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GERAÇÃO ESPONTÂNEA

ESTUDO DAS RELAÇÕES ENTRE ESPONTANEIDADE, MINDFULNESS, QUALIDADE DE SONO E SINTOMAS DE DEPRESSÃO, ANSIEDADE E STRESSE

Dissertação no âmbito do Mestrado em Psicologia Clínica, subárea de especialização em Intervenções Cognitivo Comportamentais, nas Perturbações Psicológicas e da Saúde, orientada pela Professora Doutora Margarida Pedroso de Lima e pela Professora Doutora Ana Cardoso Allen Gomes e apresentada à Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra.

Outubro de 2021

Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra

GERAÇÃO ESPONTÂNEA
Estudo das relações entre Espontaneidade, Mindfulness, qualidade de sono e sintomas de Depressão, Ansiedade e Stresse

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UNIVERSIDADE D COIMBRA

Faculty of Psychology and Educational Sciences of the University of Coimbra

SPONTANEOUS WAVE
Studying the relationships between Spontaneity, Mindfulness, sleep quality and symptoms of Depression, Anxiety and Stress

Tito de Araújo Fonseca e Cruz Tavares

Dissertation submitted to obtain the degree of Master in Psychology, in the subarea of specialty of Cognitive-Behavioral Interventions in Psychological and Health Disorders, oriented by Professor Margarida Pedroso de Lima and Professor Ana Cardoso Allen Gomes and presented to the Faculty of Psychology and Educational Sciences of the University of Coimbra.

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Resumo

A Espontaneidade é um estado mental que permite fornecer respostas originais e integradas, livres de padrões/restrições rígidos (Barbosa & Rodrigues, 2020). Originada no Psicodrama moreniano, foi sugerido que a Espontaneidade pode ser conceptualizada à luz do modelo cognitivo-comportamental (Fisher, 2007; Treadwell & Dartnell, 2017), e as Terapias Cognitivo-Comportamentais de Terceira Geração fornecem uma oportunidade para o fazer.

Analisámos associações entre Espontaneidade (SAI-R; Kipper & Hundal, 2005; adapt. por.: Gonzalez et al., 2021), as cinco facetas do Mindfulness (FFMQ; Baer et al., 2006; Baer et al., 2008; adapt. por.: Gregório & Pinto Gouveia, 2011), indicadores da qualidade do sono (PSQI, Buysse et al., 1989; valores normativos por: Gomes et al., 2018) e sintomas de Depressão, Ansiedade e Stresse (EADS-21, Lovibond & Lovibond, 1995; adapt. por.: Pais-Ribeiro et al., 2004) numa amostra portuguesa sobretudo não-clínica. Analisámos tanto a amostra total (N = 157) como uma subamostra (N = 74), composta por participantes que cumpriram critérios de inclusão mais restritos.

Os resultados parecem indicar que a Espontaneidade e o Mindfulness têm em comum a aceitação do aqui-e-agora, mas enquanto o Mindfulness é direcionado para o interior e contemplativo, a Espontaneidade é direcionada para o exterior e expressiva (Gluck, 2013).

Combinar técnicas cognitivo-comportamentais com o Psicodrama poderá resultar em benefícios terapêuticos (Treadwell & Dartnell, 2017).

Palavras chave: Espontaneidade, facetas do Mindfulness, qualidade do sono, Depressão, Ansiedade, Stresse.

Abstract

Spontaneity is a mental state that allows individuals to give original and integrated answers, free from rigid patterns or constraints (Barbosa & Rodrigues, 2020). Originated in Morenian Psychodrama, it's been suggested that Spontaneity can be conceptualized in light of the cognitive behavioral model (Fisher, 2007; Treadwell & Dartnell, 2017), and Third Wave cognitive behavioral therapies provide an opportunity for doing so.

We analyzed the associations between Spontaneity (SAI-R; Kipper & Hundal, 2005; Portuguese adaptation: Gonzalez et al., 2021), the facets of Mindfulness (FFMQ; Baer et al., 2006; Baer et al., 2008; Portuguese adaptation: Gregório & Pinto Gouveia, 2011), indicators of sleep quality (PSQI, Buysse et al., 1989; Portuguese norms: Marques et al., 2013; Gomes et al., 2018) and symptoms of Depression, Anxiety and Stress (DASS-21, Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro et al., 2004) in a Portuguese population of mostly non-clinical participants. We performed one analysis for the total sample (N = 157) and one for the subsample (N = 74), composed only of participants meeting strict inclusion criteria.

Our results indicate that Spontaneity and Mindfulness share the acceptance of the here-and-now, with Mindfulness being inward-directed and contemplative while Spontaneity is more outward-directed and expressive (Gluck, 2013).

We have further reason to believe that combining CBT techniques and the psychodramatic intervention could enhance therapeutic effects (Treadwell & Dartnell, 2017).

Key Words: Spontaneity, Mindfulness facets, sleep quality, Depression, Anxiety, Stress

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Introduction

Psychodrama is an action-based method of group psychotherapy (Abeditehrani et al., 2020), developed by Jacob Levy Moreno in 1921, in which clients use guided role-play to work on their personal and interpersonal problems by enacting themselves, parts of themselves, or significant others in their lives (Orkibi & Feniger-Schaal, 2019). This psychotherapy presents an opportunity for a corrective experience, that is, the integration of a (painful) past experience or the creation of a missing experience (Jendričko & Prosen, 2020).

Spontaneity is a central clinical concept in the theory that led to the formulation of psychodrama (Kipper et al., 2009). The origin of the word "spontaneous" is in the Old Latin word sponte, meaning "of one's own accord, willingly", which emphasizes being in agreement and harmony with oneself, without external influence or constraint. Moreno (1964) regarded spontaneity as an invisible energy that propels the individual towards a new and adequate response to a new situation. His theory also affirms that spontaneity can be trained, which is a fundamental goal of the psychodrama treatment (Blatner, 2000). This theory, however, attributes two different meanings to spontaneity: it considers it an invisible energy while also regarding it as a skill; attributing both constructs to one concept actually raises more questions about the meaning of spontaneity than contributes to a greater understanding of it (Kipper, 2000). Moreno's sometimes contradictory presentation of the concept created a considerable degree of confusion regarding the meaning of spontaneity and its ways of expression; nevertheless, there was a commonly accepted definition of spontaneity as an appropriate response to a situation or a new response to an old situation (Kipper & Hundal, 2005). In order to avoid the difficulty arising from considering spontaneity both a theoretical concept and a skill, Kipper et al.

(2009) suggested its reconceptualization as an experiential state of mind rather than either energy or skill, which is analogous to the idea of the "flow experience", defined by Csikszentmihalyi (1987) as a state of satisfying, intense concentration and a total immersion in the task at hand. People vary in their propensity to experience flow (Ross & Keiser, 2014), similarly to what concerns the spontaneous state, in which people vary in the frequency that they experience spontaneity as well as in the intensity of such an experience (Kipper & Buras, 2009). But whereas flow refers to an experiential state that describes one's feeling during the act itself, the spontaneous state refers to an experiential state that exists prior to the onset of the creative act (Duarte, 2018; Kipper et al., 2009).

Furthermore, Kipper et al. (2009) found a positive relationship between the spontaneous state and the third part of the Press Test (developed by Beahr & Corsini, 2000), a measure of executive functions which reveals the ability to ward off cognitive interferences and inhibit intrusive stimuli, integrating motivational and sensory functions and thus creating the conditions required to perform a given act (Beahr & Corsini, 2000; Royall et al, 2002). This part of the Press Test has been shown to be associated with personality characteristics such as flexibility and a tendency to be unbound by higher needs for order or routine (Beahr & Corsini, 2000).

In summary, spontaneity has been defined as a mental state which allows the individual to give an original, creative, adequate and integrated answer, free from standardized ways of conduct and rigid cultural constraints, being that the lack or absence of spontaneity is related to inflexibility, rigid thought patterns, lack of emotional regulation and overall poor mental health (Barbosa & Rodrigues, 2020).

Recent studies have demonstrated the efficacy of psychodrama group therapy in enabling insights into one's own thoughts, emotional and behavior processes and

allowing for the externalization and better regulation of emotional content (Prosen & Jendričko, 2019) in varied populations and contexts, including people living with HIV/AIDS (Karabilgin et al., 2012), psychiatric groups of adolescents (Gatta et al., 2010), adults with panic disorders (Tarashoeva et al., 2017), drug-addicted offenders (Testoni et al, 2020), cancer patients (Menichetti et al., 2016), groups of parents of children diagnosed with ADHD (Vural et al., 2014), as well as non-clinical populations of adults (Gonzalez et al., 2018). Notorious advances have been made in what concerns research in this field (for a recent integrative review that systematically examined methodological issues in 31 intervention studies on psychodrama psychotherapy, proposing specific guidelines to improve the methodology, transparency, and specificity in reporting psychodrama therapy, see Orkibi & Feniger-Schaal, 2019).

Traditional Psychodrama is conceptualized in terms of three main phases - warm up, action, and sharing – and a variety of techniques may be applied in those three phases; Moreno's psychodrama introduced techniques such as role playing, role-reversal, sculpture, soliloquy and double mirroring; many of Moreno's techniques have been appropriated by other theoretical models: for example, this is the case of role-play (widely disseminated across various types of therapies), sculpture in family therapy and the use of the auxiliary chair by Fritz Perls in Gestalt Therapy, which was later modified for the "two-chair" technique in the cognitive approach (Cruz et al., 2018). Psychodrama group therapy later integrated other techniques which have been borrowed or adapted from various individual and group psychotherapy modalities - Kipper and Matsumoto (2002) list as examples of later additions the games and dancing executed during the warm-up phase, and clarify that psychodrama has moved away from psychoanalytic concepts and closer to Gestalt and Systemic therapies, absorbing some concepts from both models.

There is also an increasing interest in applying techniques unique to the cognitive behavioral model to psychodrama (Treadwell et al., 2002). Fisher (2007) noted some common ground between Psychodrama and CBT, both in terms of underlying principles (namely the premise that human beings are free and have the power to choose belief and action by exercise of will, and that reconstructing reality is a way of restoring mental health) and techniques used (for example, CBT therapists often use action methods and reenactment). This interest in the common ground between these therapies has led to the emergence of Cognitive Behavioral Psychodrama Group Therapy (CBPGT), a recent model which incorporates cognitive behavioral techniques and concepts into the psychodramatic intervention, allowing group members to identify and modify negative thinking, behavior, and interpersonal patterns while increasing engagement in positive and success-based experiences (Treadwell & Dartnell, 2017).

The proposal that CBT and psychodrama can be integrated to enhance treatment effects is motivated by various factors (Abeditehrani et al., 2020). One of them lies in the very history of CBT, a model that can be seen as the integration of two separate strains of psychotherapy, cognitive therapy (CT) and behavioral therapy (BT) (Thoma et al., 2015). Integration of techniques from other theoretical models has always been a part of the development of CBT: notable behaviorists like Joseph Wolpe – interested in breaking the dominant trend of Freudian therapy – were psychiatrists originally trained as psychoanalysts (Thoma et al., 2015), and some of the most prominent proponents of the "cognitive revolution" – which introduced some discontinuity in relation to the behavioral model – were initially psychoanalysts (Gonçalves, 1993); Albert Ellis pointed to the Stoics as an important influence, as well as the analytic philosophy of Russell and the

psychoanalytic writings of Horney and Adler (Thoma et al., 2015); Aaron T. Beck, whose cognitive formulations constitute the organizing core of practical and conceptual developments of cognitive therapies, followed a path marked by a long psychoanalytic gestation, his first cognitive formulations being a product of his first studies, which searched for validation of traditional psychoanalytic assumptions regarding depression (Gonçalves, 1993).

One of the factors contributing to CT's success was Beck's willingness to incorporate and integrate elements of other therapies that showed efficacy (Thoma et al., 2015). Beck himself wrote: "I claim that cognitive therapy is the integrative therapy" (Beck, 1991, p.191); furthermore, he stated that CT drew its theoretical structure from a variety of sources, including various components of psychoanalytic theory, formulations of neo-Freudians and Ellis, as well as Rogerian nondirective therapy, George Kelly's theories, and various psychological disciplines, more recently cognitive, developmental, and social psychology (Beck, 1991). Beck gave significant attention to the issue of theoretical integration, suggesting that cognitive therapy provides a "common ground" or "an opportunity for a rapprochement" for psychodynamic therapy and behavior therapy (Alford & Norcross, 1991).

Jeffrey E. Young, once a pupil of Beck, developed schema therapy (ST), a form of psychotherapy that differs from traditional CBT on various levels (but would later be incorporated into its conceptual body): it is a longer-term therapy, it incorporates a focus on the developmental origins of current problems, and it also incorporates experiential, emotion-focused techniques originally developed within Gestalt therapy, such as "chair work" and use of imagery exercises (Thoma et al., 2015). Young (1994) stated having "an increasing desire to integrate and blend, rather than eliminate or criticize" (p.xv).

Since the methods used in CBT are not employed as isolated techniques, but rather in the service of a global clinical strategy derived from principles of both the cognitive model and much of BT – including behavioral activation, exposure exercises, behavioral experiments, relaxation training, and social skills training (Thoma et al., 2015) –, and tailored to the momentary needs of the individual patient, CBT is highly eclectic (Alford & Norcross, 1991). Role playing is an example of CBT's technical eclecticism; having originated in psychodrama, it has been widely used by mental health professionals in other areas of psychology who recognize its efficacy (Pio Abreu, 1992), namely in CBT, where it's often used to elicit or activate cognitions associated with specific interpersonal events or situations (Alford & Norcross, 1991). Beck (1991) explicitly addressed this: "My employment of enactive, emotive strategies was influenced, no doubt, by psychodrama and Gestalt therapy" (p.196).

Another reason in favor of the integration between CBT and Psychodrama lies in the flaws each therapy has on its own. Young (1994) stated: "integrating the best components of several therapies is far more effective than any one alone. There is much of value in psychoanalytic, experiential, cognitive, pharmacological, and behavioral approaches, but each has significant limitations when used alone" (pp. xv-xvi).

The CBT model is sometimes criticized for overestimating the influence of reason and cognition at the expense of the passions, assuming that emotion results from cognitive appraisals and thus seeking to control negative emotions through cognition (Woolfolk, 2000), resulting in the model being sometimes accused of being overly structured and intellectually oriented (Treadwell & Dartnell, 2017). As a result, some group therapists today use an approach based upon CBT or identify with a less structured and more eclectic

approach, typically employing techniques that come from cognitive behavioral therapy and its related research (Treadwell & Dartnell, 2017).

More recently, another example of this sort of integration lies in the new developments among therapies, metaphorically designated "Third Wave", influenced by constructivism, post-modernism and Eastern philosophy (Dimidjian et al., 2016; Gregório & Gouveia, 2011). "Third wave" cognitive and behavioral therapies are characterizedby the combination of Mindfulness, dialectical philosophy, acceptance, therapeutic relationship and spirituality with cognitive behavioral techniques, emphasizing context, functions of cognition and affect, and the relationship one has with one's own thoughts and emotions, instead of the traditional focus on challenging negative and irrational thoughts (Gregório & Gouveia, 2011; Sillifant, 2007).

Mindfulness, a central concept in Third Wave CBT, is the English translation of the Pali word "Sati" (an ancient language from northern India), which means self-consciousness, intentness, wakefulness and lucidity of mind, and self-possession (Sillifant, 2007; Singh et al, 2008). Although Buddhist traditions first explored the concept of mindfulness in broad philosophical terms, it has spread rapidly in Western Psychology (Hofmann & Gómez, 2017; Singh et al, 2008); it is defined as a multifaceted construct that includes different components related to attention, awareness, and ability to not react and not judge (Baer et al., 2008; Singh et al, 2008). Gregório and Gouveia (2011) point out that this multifaceted nature of mindfulness makes it hard to define and operationalize, resulting in the definition of this concept varying according to the context (social, psychological, clinical or spiritual) in which it is used, as well as according to the perspective from which it is analyzed (that of the investigator, the clinician, or the

practitioner). Nevertheless, there is a general consensus in defining mindfulness, as was done by Kabat-Zinn (1994), as a moment-to-moment non-judgemental awareness, as well as in assessing multiple facets of the construct (Gregório & Gouveia, 2011). The Five Facets of Mindfulness Questionnaire developed by Baer et al, 2006), one of the most validated and utilized instruments in the investigation and analysis of this construct (Gregório & Gouveia, 2011), assesses five different aspects of mindfulness: acting with awareness (focusing attention on one's current activity), non-judgement of inner experience (experiencing thoughts/feelings without judging them or criticizing oneself), non-reactivity to inner experience (allowing thoughts/feelings to come and go without reacting to them or getting caught up in them), describing (labeling experiences with words), and observing (noticing internal/external experiences) (Brown et al., 2015).

The body of literature on mindfulness-based interventions (MBIs), such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT), has grown exponentially in recent years (Hofmann & Gómez, 2017). These types of intervention have been shown to be effective for a host of psychiatric disorders (Goldberg et al., 2018), medical conditions (Abbott et al., 2014) and stress (Kallapiran et al., 2015; Kriakous et al., 2020), as well as for preventing relapse/recurrence in Major Depressive Disorder (Farb et al., 2018). Mindfulness principles have been integrated into other therapeutic interventions, such as Dialectical Behavioral Therapy (DBT) and Acceptance and Commitment Therapy (ACT) (Hofmann & Gómez, 2017; Singh et al, 2008). Despite distinctions between the MBIs, ACT and DBT, these treatments are quite compatible with the dominant cognitive-behavioral psychotherapy practiced today; CBT is an umbrella term, that is, it refers to a conceptual model of treatment more than to one single protocol; mindfulness and acceptance

strategies are consistent with the principles of CBT because they target core processes, such as increased emotional awareness and regulation, cognitive flexibility, and goal-based behaviors (Hofmann & Gómez, 2017; Singh et al, 2008). Research shows that Mindfulness enhances the efficacy of CBT treatment, especially when clients are engaged in rumination, worry, obsessive thinking, continual self-criticism or avoidance of inner experiences, and that integrating Mindfulness into therapy is likely to be more effective than teaching it as a standalone technique (Beck, 2021). MBIs, among others, have also been explored within the context of CBT for specific disorders, showing promising results in alleviating diagnosis-specific symptoms and comorbid depressive symptoms in Borderline Personality Disorder (Chafos & Economou, 2014), Obsessive Compulsive Disorder (Hawley et al., 2017), anxiety disorders (Wong et al., 2016), among others.

Taking into account the fact that the success of MBIs might derive from publication bias and poor quality of study features, a recent meta-analysis by Goldberg et al. (2018) showed that mindfulness treatments were of similar potency as that of first-line psychological and psychiatric interventions, when compared directly to them, and superior to other active comparison conditions and waitlist control conditions, with little variation across disorders, demonstrating that there is a robust empirical basis for mindfulness-based therapies (Goldberg et al., 2018). But what are the therapeutic factors of mindfulness? Beyond the empirical support for the efficacy of MBIs, the mechanisms by which they lead to successful treatment outcomes have also been object of research, with Creswell et al. (2019) claiming that mindfulness interventions train two stress resilience pathways in the brain: increasing activity and functional connectivity in stress regulatory regions of the prefrontal cortex (constituting the regulatory pathway); and decreasing activity and functional connectivity in regions gating the brain's stress alarm

system (which constitutes the reactivity pathway). Regarding the regulatory pathway, mindfulness interventions have been shown to increase the coupling of the resting brain (the so-called default mode network) with regulatory regions of the prefrontal cortex in the executive control network while also increasing connectivity strength among regions within the executive control network (Creswell et al., 2019). Furthermore, studies showed that mindfulness stress reduction interventions improved autonomic balance, reducing the influence of the sympathetic nervous system while increasing that of the parasympathetic (Nijjar et al., 2014).

Bishop et al. (2004) proposed a two-component model of mindfulness which can be helpful in understanding how mindfulness may relate to treatment response when considering CBT: the first component involves an intentional process in which individuals attend to, and observe, important mood related experiences that occur in the present moment; the second component involves adopting a non-evaluative orientation toward these experiences, characterized by curiosity, openness, and acceptance (Bishop et al., 2004). By such means, mindfulness facilitates an observational stance towards internal experience, allowing people to accept their thoughts as 'just thoughts' rather than a literal reflection of reality (Didonna et al., 2018).

Hawley et al. (2017) showed that specific facets of mindfulness predicted symptom alleviation after cognitive behavior therapy. In particular, the «Acting with Awareness» facet predicted post-CBT treatment symptom alleviation for individuals diagnosed with generalized anxiety disorder (GAD) or panic disorder with or without agoraphobia (PD/A); this facet assesses the ability to sustain mindful, focused attention on activities in the present moment (as opposed to "operating on auto-pilot" with minimal conscious awareness), and this facet has been shown to be significantly inversely related

to generalized psychological distress (Baer et al., 2006), worry (De Bruin et al., 2012), anxious arousal and generalized anxiety related distress (Desrosiers et al., 2013).

The «Nonreactivity» facet predicted post-CBT treatment symptom alleviation for individuals diagnosed with Obsessive Compulsive Disorder (Hawley et al., 2017), suggesting that mindfulness practice benefits these patients by empowering them to deal with their intrusive thoughts in a healthy way and better recognize and prevent their urges to engage in compulsive behaviors (Didonna et al., 2018). This facet assesses the capacity to allow thoughts and feelings to come and go without getting drawn into them and has been shown to be significantly negatively associated with symptoms of general distress (Baer et al., 2006), anxiety related distress (Desrosiers et al., 2013) as well as symptoms of anxiety and depression (De Bruin et al., 2012).

In short, research has provided evidence for Bishop et al. (2004)'s proposal that the processes underlying the positive effects of mindfulness are the self-regulation of attention and awareness, acceptance, and openness to experience of the present moment, by which mindfulness facilitates an observational stance towards internal experience, allowing people to accept their thoughts as 'just thoughts' rather than a literal reflection of reality (Didonna et al., 2018).

In a similar way, spontaneity has been confirmed to correlate positively with the tendency to focus on behavior, feelings and thoughts related to the present situations (Christoforou & Kipper, 2006), and to correlate negatively with emotional inhibition (Kipper et al., 2009). Studies showed positive correlations between spontaneity and well-being, self-efficacy, ability to express emotions, self-esteem and negative correlations between spontaneity and anxiety, stress, neuroticism and obsessive-compulsive

tendencies (Christoforou & Kipper, 2006; Davelaar et al., 2008; Gonzalez, 2012; Kipper & Shemer, 2006).

Spontaneity and Mindfulness seem to have in common the acceptance of the here-and-now, but while Mindfulness is inward-directed and contemplative, Spontaneity tends to be more outward-directed and expressive (Gluck, 2013). The fact that spontaneity positively and strongly correlates with the Extroversion personality trait as measured by the Revised NEO Personality Inventory (NEO PI-R) seems to confirm this assertion (Rocha, 2010 found a correlation coefficient of r = .578 significant at the .01 level). Despite these inferences, there have been few investigations regarding the relationship between spontaneity and mindfulness, shedding little light on the matter.

The main aim of this study is to test the association between spontaneity and mindfulness. This would allow us to see if there is indeed a connection between these constructs, paving the way for further understanding of their similarities and differences as well as the possible benefits of intervention protocols that explicitly center on enhancing both of them in participants. It would also be a further step towards the conceptualization of spontaneity in a way that fits the mold of Third Wave CBT – Abeditehrani et al (2020), for example, have already established that "In CBT-terms, spontaneity can be seen as the opposite of avoidance and inhibition".

In light of the differences and similarities between Spontaneity and Mindfulness stated above, we propose that there will be an association between all facets of Mindfulness and Spontaneity, with the exception of the facet «Observing», which has been shown to be associated with depression, anxiety and stress when the sample is composed of non-meditators (Baer et al., 2006; Baer et al., 2008; Gregório & Gouveia,

2011). Since Spontaneity has been negatively associated with anxiety and stress, it may also relate with lower levels of «Observing».

We will also examine the association Spontaneity and the facets of Mindfulness might have with sleep quality. Sleep quality has been associated with mental and physical health (Pilcher & Ott, 1998), being that a poor sleep quality can be caused by biological, cognitive, and/or behavioral problems (Caldwell et al, 2010). Allen et al. (2016) found a link between neuroticism and sleep difficulties, which is mediated by its association with the tendency to experience more negative affect; Allen et al. (2016) also found that extroversion is associated with better sleep quality through its link with more positive affect; since spontaneity has been shown to be negatively correlated with neuroticism and positively correlated with extroversion (Rocha, 2010), it is expected that spontaneity will be associated with better sleep quality. This association goes both ways: since sleep loss has been shown to impair flexible and innovative thinking and the ability to revise plans in light of new information (Harrison & Horne, 1999), we expect that worse quality of sleep will be associated with lower levels of Spontaneity.

Several research studies support that Mindfulness practices are associated with better quality of sleep. From a cognitive behavior perspective, sleep problems stem from automatic arousal, dysfunctional cognitions, and consequential distress (Harvey, 2002), and previous studies indicate that Mindfulness meditation can attenuate such automatic responses and increase the relaxation response, reducing worry and rumination and alleviating mood disturbances (Black et al., 2015). Caldwell et al. (2010) found that enhancing the levels of all facets of Mindfulness in a group of participants produced enhancements in their quality of sleep, with the exception of the «Describing» facet; a review of the effects of MBSR on sleep disturbance by Kim et al. (2016) found some

evidence associating improved sleep with increased practice of mindfulness techniques; Greeson et al. (2018) found increased mindfulness was associated with decreased sleep disturbances; and more recently Talley and Shelley-Tremblay (2020) added further evidence that mindfulness is correlated with decreases in sleep disturbances and improvements in a person's sleep quality through acting with awareness and being non-judgmental towards oneself following the experience of an event.

However, there have been no studies relating spontaneity with sleep quality. The study of this relationship will allow for further exploration of the ramifications of spontaneity through the observance of its possible association with quality of sleep, while also allowing us to see how mindfulness and spontaneity each relate to sleep quality, which could further illuminate the similarities and differences between these constructs. In relation to the association of mindfulness with sleep quality, we expect the results of Talley and Shelley-Tremblay (2020) to be replicated, with the Observing facet of Mindfulness being related with worse quality of sleep and Act with Awareness and Nonjudgement both being associated with better sleep quality. Similarly to the findings of these authors, we expect Nonreactivity and Describing to not be significantly associated with sleep quality.

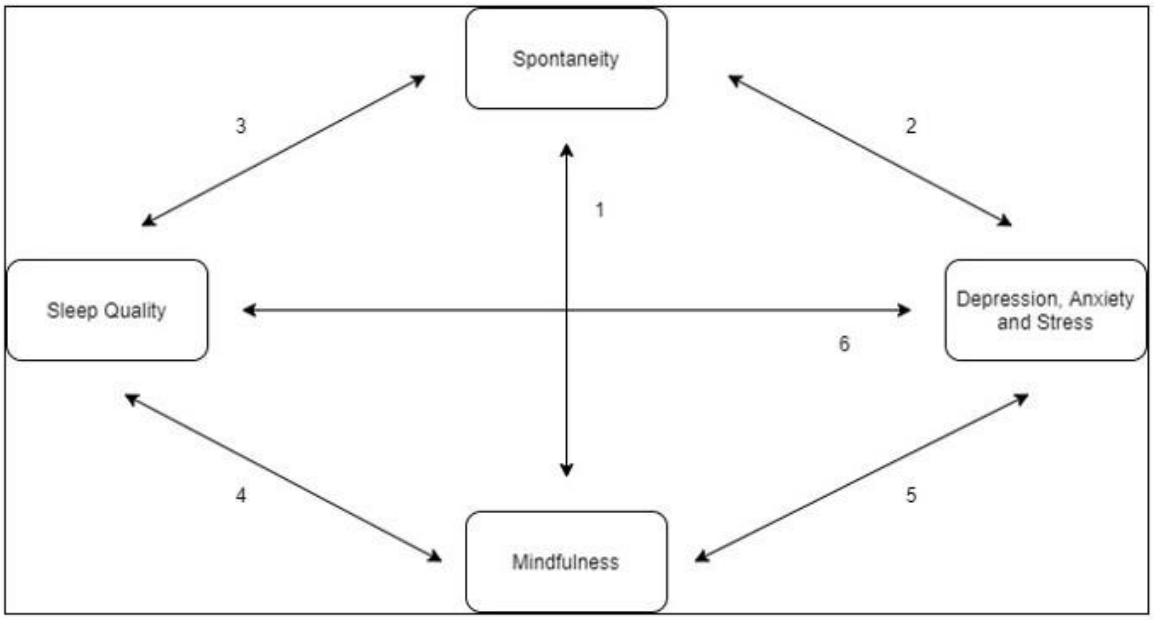
We expect Spontaneity to have a negative association with anxiety and stress (as reported by Christoforou & Kipper, 2006, Gonzalez & Martins, 2018 and Kipper & Shemer, 2006), as well as with depression, as theorized by Moreno (1964).

Similarly to Gregório and Gouveia (2011)'s findings, we expect all facets of Mindfulness to have negative associations with symptoms of Anxiety, Depression and Stress, with the exception of «Observing», which had, in these authors' study, positive correlations with these constructs, which had also been noted by Baer et al. (2006). These

authors hypothesized that observing with and without acceptance constitute two different psychological processes, the latter being a negative one, associated with attempts at avoidance and suppression (Gregório & Gouveia, 2011). This association also reinforces our supposition that «Observing» will be associated with worse quality of sleep.

Figure 1

Working hypotheses



1) Positive, medium or large correlations between Spontaneity and all facets of Mindfulness, except Observing;
2) Negative, medium or large correlations between Spontaneity and symptoms of Depression, Anxiety and Stress;
3) Spontaneity associated with an overall better Sleep Quality;
4) Act with Awareness and Nonjudgement associated with an overall better sleep quality and Observing associated with poorer sleep quality;
5) All facets of Mindfulness negatively correlated with symptoms of Depression, Anxiety and Stress, with the exception of «Observing», which will have a positive correlation with these constructs;
6) Better Sleep quality associated with less symptoms of Depression, Anxiety and Stress.

In summary, regarding the associations between our main variables (Spontaneity, Mindfulness, sleep quality and symptoms of Depression, Anxiety and Stress), we have six hypotheses, illustrated in Figure 1.

We also had as secondary goals to test whether or not sex, age, level of education, change in levels of anxiety after the COVID-19 pandemic, the presence of psychopathology, regular consumption of substances and current mental health treatment, as well as the sex and age of participants and previous practice of Psychodrama and/or Mindfulness, had any effects on our main variables.

Methods

Participants

Participants were recruited via social media posts between February and May of 2021. The posts included a link for the informed consent and questionnaires. Inclusion criteria for the total sample were: 1) being an adult (18 years old or above); 2) easy access to the internet and to a computer. The following exclusion criteria were used to define a refined subsample: 1) diagnosis of psychopathology; 2) regular consumption of one or more of the substances: alcohol, tobacco, cannabinoid and hallucinogenic drugs; 3) current participation in treatment with a mental health professional.

Our sample, including participants with a self-reported diagnosis and/or regularly consume substances and/or who are undergoing treatment with a mental health professional, was composed of 157 participants, most of them (87.8%) of Portuguese nationality. 64.7% of the sample was comprised of female participants, and 28.8% of male participants (6.4% of participants do not state their gender). Their ages range

between 18 and 76 years (M = 33.23, SD = 13.69, Mdn = 27, Mo = 21) (3.8% of the participants do not state their age).

45.5% of our participants were students (being that 30.8% are studying psychology), and the rest of the sample was composed of participants of various professions, with 3.2% of the participants being retired and 1.9% unemployed.

59.6% of the participants had a college degree, 34.6% had the complete secondary education and 4.5% had the complete primary education or less (1.3% of the participants do not state their nationality, current profession and level of education).

83.3% of our participants stated having never practiced mindfulness or undergone psychodrama group therapy. 12.2% reported having practiced Mindfulness sometime in their lives and 2.6% had previous experiences in Psychodrama (1.9% of participants do not answer this question).

58.3% of participants stated feeling more anxiety than before the COVID-19 pandemic, while 37.8% reported feeling neither more or less anxiety than before and 3.2% stated they felt less anxiety than before the pandemic.

21.2% of participants reported having been diagnosed with one or more psychopathologies, the most common diagnoses having been depression (10.9%) and anxiety (9%).

30.1% of the participants reported regularly consuming substances. Specifically, 20.5% regularly consumed alcohol, 15.3% regularly consumed tobacco, and 5.1% reported consuming psychoactive drugs on a regular basis.

77.6% reported not to be undergoing treatment with a mental health professional, while 17.3% stated to be undergoing treatment with a psychologist and 5.1% with a psychiatrist.

The subsample, from which participants with a self-reported diagnosis and/or who regularly consume substances and/or who are undergoing treatment with a mental health professional were excluded, was composed of 74 participants, with ages between 18 and 76 years old (M = 35.42, SD = 14.32, Mdn = 36, Mo = 21), with (4.05% of the participants chose not to state their age), 68.9% females and 24.3% males (6.8% do not state their sex), most of them (93.2%) of Portuguese nationality. 36.5% of the participants were students (and 28.9% study psychology) and the rest were of various professions (none of them unemployed). 60.3% of the participants had a college degree, and 35.7 % had the complete secondary education, 4.1% having had complete primary education or less.

Regarding the level of anxiety after the COVID-19 pandemic, 52.7% of the participants stated they felt more anxiety than before the pandemic, 43.2% did not report changes in their anxiety levels, and 4.1% reported feeling less anxiety than before the pandemic.

91.1% of the participants had no previous practice of Psychodrama and/or Mindfulness, and 8.1% stated they had previous experiences of Mindfulness (all participants who report having previous practice of Psychodrama checked for one or more exclusion criteria, so they were absent from this particular collection of data).

Materials

The materials for this study included items from 4 self-report inventories as well as a questionnaire relative to sex, age, nationality, current profession, level of education, regular consumption of substances, self-reported diagnostic of psychopathology, current

mental health treatment, change in anxiety levels after the pandemic and previous practice of Psychodrama and/or Mindfulness.

The **Revised Spontaneity Assessment Inventory** (SAI-R; Kipper & Hundal, 2005; Portuguese adaptation: Gonzalez et al., 2021) is a self-report inventory created for the purpose of measuring the presence and intensity of spontaneity. It is composed of 18 items which describe thoughts and feelings such as "joyful", "creative, "free to act", "in control", "uninhibited" or "capable of doing anything, within limitations". The answers to how strong these thoughts and feelings are to the participant are given on a Likert scale that ranges from 1 ("very weak") to 5 ("very strong"). The total score is obtained through the sum of the items' individual scores. In this study internal consistency was adequate for the SAI-R (Cronbach's $\alpha = 0.93$), in accordance with the study of Gonzalez et al. (2021).

The **Five Facet Mindfulness Questionnaire** (FFMQ; Baer et al., 2006; Baer et al., 2008; Portuguese adaptation: Gregório & Pinto Gouveia, 2011) is based on the assumption that Mindfulness is a multifaceted construct, and its focus is to evaluate five individual sub-components of mindfulness: Observing, Describing, Act with Awareness, Nonjudgment and Nonreactivity. It is made up of 39 self-response items which assess the individual's tendency to be mindful in her/his daily life (for example: "I can be aware of my thoughts without having to react to them", "I observe my feelings and thoughts without losing myself in them", "I criticize myself for having irrational or inappropriate emotions"), answered through a Likert-type scale which ranges from 1 ("Never or very rarely true") to 5 ("Very frequently ou always true"). In this study, the internal

consistency of each FFMQ factor and for the total scale was in the acceptable range (Observing $\alpha = 0.79$, Describing $\alpha = 0.87$, Act with Awareness $\alpha = 0.92$, Nonjudgment $\alpha = 0.9$, Nonreactivity $\alpha = 0.77$, total FFMQ $\alpha = 0.89$).

The **Pittsburgh Sleep Quality Index** (PSQI, Buysse et al., 1989; Portuguese psychometric validation: Marques et al., 2013; Gomes et al., 2018) assesses the quality of sleep referring to the previous month, consisting of 19 items aimed at the participant and another 5 items directed to the person who shares the bed and/or bedroom with the participant; these last five items were omitted in our study. The first 19 items allow us to compute an overall score and seven individual components: Sleep Quality; Sleep Latency; Sleep Duration; Habitual Sleep Efficiency; Sleep Disturbance; Use of Sleeping Medications; and Daytime Dysfunction. The PSQI also gives us a total score. Internal consistency for the PSQI was acceptable (Cronbach's $\alpha = 0.7$) All of this scale's scores are inverted, meaning that higher values indicate more symptoms of poor sleep quality. Conversely, the lower the scores, the better is the individual's sleep.

We also used a Portuguese adaptation of the **Depression, Anxiety and Stress Scales** (DASS, originally developed by Lovibond & Lovibond, 1995), composed of 21 items, named DASS-21 (Portuguese version by Pais-Ribeiro et al., 2004). This scale is based on a dimensional perspective of psychopathological symptoms. It is constituted by 21 self-response items (each rated in a Likert scale ranging from 1 to 4) through which participants rate the extent to which they have experienced each state over the past week. The DASS-21 gives us three main scores (Depression, Anxiety and Stress), each obtained by summing seven individual items specific to each of these main scores. In our study,

each subscale and the total scale showed good internal consistency (total DASS-21 α = 0.94). The Depression scale (Cronbach's α = 0.88) assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia; the Anxiety scale (Cronbach's α = 0.87) assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect; and the Stress scale (Cronbach's α = 0.89) assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and being impatient.

Procedure

This is a non-experimental correlational study. Ethical approval was obtained from the Ethics Committee of the Faculty of Psychology and the Education Sciences of the University of Coimbra prior to recruitment (ref.: CEDI.25.02.2020).

The online survey containing the informed consent, questions regarding sociodemographic variables and the instruments described above was created through Google Forms (google.com/forms) and posted on social media. Only one of the researchers had access to the participants' responses through a Google account with confidential credentials. Upon closure of the database, the responses were transposed to IBM SPSS Statistics (version 22) and the online form was erased.

Through IBM SPSS Statistics (version 22) we calculated the Cronbach's alpha values for each instrument and proceeded to calculate the descriptive statistics of the sample characteristics.

We performed Kolmogorov-Smirnov and Shapiro-Wilk normality tests for all variables and proceeded to perform non-parametric comparison tests between the medians of the variables, with the factors being sex, age and previous practice of

Mindfulness and/or Psychodrama. All these calculations were performed twice: once for the reduced sample and again for the total sample, including participants with a self-reported diagnosis and/or who regularly consume substances and/or who are undergoing treatment with a mental health professional (in which case these variables were factors for the non-parametric comparison tests between the medians of the variables).

We proceeded to calculate the means, standard deviations and medians of the scores obtained in the instruments for both the total sample and the sample that excluded participants with a self-reported diagnostic of psychopathology, current mental health treatment and who regularly consume substances.

Given the results of the normality tests, we went on to calculate Spearman correlation coefficients between our variables and the sociodemographic characteristics which were not nominal. We proceeded to calculate the correlations between the scores of the four instruments utilized. All these coefficients were calculated both in the total and reduced samples.

In order to evaluate the correlation coefficient, determining the strength of the relationship (effect size), we used Cohen's standard as presented in Cohen et al. (2003).

Results

Preliminary analysis

The scores of the SAI-R and of all the scales of the FFMQ were the only variables shown to follow a normal distribution, according to the Kolmogorov-Smirnov and Shapiro-Wilk tests for normality.

In the case of the total sample, these tests for normality also indicated that the scores of the SAI-R and the Describing, Act with awareness and Nonjudgement scales of

the FFMQ, follow a normal distribution, and the Shapiro-Wilk test in particular also indicated that for Nonreactivity.

Performing Mann-Whitney's test for independent samples in the total sample, we verified that the sex of the participants had a significant effect on Sleep latency: even though the groups have the same median (Mdn = 1), means were lower in men (M = 0.87) than in women (M = 1.27). The sex of the participants also had an impact on the Nonreactivity facet of Mindfulness, U = 1630, p = .011, with the scores being significantly higher for men (Mdn = 22) than for women (Mdn = 20). Sex also had an effect on the "Being easily upset/agitated" subscale of the DASS-21: despite the medians of the groups being equal (Mdn = 1), the means indicate that women (M = 1.40) had higher scores in comparison to men (M = 1.01).

A Kruskal-Wallis ANOVA revealed that age only had a significant impact on the Act with Awareness scale of the FFMQ, χ^2 (43, n = 150) = 60,043, p = .044. Scores tended to increase with age, being that people under 30 (Mdn = 24) had lower values than people between 30 and 50 years (Mdn = 28.5), which in turn had lower scores than people above 50 years old (Mdn = 31).

There were only four participants with previous practice of Psychodrama in our sample, which would make it unreliable to test statistical differences between this group and others. Comparing the medians of people with no previous practice of either Psychodrama or Mindfulness and the medians of people with previous practice of Mindfulness, we found no statistically significant differences.

In the reduced sample, the Mann-Whitney test showed that the sex of the participants only had a significant effect on Sleep latency, U = 303, p = .025, Daytime dysfunction, U = 315, p = .021, the Global score of the PSQI, U = 313.5, p = .045. On

both components and global PSQI scores, medians were significantly higher in women (Mdn = 1, Mdn = 1, and Mdn = 5, respectively) than in men (Mdn = 0, Mdn = 0.5, and Mdn = 3, respectively).

Kruskal-Wallis ANOVAs revealed that age group and previous practice of Mindfulness had no significant effects in any of the variables (there were no practitioners of Psychodrama in this sample since all of them met one or more exclusion criteria).

Effects verified in the total sample

In the sample including people who met exclusion criteria, we conducted Kruskal-Wallis ANOVAs and Mann-Whitney comparison tests to see the effects the inclusion of these participants had on the previously mentioned results.

Self-reported diagnostic of psychopathology has a significant impact on the scores of the SAI-R, U = 1194, $p < .001$, the PSQI global score, U = 1416, $p = .009$, its subscales Sleep disturbance, U = 1646, $p = .038$, Sleep latency, U = 1555, $p = .037$, Daytime dysfunction, U = 1596, $p = .044$ and Sleep quality, U = 1491, $p = .010$, the Act with awareness, U = 1407, $p = .007$ and Nonjudgement, U = 1496, $p = .020$ subscales of the FFMQ, and the Depression, U = 1568, $p = .050$, and Anxiety, U = 1242, $p = .001$ subscales of the DASS-21. As can be seen in Table 1, the average scores were higher for people with no self-reported diagnosis of psychopathology in the case of the SAI-R and all facets of the FFMQ, except Describing, but lower in the case of the PSQI (in all components and in the Global score) and the DASS-21 (all three main scales).

Table 1 – Means and medians of participants with and without a self-reported diagnostic of psychopathology

Variable	Self-reported diagnostic of psychopathology	Mean	Median
SAI-R	No	59.16	60
	Yes	52.50	52
FFMQ Observing	No	25.44	26
	Yes	25.33	26
FFMQ Describing	No	27.02	27
	Yes	27.27	28
FFMQ Act with awareness	No	26.83	27
	Yes	23.09	23
FFMQ Nonjudgment	No	27.50	28
	Yes	24.09	23
FFMQ Nonreactivity	No	20.69	21
	Yes	19.67	20
PSQI Sleep duration	No	.37	0
	Yes	.52	0
PSQI Sleep disturbance	No	1.11	1
	Yes	1.33	1
PSQI Sleep latency	No	1.06	1
	Yes	1.58	2
PSQI Daytime dysfunction	No	.93	1
	Yes	1.24	1
PSQI Habitual sleep efficiency	No	.45	0
	Yes	.58	0
PSQI Sleep quality	No	1.08	1
	Yes	1.42	1
PSQI Use of sleeping medication	No	.27	0
	Yes	.55	0
PSQI Global	No	5.26	5
	Yes	7.21	7
DASS-21 Depression	No	4.05	3
	Yes	5.94	4
DASS-21 Anxiety	No	3.17	2
	Yes	6.27	6
DASS-21 Stress	No	6.27	6
	Yes	9.58	9

Regarding regular use of substances, the Kruskal-Wallis ANOVA revealed significant differences in the Nonjudgement subscale of the FFMQ between the groups

of people who do not consume any substance (Mdn = 28) and people who regularly drink alcohol (Mdn = 16) and smoke (Mdn = 22.5), χ^2 (3, n = 130) = 8.30, p = .040. There were also significant differences between non-regular consumers of any substance (Mdn = 6) and consumers of alcohol (Mdn = 11) and tobacco (Mdn = 11.5) in the Stress scale of the DASS-21, χ^2 (3, n = 129) = 8.45, p = .038. There was also a difference between non-regular consumers (Mdn = 0) and smokers (Mdn = 1) in Devaluation of life, χ^2 (3, n = 129) = 11.26, p = .010. In the subscale Anhedonia there was a significative difference between non-regular consumers (Mdn = 0), alcohol drinkers (Mdn = 0.5) and smokers (Mdn = 1), χ^2 (3, n = 129) = 9.51, p = .023. In the Muscle Skeletal Effects scale there was also a difference between non-consumers (Mdn = 0), alcohol drinkers (Mdn = 1.5) and smokers (Mdn = 1.5), χ^2 (3, n = 129) = 12.11, p = .007. In the Irritable/overreactive scale of the DASS-21, non-regular consumers (Mdn = 2), alcohol drinkers (Mdn = 4) and smokers (Mdn = 3.5) also differed significantly, χ^2 (3, n = 129) = 8.56, p = .036.

Mann-Whitney tests revealed statistically significant differences between the medians of people undergoing treatment with a mental health professional and people undergoing no psychological or psychiatric treatment in the scores of the SAI-R, the Daytime dysfunction and Use of sleeping medication scales of the PSQI, the Act with awareness and Nonjudgement scales of the FFMQ, the Stress scale of the DASS-21 and a few subscales of this questionnaire (Table 2). In the cases where statistically significant differences were observed, the means and medians of people undergoing a mental health treatment were lower for the SAI-R and FFMQ, and higher in the case of the PSQI and the DASS-21 (Table 2).

Table 2: Mann-Whitney U test with means, standard deviations and medians. Grouping variable: current treatment with a mental health professional

Variable	Mean		Std. Deviation		Median		Mann-Whitney U	*p*
	Current mental treatment		Current mental treatment		Current mental treatment			
	No	Yes	No	Yes	No	Yes		
SAI-R	58.75	54.27	9.86	1.12	60	53	153	.015*
PSQI Sleep duration	.39	.43	.67	.56	0	0	1946	.423
PSQI Sleep disturbance	1.12	1.29	.49	.62	1	1	1817.50	.117
PSQI Sleep latency	1.13	1.29	1.02	1.15	1	1	1965.50	.548
PSQI Daytime Dysfunction	.90	1.31	.66	.80	1	1	1504	.005**
PSQI Habitual Sleep Efficiency	.48	.46	.80	.70	0	0	2067	.864
PSQI Sleep quality	1.14	1.20	.65	.80	1	1	1999.50	.627
PSQI Use of sleeping medication	.23	.69	.69	1.16	0	0	1686	.006**
PSQI Global	5.39	6.66	3.04	3.55	5	6	1669.50	.064
FFMQ Observing	25.52	25.06	5.16	5.77	26	27	2085.50	.892
FFMQ Describing	26.83	27.89	5.58	6.42	27	28	1855.50	.265
FFMQ Act with Awareness	26.68	23.83	6.72	7.85	27	23	1582.50	.023*
FFMQ Nonjudgement	27.32	24.89	6.35	9.40	28	26	1786	.159
FFMQ Nonreactivity	2.99	18.71	4.23	4.99	21	19	1567.50	.019*
DASS-21 Depression	4.03	5.91	3.99	5.09	3	4	1611	.035*
DASS-21 Anxiety	3.40	5.31	3.55	4.87	2	3	1662	.059
DASS-21 Stress	6.38	9.03	4.31	5.03	6	9	1465.50	.006**

* *p* value is significant at the .05 level (2-tailed).

** *p* value is significant at the .01 level (2-tailed).

Descriptives in the total sample and in the subsample

The subsample, from which were excluded participants with a self-reported diagnosis of psychopathology and/or undergoing current mental treatment and/or who regularly consume substances, had higher means and medians in the scores of the SAI-R and the Act with awareness and Nonjudgement facets of Mindfulness. In the case of

Observing the total sample had a higher mean and median. Regarding Describing and Nonreactivity, the medians were the same in both the reduced and total samples, even though the means were higher in the reduced sample (Table 3).

The total sample had higher means in the PSQI, even though the medians were the same for all scales of this instrument except Use of sleeping medication and the Global score, with the medians of the total sample being higher in both cases (Table 3).

The total sample had higher means in every scale and subscale of the DASS-21. While the means were in many cases similar, the total sample had higher medians in the three main scales (Depression, Anxiety and Stress) (Table 3).

Table 3: Means, standard deviations and medians

	Total sample			Reduced sample		
	Mean	Std. Deviation	Median	Mean	Std. Deviation	Median
SAI-R	57.73	10.06	59	60.83	8.55	61.41
FFMQ Observing	25.41	5.29	26	25.03	5.60	25
FFMQ Describing	27.07	5.78	27	27.37	6.10	27
FFMQ Act with awareness	26.03	7.07	25.50	28.23	6.64	29
FFMQ Nonjudgement	26.77	7.20	27.35	28.68	6.39	29
FFMQ Nonreactivity	20.47	4.50	21	20.94	4.94	21
PSQI Sleep duration	.40	.64	0	.32	.62	0
PSQI Sleep disturbance	1.16	.53	1	1.04	.45	1
PSQI Sleep latency	1.17	1.05	1	1.01	.94	1
PSQI Daytime Dysfunction	.99	.71	1	.75	.57	1
PSQI Habitual sleep efficiency	.47	.78	0	.44	.80	0
PSQI Sleep quality	1.16	.69	1	1.10	.69	1
PSQI Use of sleeping medication	.33	.84	0	.22	.71	0
PSQI Global	5.68	3.20	5	4.88	2.85	4
DASS-21 Depression	4.46	4.32	3	2.91	3.30	2
DASS-21 Anxiety	3.83	3.96	3	2.73	2.79	2
DASS-21 Stress	6.98	4.60	6.50	5.54	4.20	5

Associations between the main variables and age, level of education and changes in anxiety after the pandemic

We started by testing the correlations between the scores of the questionnaires and the ordinal/scale variables from our sociodemographic survey (age, level of education and change in anxiety levels after the pandemic) (Table 4).

In the case of the total sample, age significantly, and positively, correlated with the Act with Awareness and Nonjudgement scales of the FFMQ, having significant negative correlations with the Depression and Stress scales of the DASS-21 and some of its subscales (Table 4). Level of education correlated significantly with the Observing and Describing facets of Mindfulness, and had significant negative correlations with Anxiety and some subscales of the DASS-21 (Table 4). As for change in anxiety after the pandemic, it is worth highlighting that this variable had three levels, 1 corresponding to "I feel less anxiety than before", 2 corresponding to "Neither more nor less anxiety than before" and 3 corresponding to "I feel more anxiety than before". This variable had a significant negative correlation with the scores of the SAI-R and all facets of Mindfulness aside from Describing and Nonreactivity; it positively correlated with the Sleep Quality, Use of sleeping medication and Global scores of the PSQI (higher scores meaning poorer sleep patterns), as well as with all scales and subscales of the DASS-21 (Table 4).

Excluding participants with a self-reported diagnostic of psychopathology and/or regularly consume substances and/or are currently undergoing mental treatment, age had significant correlations with the Act with awareness facet of Mindfulness, the Use of sleeping medication scale of the PSQI and only one subscale of the DASS-21 (Inertia) (Table 4). Level of education had significant positive correlations with the Use of sleeping medication, the Anxiety scale of the DASS-21 and one of its subscales (Autonomic arousal) (Table 4). Change in anxiety levels after the pandemic significantly correlated with the Sleep disturbance, Daytime dysfunction, Sleep quality, Use of sleeping medication and the Global scores of the PSQI; it also correlated positively with the Depression, Anxiety and Stress scales of the DASS-21, as well as with many of their subscales (Table 4).

Table 4: Correlations between the scale scores and age, level of education and change in anxiety levels after the pandemic in the total sample and the reduced sample

Variables		Age		Level of education		Changes in anxiety after the pandemic	
		Total sample	Reduced sample	Total sample	Reduced sample	Total sample	Reduced sample
SAI-R	r_s	.136	-.064	.073	.139	-.271**	-.204
	P	.097	.598	.368	.242	.001	.081
	N	149	71	153	73	155	74
FFMQ Observing	r_s	.018	.049	.235**	.213	.176*	.132
	P	.831	.683	.003	.070	.029	.261
	N	150	71	154	73	155	74
FFMQ Describing	r_s	.076	-.103	.183*	.130	-.135	-.039
	P	.358	.394	.023	.274	.095	.743
	N	150	71	154	73	155	74
FFMQ Act with awareness	r_s	.359**	.323**	.033	-.009	-.283**	-.190
	P	<.001	.006	.682	.938	<.001	.105
	N	150	71	154	73	155	74
FFMQ Nonjudgement	r_s	.225**	.124	.075	.187	-.318**	-.131
	P	.006	.301	.356	.114	<.001	.266
	N	150	71	154	73	155	74
FFMQ Nonreactivity	r_s	-.098	-.164	.104	.019	-.049	-.054
	P	.232	.171	.199	.870	.544	.647
	N	150	71	154	73	155	74
PSQI Sleep duration	r_s	.110	.119	.047	.118	.166*	.219
	P	.181	.325	.564	.321	.039	.062
	N	150	71	154	73	154	73
PSQI Sleep disturbance	r_s	.072	.169	-.123	.037	.320**	.259*

	P	.381	.159	.129	.758	<.001	.027
	N	150	71	154	73	154	73
PSQI Sleep latency	r_s	-.159	-.042	-.133	.042	.270**	.190
	P	.052	.728	.100	.724	.001	.108
	N	150	71	154	73	154	73
PSQI Daytime dysfunction	r_s	-.160	.043	-.087	.026	.430**	.310**
	P	.051	.724	.285	.827	<.001	.008
	N	150	71	154	73	154	73
PSQI Habitual sleep efficiency	r_s	-.047	.036	.003	-.027	.108	.058
	P	.564	.767	.968	.824	.182	.624
	N	150	71	154	73	154	73
PSQI Sleep quality	r_s	-.018	.110	-.081	.172	.277**	.314**
	P	.831	.362	.316	.145	<.001	.007
	N	150	71	154	73	154	73
PSQI Use of sleeping medication	r_s	.139	.295*	.124	.257*	.191*	.244*
	P	.089	.012	.126	.028	.018	.038
	N	150	71	154	73	154	73
PSQI Global	r_s	-.026	.122	-.060	.079	.405**	.345**
	P	.753	.309	.458	.504	<.001	.003
	N	150	71	154	73	154	73
DASS-21 Depression	r_s	-.215**	-.152	-.154	-.096	.436**	.348**
	P	.008	.205	.057	.422	<.001	.003
	N	150	71	154	73	154	73
DASS-21 Anxiety	r_s	-.153	-.055	-.253**	-.265*	.346**	.258*
	p	.062	.647	.002	.023	<.001	.027

	N	150	71	154	73	154	73
DASS-21 Stress	r_s	-.163*	-.089	-.100	-.087	.396**	.385**
	p	.047	.463	.217	.463	<.001	.001
	N	150	71	154	73	154	73

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

Correlations between the main variables

We proceeded to calculate the correlation coefficients between the scores of the questionnaires (Tables 5 to 13).

Excluding participants with a self-reported diagnostic of psychopathology and/or who regularly consume substances and/or are currently undergoing mental health treatment, the SAI-R had significant correlations with every scale of the FFMQ except for Observing and Act with Awareness (Table 5). In the case of the total sample, all facets of Mindfulness significantly correlated with the SAI-R except for Observing (Table 5).

Table 5: Correlations between the scores of the SAI-R and the FFMQ

	Observing	Describing	Act with awareness	Nonjudgement	Nonreactivity
Reduced sample (N = 74)					
r_s	.129	.409**	.156	.296*	.253*
p	.273	<.001	.183	.011	.030
Total sample (N = 155)					
r_s	.154	.359**	.314**	.379**	.311**
p	.056	<.001	<.001	<.001	<.001

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

In the reduced sample, the SAI-R significantly and inversely correlated with the global score of the PSQI (being that lower scores in this instrument signal better sleep)

and had significant negative correlations with three other scales of the PSQI (Sleep duration, Daytime dysfunction and Sleep quality) (Table 6).

In the total sample, the SAI-R maintained these significant correlations, except it no longer correlated significantly with Sleep duration, but instead with Sleep latency (Table 6).

Table 6: Correlations between the scores of the SAI-R and the PSQI

SAI-R	PSQI							
Reduced sample (N = 73)								
	Sleep duration	Sleep disturbance	Sleep latency	Daytime dysfunction	Habitual sleep efficiency	Sleep quality	Use of sleeping medications	PSQI Global
r_s	-.265*	.016	-.035	-.316**	-.031	-.342**	-.044	-.232*
p	.023	.891	.768	.006	.792	.007	.714	.049
Total sample (N = 154)								
r_s	-.140	-.174	-.202*	-.415**	-.114	-.294**	-.183*	-.372**
p	.082	.031	.012	<.001	.159	<.001	.023	<.001

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Not considering participants meeting exclusion criteria, all correlation coefficients between the SAI-R and the DASS-21 were negative and significant, except for one component of the Anxiety scale (Skeletal muscle effects) (Table 7).

Including all participants in the analysis, all correlations between the SAI-R and the DASS-21 were negative and significant (Table 7).

Table 7: Correlations between the scores of the SAI-R and the DASS-21

DASS-21		SAI-R	
		Reduced sample (N = 73)	Total sample (N = 154)
Depression	r_s	-.506**	-.564**
	p	<.001	<.001
Anxiety	r_s	-.335**	-.344**
	p	.004	<.001
Stress	r_s	-.399**	-.430**
	p	<.001	<.001

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlating the scales of the FFMQ with the PSQI, there were few significant correlations, both in the total and reduced samples (Tables 8 and 9). In both cases, Nonjudgement was the facet of Mindfulness that had more significant negative correlations with the PSQI (Table 8 and 9).

In the total sample, Nonjudgement correlated significantly with every scale of the PSQI except for Habitual sleep efficiency and Use of sleeping medication. Act with awareness also correlated significantly with the Global score, Sleep quality and Daytime dysfunction scores (Table 9).

Table 8: Correlations between the scores of the FFMQ and the PSQI (reduced sample)

PSQI		FFMQ				
N = 73		Observing	Describing	Act with awareness	Nonjudgement	Nonreactivity
Sleep duration	r_s	.096	-.092	-.112	-.231*	.034
	p	.420	.437	.345	.050	.773
Sleep disturbance	r_s	-.003	-.041	-.065	-.118	.092
	p	.978	.728	.587	.320	.438
Sleep latency	r_s	-.154	.028	-.059	-.138	.079
	p	.194	.814	.619	.245	.507
Daytime dysfunction	r_s	.044	.023	-.306**	-.269*	.009
	p	.713	.850	.008	.021	.938
Habitual sleep efficiency	r_s	-.112	.010	-.007	-.070	.198
	p	.347	.932	.951	.556	.093
Sleep quality	r_s	-.018	-.131	-.174	-.179	-.057
	p	.883	.269	.141	.129	.634
Use of sleeping medication	r_s	.120	-.001	-.108	-.004	-.040
	p	.311	.996	.361	.975	.739
PSQI Global score	r_s	-.048	-.052	-.205	-.257*	.079
	p	.687	.663	.082	.028	.507

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 9: Correlations between the scores of the FFMQ and the PSQI (total sample)

PSQI		FFMQ				
N = 155		Observing	Describing	Act with awareness	Nonjudgement	Nonreactivity
Sleep duration	r_s	.072	-.062	-.075	-.227**	-.009
	p	.377	.446	.355	.004	.916
Sleep disturbance	r_s	.012	-.172*	-.160*	-.190*	-.091
	p	.881	.033	.046	.018	.258
Sleep latency	r_s	-.113	-.058	-.135	-.254**	-.006
	p	.162	.472	.094	.001	.944
Daytime dysfunction	r_s	.025	-.081	-.367**	-.383**	-.126
	p	.753	.315	<.001	<.001	.117
Habitual sleep efficiency	r_s	-.063	-.096	-.144	-.121	.064
	p	.436	.234	.073	.134	.429
Sleep quality	r_s	.005	-.144	-.284**	-.279**	-.080
	p	.947	.073	<.001	<.001	.320
Use of sleeping medication	r_s	-.046	.013	-.143	-.113	-.133
	p	.574	.875	.076	.161	.100
PSQI Global score	r_s	-.049	-.153	-.315**	-.379**	-.086
	p	.548	.058	<.001	<.001	.289

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Concerning the correlations between the FFMQ and the DASS-21 in the reduced sample (Table 10), Nonjudgement was the only Mindfulness scale to have significant negative correlations with Anxiety and Stress, as well as with all subscales of the DASS-21, except for Devaluation of life and Skeletal muscle effects. Depression only had significant negative correlations with Act with Awareness and Nonjudgement (Table 10). Observing had no significant correlations with any scale or subscale with the exception of Situational Anxiety (Table 10).

Including all participants (Table 11), Nonjudgement and Act with awareness both had negative significant correlations with all three main scales of the DASS-21 and most of their components. Observing had no significant correlations with any scale of the DASS-21. All facets of Mindfulness except Observing had significant negative correlations with Depression and most of its symptoms. Observing and Nonreactivity were the only facets of Mindfulness that didn't have significant correlations with Anxiety. All facets of Mindfulness had significant negative correlations with Stress, apart from Observing and Describing (Table 11).

Table 10: Correlations between the scores of the FFMQ and the DASS-21 (reduced sample)

DASS-21		FFMQ				
N = 73		Observing	Describing	Act with awareness	Nonjudgement	Nonreactivity
Depression	r_s	.009	-.216	-.338**	-.495**	-.061
	p	.938	.066	.003	<.001	.608
Anxiety	r_s	-.120	-.206	-.149	-.440**	-.105
	p	.311	.080	.208	<.001	.374
Stress	r_s	.010	-.129	-.196	-.541**	-.071
	p	.935	.278	.097	<.001	.549

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 11: Correlations between the scores of the FFMQ and the DASS-21 (total sample)

DASS-21		FFMQ				
N = 155		Observing	Describing	Act with Awareness	Nonjudgement	Nonreactivity
Depression	r_s	-.031	-.237**	-.412**	-.460**	-.178*
	p	.697	.003	<.001	<.001	.026
Anxiety	r_s	-.032	-.233**	-.245**	-.347**	-.147
	p	.696	.003	.002	<.001	.068
Stress	r_s	.020	-.157	-.367**	-.504**	-.160*
	p	.808	.051	<.001	<.001	.047

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The Depression and Stress scales of the DASS-21 had significant positive correlations with the Global score of the PSQI, both in the total and the reduced samples (Tables 12 and 13). Specifically in the reduced sample, Stress had significant correlations with more scales of the PSQI (specifically, it significantly correlated with Sleep latency, Daytime dysfunction and Sleep quality) than any other subscale of the DASS-21 (Table 12). Anxiety did not significantly correlate with any scale of the PSQI in the reduced sample (Table 12).

In the case of the total sample (Table 13), all scales of the PSQI had a significant positive correlation with Depression (except for Habitual sleep efficiency), Anxiety and Stress (with the exceptions of Sleep duration and Use of sleeping medication) (Table 13).

Table 12: Correlations between the scores of the PSQI and the DASS-21 (reduced sample)

DASS-21		PSQI							
N = 73		Sleep duration	Sleep disturbance	Sleep latency	Daytime dysfunction	Habitual sleep efficiency	Sleep quality	Use of sleeping medication	PSQI Global
Depression	r_s	.240*	.044	.135	.382**	.095	.175	.087	.255*
	p	.041	.709	.256	.001	.422	.138	.466	.030
Anxiety	r_s	.167	.191	.185	.135	.172	.172	.100	.209
	p	.157	.106	.116	.255	.145	.145	.402	.076
Stress	r_s	.112	.138	.323**	.350**	.139	.394**	.152	.370**
	p	.347	.244	.005	.002	.241	.001	.199	.001

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 13: Correlations between the scores of the PSQI and the DASS-21 (total sample)

DASS-21		PSQI							
N = 155		Sleep duration	Sleep disturbance	Sleep latency	Daytime dysfunction	Habitual sleep efficiency	Sleep quality	Use of Sleeping medication	PSQI Global score
Depression	r_s	.201*	.281**	.251**	.519**	.123	.314**	.196*	.423**
	p	.012	<.001	.002	<.001	.128	<.001	.015	<.001
Anxiety	r_s	.092	.368**	.270**	.243**	.167*	.330**	.090	.348**
	p	.256	<.001	.001	.002	.038	<.001	.267	<.001
Stress	r_s	.164*	.260**	.281**	.440**	.161*	.449**	.155	.444**
	p	.041	.001	<.001	<.001	.045	<.001	.054	<.001

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

There were significant results obtained in both the reduced and total sample. Spontaneity had significant positive correlations with Describing, Nonjudgement and Nonreactivity and significant negative correlations with the three main scales of the DASS-21. It also had significant negative correlations with the Daytime dysfunction, Sleep quality and Global scores of the PSQI.

Nonjudgement was the only facet of Mindfulness having significant negative correlations with the Global score of the PSQI in both the reduced and total samples, as well as significant negative correlations with the three main scales of the DASS-21. Act with awareness also negatively correlated with Depression on a statistically significant level in both the reduced and total samples.

Depression and Stress had significant positive correlations with the Global score of the PSQI in the reduced and total samples.

These findings are discussed in detail below according to the hypothesis established earlier (see Figure 1).

In general terms, the total sample showed more significant correlations coefficients and higher values for the coefficients. Bishara and Hittner (2015) point out that the Spearman correlation coefficient is a conservative measure which provides estimates with a small but consistent negative bias, and that this underestimation is a concern for smaller samples. Thus, the smaller size of the sample without the participants eligible for exclusion might have influenced the correlation coefficients. On the other hand, the inclusion of these participants (in the total sample), with overall lower scores in the SAI-R and FFMQ and higher scores in the PSQI and the DASS-21, added range variation to our variables, which can inflate the correlation coefficients (Aguinis & Whitehead, 1997).

1. Positive, medium or large correlations between Spontaneity and all facets of Mindfulness except Observing

Spontaneity had a medium positive correlation with Describing and significant positive correlations with Nonjudgement and Nonreactivity. Thus, there seems to be an

association between the spontaneous state and the ability to label experiences through words (Describing), to experience thoughts and feelings without critique (Nonjudgement) and to allow them to come and go without getting caught up in them (Nonreactivity). The lack of a significant correlation between Spontaneity and the Observing facet of Mindfulness in both the reduced and total samples is also congruent with our initial hypothesis, giving further evidence that Spontaneity and Mindfulness seem to have in common the acceptance of the present moment, but with Mindfulness being more inward-directed and contemplative and Spontaneity tending to be more outward-directed and expressive (Gluck, 2013).

The inconsistent results concerning the association between Spontaneity and Act with awareness, which was significant in the total sample but not in the subsample, warrants further study. At first glance, this inconsistency could suggest that Spontaneity might be more associated with impulsivity, defined by Dickman (1990) as the tendency to deliberate less than most people of equal ability before taking action.

Contrary to what common sense might stipulate, the consequences of impulsivity are not always negative, since when the time available for making a decision is extremely brief, highly impulsive people are actually more accurate than less impulsive people (Bıçaksız, 2019; Dickman, 1990). Dickman (1990) suggested that impulsivity may be differentiated as functional and dysfunctional, having defined functional impulsivity as the tendency to act without elaboration on the consequences when this is the optimal behavior. According to Dickman (1990), functionally impulsive individuals are active, enthusiastic, adventurous and willing to take risks. On the other hand, dysfunctional impulsivity refers to the general concept of impulsivity as a maladaptive personality trait involving acting without thinking and experiencing negative consequences due to such a

behavior pattern (Dickman, 1990). Dysfunctional impulsivity also implies an inability to refrain from acting when such would be appropriate, hence its association with neuroticism (Crow, 2019).

More recently it has been argued that while dysfunctional impulsivity reflects a personality trait, functional impulsivity reflects more of a skill, one which involves rapid action when it is necessary (Bıçaksız, 2019; Reeve, 2007). A study by Kipper et al. (2010) found a significant negative correlation between Spontaneity and maladaptive impulsivity. It is possible that Spontaneity is associated with functional impulsivity, as was suggested by Duarte (2018). This would make sense given that, similarly to Spontaneity, functional impulsivity is associated with extroversion (Dickman, 1990), while dysfunctional impulsivity is associated with neuroticism (Crow, 2019).

We also have to take into account that in the total sample age significantly affected the scores of Act with Awareness, so further studies regarding the association of Spontaneity and the facets of Mindfulness will have to control for the influence of third variables.

While these results regarding the associations between Spontaneity and Mindfulness are encouraging, particularly the medium associations between the SAI-R and all facets of the FFMQ, except Observing, in the total sample (being that the association of the SAI-R with Nonjudgement was the strongest in this sample), future research replicating them is required to further validate them and clarify the inconsistencies found in our study.

2. Negative, medium or large correlations between Spontaneity and symptoms of Depression, Anxiety and Stress

Our results regarding Spontaneity's associations with psychopathological symptoms coincide with the formulations of Moreno (1964) and the previous findings by Christoforou and Kipper (2006) and Kipper and Shemer (2006). The inclusion of participants eligible for exclusion reduced the mean and median of the SAI-R (Table 3) and a self-reported diagnostic of psychopathology and current treatment with a mental health professional were shown to have a statistically significant effect in participants' scores in this instrument, contributing to the reduction of its mean and median (Tables 1 and 2). In the total sample, Spontaneity was associated with lower levels of anxiety after the COVID-19 outbreak (Table 4). Furthermore, both in the total and reduced samples Spontaneity had a large negative correlation with Depression and medium negative correlations with Anxiety and Stress (Table 7).

Nevertheless, the results of Christoforou and Kipper (2006) were not exactly replicated, since we found only medium negative associations between Spontaneity and Anxiety, whereas those authors, using the State-Trait Anxiety Inventory (Spielberger et al., 1983), found a large association between Spontaneity and State-Anxiety (r = -.67, p < .01), but only a medium correlation between Spontaneity and Trait-Anxiety (r = -.44, p < .01), which was still larger than the any of the associations we found between Spontaneity and Anxiety (Table 7). This difference might have to do with the samples in each study, since Christoforou and Kipper (2006)'s was composed of 85 undergraduate students in the U.S.A., making it possible that those results don't apply to a sample of non-students and/or of people outside the U.S.A. This difference can also be attributed to the distinction between the instruments used to assess Anxiety and the specific kind of

Anxiety studied. The DASS-21 does not distinguish Trait-Anxiety from State-Anxiety and constitutes a reduced version of the original DASS. Furthermore, the DASS-21 tends to focus on somatic tension and hyperarousal in order to measure Anxiety (Pais-Ribeiro et al, 2004), so it might be more linked to the activation of the sympathetic nervous system than to the subjective experience of anxiety. It is also worth noting that Christoforou and Kipper (2006) calculated Pearson's correlation coefficient, whereas in our study its non-parametric equivalent was used, which constitutes a more conservative measure (Bishara & Hittner, 2015).

Concerning the association between Spontaneity and Stress, Kipper and Shemer (2006) found a medium (near large) association between these two constructs (r = -.45, p < .001) very close to the findings of our own study (Table 7), even though these authors used another instrument to measure Stress (the Perceived Stress Scale, developed by Cohen et al., 1983), calculated Pearson's correlation coefficient and had a sample composed only of U.S. citizens.

Nevertheless, the significant negative associations we found between Spontaneity and symptoms of Depression, Anxiety and Stress make sense not just in light of the formulations of Moreno (1964) and the previous findings by Christoforou and Kipper (2006) and Kipper and Shemer (2006), but also in light of the significant positive correlations of Spontaneity with the Describing, Nonjudgment and Nonreactivity facets of Mindfulness. Describing has been shown to negatively relate to experiential avoidance of distressing physiological experiences (Desrosiers et al., 2013), nonjudgement is considered to be the opposite of self-criticism and negative self-cognitions (Raphiphatthana et al., 2016) and Nonreactivity has been shown to be protective against negative affect (Raphiphatthana et al., 2016).

Lastly, the significant negative associations between the scores of the SAI-R and the three main scales of the DASS-21 replicate the findings of Gonzalez & Martins (2018), who also found Spontaneity to have strong negative correlations with Depression and medium negative correlations with Anxiety and Stress in a Portuguese sample, using the Portuguese version of the DASS-21.

3. Spontaneity associated with an overall better Sleep Quality

Our initial hypothesis regarding the association of Spontaneity with sleep quality was partly confirmed, since Spontaneity had significant negative correlations with Daytime dysfunction, Sleep quality and the Global score of the PSQI in the reduced and total samples (Table 6). Furthermore, scores of the Sleep Quality subscale of the PSQI were significantly higher for people with practice of Psychodrama than for people no previous practice of Psychodrama or Mindfulness. This leads us to believe that higher levels of Spontaneity might have a role in improving one's overall quality of sleep, especially considering Spontaneity is negatively related to neuroticism (which, mediated by negative affect, tends to produce sleep difficulties, Allen et al., 2016) and, as Rocha (2010) found, is positively associated with extroversion (which has been associated with better quality of sleep, Allen et al., 2016).

On the other hand, poorer quality of sleep might also have a negative effect on Spontaneity. Harrison and Horne (1999) noted that sleep loss impairs flexible and innovative thinking as well as the ability to revise plans in light of new information. Since Spontaneity is generally defined as the ability to give an appropriate response to a situation or a new response to an old situation (Kipper & Hundal, 2005), it makes sense that poor sleep would reduce the levels of Spontaneity.

4. Nonjudgement and Act with awareness associated with an overall better sleep quality and Observing associated with poorer sleep quality

Our hypothesis regarding the association of Mindfulness and Sleep Quality was partially confirmed. Nonjudgement had a significant negative correlation with the Global score of the PSQI in both the reduced and total samples (Tables 8 and 9). This adds further evidence that the process of being non-judgmental towards oneself is associated with better sleep quality (Marques et al., 2020; Talley & Shelley-Tremblay, 2020), and is aligned with Smith et al. (2020)'s statement that non-judgmental acceptance of sleep-related cognitions reduces sleep-related problems and disturbance.

Since our study is a correlational one, we cannot state the existence or direction of causality in this association based solely on our data. While Caldwell et al (2010) found that increases in Mindfulness facets (except Describing) were associated with improved sleep quality, there have been few experimental studies regarding this subject. It is possible that better sleep quality also predisposes to or enhances mindful states instead of just the other way around. For example, Act with Awareness and Nonjudgement had significant negative associations with Daytime Dysfunction in both the total and reduced samples, suggesting that sleepiness could have negative effects in these facets of Mindfulness. Further research should look into the possible causality underlying these associations.

Act with awareness had a significant negative association with the PSQI only in the total sample, but not in the reduced sample. Talley and Shelley-Tremblay (2020) suggested mindfulness is positively correlated with better sleep quality by altering a person's psychological flexibility through awareness, and that acting with awareness could be beneficial if a person is trying to block out hyperarousal while falling asleep.

While Curado et al. (2018) found negative associations between Act with awareness and the severity of insomnia symptoms, Smith et al. (2020) did not find this facet of Mindfulness to be significantly associated with sleep disturbance. Therefore, and adding our own findings, there is not yet enough evidence to either confirm or deny the suggestion of Talley and Shelley-Tremblay (2020) regarding the role of Act with awareness in enhancing sleep quality.

Observing did not correlate with the PSQI according to our hypothesis, having had negative associations with the Global score of the PSQI in both the total and reduced samples, even though they did not achieve significance. As was observed by Gregório and Gouveia (2011), Observing can be a positive or a negative process, depending on whether or not it's related to lack of acceptance and attempts at avoidance and suppression. It is possible that most of our participants experience observing in an adaptive way, thus making the relationship between this facet of Mindfulness and worse sleep quality a mostly negative one. According to Gregório and Gouveia (2011), Observing as a competence of Mindfulness is sensitive to practice. So, regular practitioners of Mindfulness should have a tendency to observe in an adaptive way. Furthermore, Alleva et al. (2012) and Nigol and Di Benedetto (2019) noted that Observing may be mediated by other factors such as ruminating and catastrophizing. In our study previous practice of Mindfulness did not have significant effects on the scores of Observing, but that was most likely due to the very small percentage (and number) of practitioners in our sample. Thus, future research regarding the association of Mindfulness and sleep quality should either study Observing having in mind the possible mediation of third variables or opt to study a sample composed only of practitioners to

try to avoid that this inconsistency in the way people experience the Observing facet interferes with the results.

As expected, Describing and Nonreactivity had no significant correlation with the Global PSQI score, similarly to the results of Talley and Shelley-Tremblay (2020). It makes sense that Describing is not associated with better quality of sleep because, while cultivating Mindfulness during the day reduces ruminative thought processes, the activity of labeling internal experiences in itself, while in bed, can be incompatible with sleep, especially if it is associated with negative affect (Kalmbach et al., 2020).

Regarding Nonreactivity, Caldwell et al. (2010) found a significant negative association between this facet and the total score of the PSQI, so it's possible that it is only associated with better quality of sleep when there is a third variable mediating this relationship. Talley and Shelley-Tremblay (2020) already pointed out that the relationship between facets of Mindfulness and sleep quality was mediated by hyperarousal, while Liu et al. (2018) noted the role of rumination as a mediator and of self-control as a moderator. Self-compassion might also have a role in mediating this relationship (Kalmbach et al., 2020). Thus, future studies should look out for the influence of other variables which might mediate the association between the facets of Mindfulness and sleep quality.

5. All facets of Mindfulness negatively correlated with symptoms of Depression, Anxiety and Stress, except «Observing», which will have a positive correlation with these constructs

Our findings contradict our initial hypothesis regarding the associations between facets of Mindfulness and psychopathological symptoms, and only partially replicate the findings of Baer et al. (2006) and Gregório and Gouveia (2011).

In both samples Nonjudgement negatively correlated with symptoms of Depression, Anxiety and Stress, and Act with awareness was negatively associated with Depression only (Tables 10 and 11). Only Act with Awareness and Nonjudgement were significantly affected by self-reported diagnostic of psychopathology and current mental health treatment (Tables 1 and 2), and Nonjudgement was the only facet of Mindfulness significantly affected by regular consumption of substances.

The negative association of Nonjudgement with Depression is in accordance with the hypothesis that non-judging is the opposite of self-criticism and negative self-cognitions, which are characteristics of the depressive mood, as was noted by Raphiphatthana et al. (2016). These authors also pointed out that, by taking a non-evaluative point of view towards one's thoughts and feelings, one would be less likely to experience negative mood and the lack of positive affect (Raphiphatthana et al., 2016). Our findings further contribute to show that accepting present feelings in a non-judgemental way can reduce depressive symptomatology, as has been shown by previous studies (Desrosiers et al., 2013; Nigol & Di Benedetto, 2019).

The negative correlations between Nonjudgement and the Anxiety and Stress scales of the DASS-21 are also aligned with previous research (Baer et al., 2006; Gregório & Gouveia, 2011). Nonjudgement has been shown to be negatively associated with

hyperarousal since, by holding a non-evaluative stance towards an experience, one may be less likely to engage in a negative appraisal of said experience, and thus be less likely to exhibit intense negative emotional reactions and anxious thoughts and feelings (Raphiphatthana et al., 2016). Thus, the negative associations we found between this facet of Mindfulness and symptomatology of Anxiety and Stress add further evidence to support these claims.

Similarly, the Act with awareness facet, focusing attention on one's current activity, seems to also have a role in reducing depressive symptoms, as was also noted by De Bruin et al. (2012) and Raphiphatthana et al. (2016). Being attentive to one's present activity may compete for the attentional resources required for negative repetitive thoughts, thus, Acting with awareness may ameliorate depressive symptoms through the reduction of the attentional resources utilized in ruminative thinking (Raphiphatthana et al., 2016). However, despite having been the only facet of Mindfulness significantly associated with reduced levels of anxiety after the COVID-19 outbreak in both the reduced and total samples (Table 4), Act with awareness was not related with Anxiety or Stress in our reduced sample. While this might be due to the conservative bias of the correlation coefficient in a minor collection of data, Nigol and Di Benedetto (2019) point out that, like Observing, Act with awareness may be mediated by other factors such as ruminating and catastrophizing, or by other mindfulness facets. These potential mediational effects may account for the inconsistent correlations of this facet described in our study.

Contrary to what we had predicted, Observing did not have positive correlations with any psychopathological symptoms in the complete nor in the reduced sample (Tables 10 and 11), opposite to the small but positive correlations Gregório and Gouveia (2011)

found between Observing and Depression (measured by the Beck Depression Inventory – BDI, Beck et al., 1961; Beck et al., 1988; Portuguese translation and adaptation: Vaz Serra & Pio Abreu, 1973a, 1973b), Anxiety and Stress (both measured through the same version of the DASS-21 used in our study). This discrepancy might be due to differences in samples across the different studies, since the study of Gregório and Gouveia had a much larger sample (821 participants), but also had a much higher percentage of students (72.72%). These authors also used a different instrument to measure symptoms of depression and calculated Pearson's correlation coefficient, which has been shown to be less conservative than Spearman's rho (Bishara & Hittner, 2015). Furthermore, as previously noted, Observing is two-faceted: without a mindful approach to observing one's thoughts and feelings, one may observe in a way that elicits harmful consequences (Raphiphatthana et al., 2016). The unexpected behavior of this variable regarding our hypothesis about its association with psychopathological symptoms might be due to the influence of third variables which we did not measure.

Describing only had significant negative associations with Depression and Anxiety in our total sample (Tables 10 and 11). While Baer et al. (2006) and Gregório and Gouveia (2011) found a significant negative association between this facet of Mindfulness and symptoms of Depression, Anxiety and Stress, other studies have shown that Describing was mostly unrelated to mood disorders and their related constructs (Alleva et al., 2012; Raphiphatthana et al., 2016). Desrosiers et al. (2013) found no significant correlation between this facet and symptoms of Depression, arguing that covariations between describing and other facets of Mindfulness and/or covariations between anhedonic depression and other symptoms of depression and anxiety might be the cause of such a result.

These authors also argued that Describing, or labeling internal experiences with words, may be associated with lower anxious arousal because the ability to describe reflects decreased experiential avoidance of distressing physiological experiences (Desrosiers et al., 2013). However, our results and the inconsistency in the behavior of this facet of Mindfulness across studies, as well as the general lack of significant negative correlations between Describing and the PSQI, lead us to doubt this assertion. It is instead possible that, similarly to what these authors stated about the association between Describing and Depression, the relationship between this facet of Mindfulness and symptoms of Anxiety and Stress is also mediated by third variables and/or the covariation of the other facets of Mindfulness. Raphiphatthana et al. (2016) suggested that the Describing facet may be more relevant when the experience of physiological arousal is intense, but that hypothesis requires further research.

In our study, Nonreactivity only had significant negative correlations with Depression and Stress in the total sample, but not in the reduced sample (Tables 10 and 11). While previous studies showed Nonreactivity to be related to lower symptomatology of Depression, Anxiety and Stress (Baer et al., 2006; Desrosiers et al., 2013; Gregório & Gouveia, 2011), Raphiphatthana et al. (2016) point out that while being non-reactive may protect an individual from negative affect, it appears to dampen the intensity of positive affect as well. In light of this information, the inconsistent results regarding this facet of Mindfulness make sense, and further research should take into account this double effect Nonreactivity can have.

6. Better Sleep quality associated with less symptoms of Depression, Anxiety and Stress

The results obtained in the total sample are aligned with previous research correlating the PSQI with the DASS-21 (Gaş et al., 2021; Qiu et al., 2016; Zou et al., 2020), which found significant positive correlations between the Global score of the PSQI and the three major scales of the DASS-21. This further reinforces the evidence from clinical epidemiological studies documenting high degrees of comorbidity of sleep problems and these types of symptomatology (Tubbs et al., 2020).

While Anxiety did not correlate with any scale of the PSQI in the reduced sample, self-reported diagnostic of psychopathology and current treatment with a mental health professional had significant effects in reducing the scores of the PSQI (Tables 1 and 2), and the inclusion of participants with a self-reported diagnosis and/or who regularly consume substances and/or are undergoing mental treatment increased the means obtained by participants in this instrument (Table 3). This leads us to believe that the non-significant association between Anxiety and the PSQI scores in the reduced sample, as well as the non-significant correlations between the scores of the PSQI and Change in anxiety levels after the COVID-19 pandemic in the reduced sample, constitute examples of the smaller size of the sample producing a conservative bias in the correlation coefficient.

Our study had some limitations. The sample we collected was relatively small and, in the reduced sample, was reduced to about half of its original size. Also of note are the higher percentage of female participants, as well as the high prevalence of college students, particularly of Psychology. Added to the fact that access to a computer and to

the World Wide Web was necessary for participation, our sample may not be representative of the general Portuguese population. Another limitation resides in the fact that ours is a correlational study, a non-experimental design which does not allow us to establish causality. Finally, we focused only on the relationships between our four instruments without measuring possible third variables which might have held influence over the results.

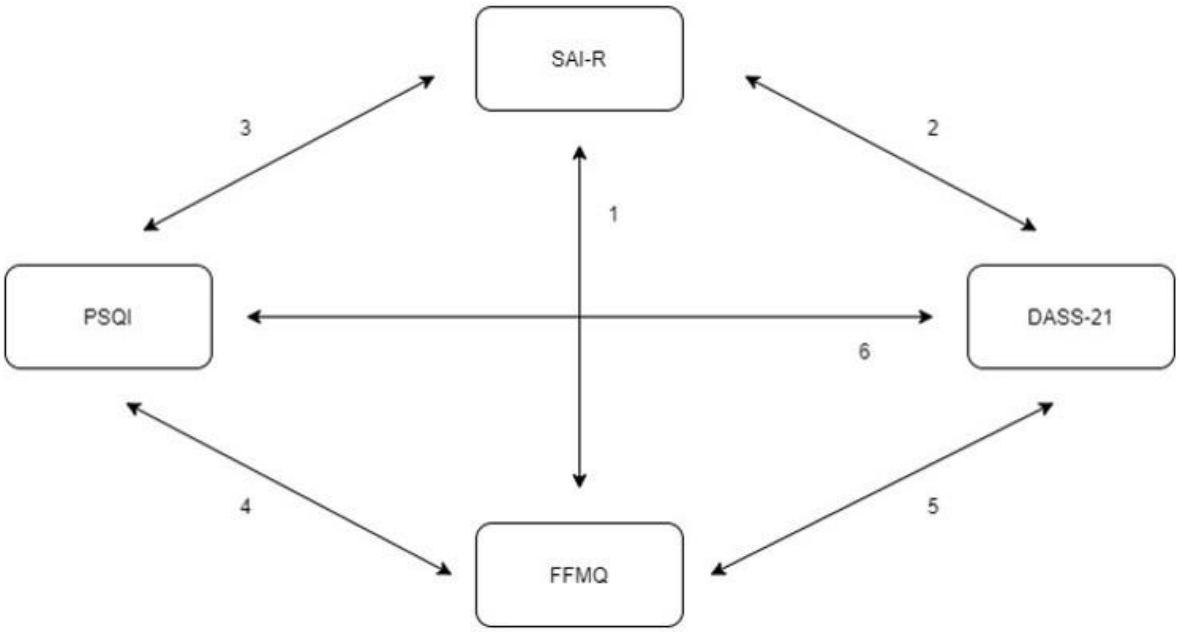
Despite these shortcomings, the use of Spearman's rho is a strong point of our study, since it constitutes a conservative measure which prevents exaggeration when the data does not follow a normal distribution (Bishara & Hittner, 2015). Added to the fact that we calculated this coefficient twice for each relationship between the variables (one time for the reduced sample and another for the total sample), we can have a high degree of confidence in the significant associations detected in both the total and reduced samples.

Conclusions

Our study is the first to analyze the associations Spontaneity has with Mindfulness and with sleep quality. This constitutes a further step towards the conceptualization and understanding of the mechanisms of the spontaneous state in light of the Cognitive Behavioral Model.

Figure 2

Main conclusions



1) Spontaneity positively correlated with Describing, Nonjudgement and Nonreactivity.
2) Spontaneity negatively associated with symptoms of Depression, Anxiety and Stress;
3) Spontaneity negatively correlated with the Daytime dysfunction, Sleep quality and Global scores of the PSQI;
4) Nonjudgement negatively correlated with the Global score of the PSQI;
5) Nonjudgement negatively correlated with symptoms of Depression, Anxiety and Stress; Act with awareness negatively associated with Depression;
6) Depression and Stress positively correlated with the Global score of the PSQI.

Despite some inconsistencies between the results of the total sample and those of the subsample, there were significant results which occurred both in the reduced and total samples (Figure 2).

Spontaneity had significant positive correlations with three facets of Mindfulness: Describing, Nonjudgement and Nonreactivity. Thus, Spontaneity and Mindfulness seem to have in common: the ability to label one's internal experiences with words, which is inversely related to experiential avoidance of distressing physiological experiences (Desrosiers et al., 2013) – such as Spontaneity has been defined in CBT-terms as the opposite of avoidance and inhibition (Abeditehrani et al (2020) –; the ability to take a non-evaluative point of view towards one's thoughts and feelings, which is the opposite of self-criticism and negative self-cognitions (Raphiphatthana et al., 2016); and the capacity to allow thoughts and feelings to come and go without getting caught up in them. This common ground between Spontaneity and Mindfulness provides further evidence that CBT and Psychodrama can be integrated to enhance therapeutic effects, an idea which serves as the basis for Cognitive Behavioral Psychodrama Group Therapy (CBPGT). CBPGT, combining CBT techniques with Psychodrama, provides a balance between an exploration of emotionally laden situations and a more concrete, data-based, problem-solving process, and this integration may be beneficial for clients who have not responded to more traditional approaches. (Treadwell & Dartnell, 2017).

As expected, Spontaneity had negative associations with symptoms of Depression, Anxiety and Stress, which is aligned with Moreno (1964)'s theory of Spontaneity as well as with previous research regarding Spontaneity's association with this symptomatology (Christoforou & Kipper, 2006; Kipper & Shemer, 2006). These findings also replicate those of Gonzalez and Martins (2018), contributing to show the

Portuguese version of the SAI-R to be a useful and reliable instrument to assess Spontaneity in various contexts.

Spontaneity was negatively related to worse sleep quality, daytime dysfunction due to lack of sleep, and to the Global score of the PSQI. While this could indicate that Spontaneity has beneficial effects regarding sleep quality, there is also reason to believe that better sleep quality might predispose to, or enhance, spontaneous states, being that worse quality of sleep might also lower the levels of Spontaneity instead of just the other way around.

Concerning the facets of Mindfulness, only Nonjudgment had significant negative correlations with the three main scales of the DASS-21, as well as with the Global score of the PSQI, in accordance to the statement that taking a non-evaluative point of view towards one's thoughts and feelings reduces the likelihood of experiencing negative mood and the lack of positive affect, as well as hyperarousal, intense negative emotional reactions and anxious thoughts and feelings (Baer et al., 2006; Desrosiers et al., 2013; Gregório & Gouveia, 2011; Nigol & Di Benedetto, 2019; Raphiphatthana et al., 2016).

Act with awareness was negatively related to symptoms of Depression, adding evidence that being attentive to present activities reduces the attentional resources required for ruminative thinking (De Bruin et al., 2012; Raphiphatthana et al., 2016).

The lack of consistent associations between other facets of Mindfulness and the scales of the DASS-21 might be due to the conservative bias of the correlation coefficient in the smaller collection of data, as well as possible mediation by other factors such as acceptance, avoidance, ruminating and catastrophizing, or even other mindfulness facets (Gregório & Gouveia, 2011; Nigol & Di Benedetto, 2019; Raphiphatthana et al., 2016).

Symptoms of Depression and Stress were positively correlated with the Global score of the PSQI, which is in accordance with previous studies and the documented high degree of comorbidity of sleep problems and symptoms of Depression, Anxiety and Stress (Gaş et al., 2021; Qiu et al., 2016; Tubbs et al., 2020; Zou et al., 2020).

However, the associations of the PSQI with Anxiety were non-significant in the reduced sample. But the overwhelming evidence in literature affirming this association, the fact that people with a self-reported diagnostic of psychopathology and/or currently undergoing treatment with a mental health professional had significantly lower scores in the PSQI, and the significant associations shown in the case of the total sample, all lead us to believe that the smaller size of the reduced sample produced a conservative bias in the correlation coefficient between these variables which was responsible for the non-significant results.

These inconsistencies highlight the need that future studies take into account the influence of third variables when approaching the facets of Mindfulness and their relations with any other variable, including with Spontaneity. While the results we found regarding the correlation of Spontaneity and Mindfulness are encouraging, they have to be replicated by future research. Further studies regarding the differences and similarities between Spontaneity and Mindfulness would also benefit from an experimental design, testing the differences in outcomes in independent samples, each receiving a different treatment, one designed to enhance the levels of Spontaneity and another designed to increase the levels of Mindfulness.

There is ample opportunity for the exploration and conceptualization of Spontaneity in a way that not only fits the mold of Third Wave CBT but that also holds promise towards enhancing the efficacy of CBT treatment.

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