

The fourth category "escape from negative emotions" summed up reasons to use the smartphone as a way of forgetting unpleasant emotional states, daily stress, as well as current problems. In accordance with earlier findings [63, 64], participants obviously tend to escape from anxiety, sadness, or displeasure with the help of their smartphone, which can lead to a problematic consumption pattern. There is further evidence on a positive association between emotion dysregulation and problematic smartphone use [65]. People often search and find social support online if they miss it in their offline life. However, in the longer term this can contribute to the development of addictive tendencies [66].

In the category "search for positive emotions," responses were listed that expressed the intention of feeling better when using a smartphone, for example, to feel happy, relaxed, excited, entertained, or satisfied. This goes along with previous findings that smartphone use may contribute to instant gratification [67] through positive reinforcement, which immediately results in satisfaction. Chan (2018) opposingly found hints that mobile interaction goes along with more negative emotions [68]. This might be the case when the reinforcing effect wears off. As a consequence, more time could be spent on the smartphone use to achieve the same positive emotions as previously with less usage time.

In contrast to the reasons for social media use described by Brailovskaia et al. [24], we determined "organization and availability" as an additional category to contain all reasons that are associated with constant availability or organizational issues when using a smartphone, for example, work purpose. In our globalized world of rising constant availability, it might be that people fulfill their need for feeling safe, having control, and being perfectly prepared for upcoming challenges when they use their smartphone for a reason integrated in this category [69]. To be more flexible, people risk facilitating the way for longer working hours and less psychological detachment [70, 71].

In the second step of the study, after the inductive content analysis, we investigated potential links between the categories of reasons for smartphone use and problematic smartphone use, depression, FOMO, and life satisfaction (see *research question 2*). We found no significant associations between the category "search for information and inspiration" and the investigated variables. Thus, the use of the smartphone for information and inspiration purposes does not seem to be linked to psychological health variables such as problematic smartphone use, depression, FOMO, and life satisfaction, neither positively nor negatively.

We found a weak negative relationship between the category "search for social interaction" and problematic smartphone use. Thus, people who engage with their smartphone for social interaction purpose might be more resilient against problematic smartphone use. This relationship goes along with results from previous research [72]. It seems that seeking for social interaction might serve as a protective factor against psychopathology such as problematic smartphone usage [73], which is also supported by a positive link between social interaction and life satisfaction [74].

In addition, we found a significantly negative, weak correlation between the category "search for social interaction" and depressive symptoms. Presumably, people

who mainly use their smartphone for social purposes are less depressed. Similarly, Elhai et al. [72] found a positive relationship between non-social features of smartphone use and depression.

The weak positive relationship of the category "beat of boredom and pastimes" with problematic smartphone use and depression symptoms goes along with earlier research that described a positive relationship between boredom proneness and problematic smartphone use [75]. In a further study, this relationship was partially mediated by depressive symptoms [76]. Notably, people who do not know how to spend their time might suffer from lower self-efficacy, more sadness, and a higher urge to regulate negative feelings through problematic use behavior [77, 78].

The category "escape from negative emotions" was negatively related to life satisfaction on a weak level. The more participants engage in smartphone use to flee from a harming emotional state, for example, sadness due to loneliness, the less they are satisfied with life [79]. This might also explain the weak positive association between this category and depression symptoms, FOMO, and problematic smartphone use that has also been recently shown by other scientists [11]. In general, the category seems to reflect a coping strategy against an unpleasant emotional state. This goes along with the finding of a positive association between emotion dysregulation and problematic smartphone use [64]. Elhai et al. [80] also emphasized that this negative smartphone use expectancy is related to more severe smartphone use.

The weak negative relationship between the category "search for positive emotions" and life satisfaction could be explained by the fact that people who fall into this category search for improving their emotional state [81] in a situation that they are not satisfied with, for example, when they experience loneliness [82]. Zilka [83] demonstrated that especially young people were convinced to successfully satisfy important needs with the help of their smartphone but often failed to do so. This could explain why engaging with smartphones to feel better goes along with lower life satisfaction, even though the relationship cannot be interpreted causally. Similarly, Squires et al. [65] showed positive relationships between emotion dysregulation, psychological distress, and problematic smartphone use.

The last category "organization and availability" was weakly negatively related to both FOMO and problematic smartphone use. Despite the available research on the negative impact of constant accessibility on mental health [67, 84], these findings lead to the assumption that individuals who use their smartphone for organizational and availability purposes are less vulnerable for fear of missing things or problematic use behavior patterns. This might be explained by the elevated sense of control as provided by a recent study of Brailovskaia and Margraf [85] that showed sense of control to be a significant mediator between burden and addictive behavior patterns.

Our study results indicate that especially depressive participants and participants with problematic smartphone use tendencies tend to flee from unpleasant emotional states such as sadness. This goes along with Bian and Leung [86], who suggested that especially young adults seem to fail to find alternative coping strategies when being disaffected and lonely [86], for example, seeking for offline social support, which could lower the risk of problematic smartphone use [87]. Instead, they tend to regulate their negative emotions with the help of their smartphones. The long-term effect of this behavior on depression and problematic smartphone use remains unclear and interesting to assess in future research. The present results help to better understand the reasons for smartphone use in present times and to be aware of their relationships with and potential prediction by psychological variables. The results can be taken into account when treating psychopathological phenomena such as depression, fear, or problematic smartphone use. Thereby, patients should be encouraged to explore functional long-term strategies to regulate unpleasant emotional states apart from smartphone use. Also, it might be an additional productive source of information to assess a patient's smartphone use and this person's intention in doing so when assessing the psychopathology. Our findings about people's reasons for smartphone use and their interaction with psychopathological phenomena contribute to the understanding of individual interpersonal needs. It will be future theoretical and therapeutical task to look for alternative sources of fulfillment of these needs apart from problematic smartphone use (youth club, reading circle, support group). Especially the fact that "escape from negative emotions" is mostly intended by more depressed people and those with enhanced tendencies of problematic smartphone use show our responsibility to offer early strategies to deal with unpleasant emotional states in education, training, and therapy as mentioned above. Motivational interviewing, formerly known as a treatment of alcohol addiction, might be another effective way to help people with problematic smartphone and social media use tendencies [88].

There are a couple of limitations in our study that are important to stress out. First, we conducted the content analysis with just two trained raters. It might be that a larger number of raters would have led to other categories. Second, the assessed correlation analyses cannot be interpreted causally. We do not know whether there are additional influencing factors that have contributed to

the significant relationships between the variables. Thus, future research should focus on experimental and longitudinal studies that should include more potential predictor variables, such as personality traits, and a more balanced number of positive and negative variables in accordance with the salutogenesis model [89]. Third, the generalizability of the results to the general population is limited due to the fact that more than two-thirds of our sample were female. With an average age of the participants of 32 years, we could not represent a huge part of the population. Fourth, the data assessment fell in times of a pandemic situation that rested for more than 1 year before the investigation started.

People might have changed their smartphone use habits as well as other issues in their life, such as meeting friends, doing sports, etc. [90]. It would be interesting to conduct a follow-up survey after the pandemic situation. Fifth, we assessed the mental health state of "healthy" participants. To use the results in psychotherapy, it would be interesting to ask feared, depressive, or smartphone-addicted clinical patients for their smartphone use reasons. Sixth, all responses were given in form of a self-report.

According to Conway and Lance [91], this response set is likely to be influenced by the same-source bias. We tried to minimize the impact of this bias by reliable instruments and a moderate study length. Nevertheless, future studies could take other methods of assessment, for example, a family or friends' report, into consideration. Seventh, following previous research from Germany on problematic smartphone use [49], we used a modified version of the BSMAS to assess problematic smartphone use. Future studies should replicate our findings by the use of other measures of problematic smartphone use (e.g., the Smartphone Addiction Scale-Short Version; SAS-SV [92]).

Summing up, there are different reasons to use a smartphone that are mostly similar to the use of social media. "Search for social interaction" goes along with less problematic smartphone use and depression symptoms and more life satisfaction. "Search for positive feelings" is a reason named by people with lower life satisfaction. "Escape from negative emotions" is mostly intended by more depressed people, those with problematic smartphone use tendencies, higher FOMO, and lower life satisfaction.

Statement of Ethics

All authors state their compliance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). The study has received ethical approval from the responsible Ethics Committee of Ruhr University Bochum (Prof. Dr. Robert Kumsta), approval number 636. The rights of the human subjects participating in our research were protected. Participants provided written informed consent before answering the questionnaires. They could stop participating without any consequences.

Conflict of Interest Statement

My co-authors and I do not have any interests that might be interpreted as influencing the research. On behalf of all authors, I state there is no conflict of interest.

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Author Contributions

Jan Stirnberg, Jürgen Margraf, Lena-Marie Precht, and Julia Brailovskaia conducted the study design. Jan Stirnberg conducted literature searches and statistical analysis and wrote the first draft of the manuscript. Jürgen Margraf and Julia Brailovskaia conducted data collection. Jan Stirnberg and Julia Brailovskaia conducted data preparation. Jürgen Margraf, Lena-Marie Precht, and Julia Brailovskaia reviewed and edited the first draft.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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