**Development and evaluation of a revised 20-item short version of the UPPS-P Impulsive Behavior Scale**

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**Author contributions**

**Loïs Fournier:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing – Original draft, Writing – Review & editing. **Alexandre Heeren:** Conceptualization, Methodology, Writing – Review & editing. **Stéphanie Baggio:** Writing – Review & editing. **Luke Clark:** Writing – Review & editing. **Antonio Verdejo-García:** Writing – Review & editing. **José C. Perales:** Conceptualization, Methodology, Writing – Review & editing. **Joël Billieux:** Conceptualization, Methodology, Project Administration, Supervision, Writing – Review & editing.

**Competing interests**

The authors declare no competing interests.

**Ethics information**

The present registered report protocol describing research with human participants complies with the Declaration of Helsinki (World Medical Association, 2013). The present registered report protocol received ethical approval from the Research Ethics Commission of the Faculty of Social and Political Sciences of the University of Lausanne, Lausanne, Switzerland [Project ID: C\_SSP\_102022\_00013] on December 13, 2022. Informed consent will be obtained from all human participants. Human participant compensation will equate to an hourly rate of 9 GBP. Detailed information regarding the ethical approval is stored in European servers based in Frankfurt (Germany) and publicly shared under a CC-By Attribution 4.0 International license on the *Open Science Framework* (<https://osf.io/v2f5w/?view_only=d6a2f8819b44492b9c3dc3caaf95be60>).

**Code availability**

All code will be stored in European servers based in Frankfurt (Germany) and publicly shared under a CC-By Attribution 4.0 International license on the *Open Science Framework* (<https://osf.io/v2f5w/?view_only=d6a2f8819b44492b9c3dc3caaf95be60>) upon acceptance for publication of the stage two registered report.

**Data availability**

All data will be stored in European servers based in Frankfurt (Germany) and publicly shared under a CC-By Attribution 4.0 International license on the *Open Science Framework* (<https://osf.io/v2f5w/?view_only=d6a2f8819b44492b9c3dc3caaf95be60>) upon acceptance for publication of the stage two registered report.

**Materials availability**

All materials will be stored in European servers based in Frankfurt (Germany) and publicly shared under a CC-By Attribution 4.0 International license on the *Open Science Framework* (<https://osf.io/v2f5w/?view_only=d6a2f8819b44492b9c3dc3caaf95be60>) upon acceptance for publication of the stage two registered report.

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**Abstract**

The UPPS-P Impulsive Behavior Scale is a well-established psychometric instrument for assessing impulsivity, a key psychological construct transdiagnostically involved in the etiology of numerous psychiatric and neurological disorders. To facilitate its integration in clinical and research settings, Billieux et al. (2012) developed a 20-item short version of the UPPS-P Impulsive Behavior Scale, reducing administration time to around a third of the 59-item original version of the psychometric instrument. Despite its widespread popularity, legitimate concerns have been raised about the content validity of this short version. Indeed, the inevitable loss of construct-level content coverage when developing short forms, although often unaddressed by researchers, warrants in-depth examination. Therefore, the present registered report aims to develop and evaluate the psychometric properties of a revised 20-item short version of the UPPS-P Impulsive Behavior Scale through an expert-driven and data-driven methodological approach to short-form development emphasizing item-level and construct-level content validity. As such, the present registered report will provide pilot information on the effectiveness of a novel method for developing concise yet comprehensive psychometric instruments.

**Keywords**

network modeling; psychometrics; structural equation modeling; UPPS-P Impulsive Behavior Scale

**1. Introduction**

*Impulsivity* is a key psychological construct integrated into most major personality models (Whiteside & Lynam, 2001) and stands as one of the most prevalent diagnostic criteria in foremost nosography manuals (American Psychiatric Association, 2022; World Health Organization, 2024). Among prevailing models of impulsivity, the UPPS-P Impulsive Behavior Model (Cyders et al., 2007; Whiteside & Lynam, 2001) accounts for the non-unitary nature of impulsivity (Evenden, 1999; Sharma et al., 2014) by conceptualizing it as a multidimensional psychological construct encompassing five distinct facets which are differentially associated with numerous psychopathological and neuropathological symptoms across various disorders (Berg et al., 2015; Rochat et al., 2018; Smith et al., 2007): (1) *lack of premeditation* (i.e., lack of reflection on the potential consequences of actions preceding their emission), (2) *positive urgency* (i.e., emission of sudden actions in intense positive emotional states), (3) *sensation seeking* (i.e., attraction to excitement and openness to new experiences), (4) *negative urgency* (i.e., emission of sudden actions in intense negative emotional states), and (5) *lack of perseverance* (i.e., difficulty sustaining focus on demanding or monotonous tasks).

Originally, the UPPS-P Impulsive Behavior Model was developed based on four different trait-like impulsivity-related facets of the Revised NEO Personality Inventory (i.e., impulsiveness, excitement seeking, self-discipline, and deliberation) (Costa & McCrae, 1992) and seventeen classic scales or subscales measuring impulsivity (Whiteside & Lynam, 2001). By federating twenty-one coexisting conceptualizations of impulsivity and thereby correcting the jingle (i.e., distinct constructs designated by one same label) and jangle (i.e., distinct labels designating one same construct) fallacies that characterized the research field of impulsivity, the UPPS-P Impulsive Behavior Model and its corresponding original assessment tool – i.e., the 59-item original version of the UPPS-P Impulsive Behavior Scale (Cyders et al., 2007; Whiteside & Lynam, 2001) – have received considerable interest and have exerted a substantial impact on following impulsivity research over the past decades. Extensive research has investigated the cognitive, affective, behavioral, and motivational mechanisms underlying the impulsive behavior dimensions described in the UPPS-P Impulsive Behavior Model, including decision-making processes in complex conditions (mainly associated with lack of premeditation), prepotent response inhibition in intense emotional states (mainly associated with negative and positive urgency), approach-avoidance system functioning (mainly associated with sensation seeking), and resistance to proactive interference in working memory (mainly associated with lack of perseverance) (Bechara & Van Der Linden, 2005; Gay et al., 2008; Rochat et al., 2018).

To facilitate the integration of the UPPS-P Impulsive Behavior Scale in clinical and research settings, Billieux et al. (2012) developed and evaluated the psychometric properties of a short-form version of the corresponding original assessment tool, i.e., the 20-item short French version of the UPPS-P Impulsive Behavior Scale. In reducing administration time to around a third of the original psychometric instrument, this short-form version of the UPPS-P Impulsive Behavior Scale has gained considerable popularity. Moreover, given its well-established psychometric properties and relevance for various problematic behaviors and mental disorders, the 20-item short French version of the UPPS-P Impulsive Behavior Scale was adapted to numerous languages (Bteich et al., 2017; Cándido et al., 2012; d’Orta et al., 2015; Fournier et al., 2024; Zsila et al., 2020) and populations such as children (Geurten et al., 2021) and patients with substance use disorders (Calzada et al., 2017; Kempeneers et al., 2023; Sánchez-Domínguez et al., 2023).

The methodological approach to short-form development with respect to the 20-item short French version of the UPPS-P Impulsive Behavior Scale consisted of retaining the four items per factor that presented the highest factor loadings (Billieux et al., 2012). Indeed, it is common practice in short-form development to retain items presenting the highest factor loadings or total-item correlations for a psychometric instrument’s given factor(s), as it presumably maximizes internal consistency and minimizes measurement error (Smith et al., 2000). However, considering the attenuation paradox in psychometrics (Boyle, 1991; Loevinger, 1954), internal consistency reliability countervails with construct-level content validity and, consequently, such common practice in short-form development tends to narrow the breadth of construct-level content coverage of psychometric instruments (Clark & Watson, 2019). Reflecting this, Cyders et al. (2014) criticized the methodological approach to short-form development with respect to the 20-item short French version of the UPPS-P Impulsive Behavior Scale (Billieux et al., 2012), raising legitimate concerns about the content validity of this short-form version of the UPPS-P Impulsive Behavior Scale.

As short-form development in psychometrics consists of retaining a subset of items included in the original version of a said psychometric instrument, loss of construct-level content coverage is inevitable, therefore warranting in-depth examination (Smith et al., 2000). To address the content validity issue critically highlighted by Cyders et al. (2014), the present registered report aims to develop and evaluate the psychometric properties of a revised 20-item short version of the UPPS-P Impulsive Behavior Scale through an expert-driven and data-driven methodological approach to short-form development emphasizing item-level and construct-level content validity.

The present registered report consists of a three-phase protocol, the overarching objectives of which are to develop and evaluate the psychometric properties of a revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R), which will be initiated upon acceptance of the stage one registered report. In the first phase (i.e., development phase I), the primary objectives are to collect participant data with respect to an initial item pool derived from the original form and to ensure it presents adequate psychometric properties (i.e., content validity, construct validity, and internal consistency reliability) prior to proceeding with short-form development. In the second phase (i.e., development phase II), the primary objectives are to develop the short form from the initial item pool derived from the original form and to ensure it presents adequate psychometric properties (i.e., content validity, construct validity, and internal consistency reliability) prior to proceeding with short-form evaluation. Lastly, in the third phase (i.e., evaluation phase), the primary objectives are to collect participant data with respect to the short form – along with forms assessing related psychological constructs – and to evaluate its psychometric properties (i.e., construct validity, internal consistency reliability, test-retest reliability, convergent validity, criterion validity).

**2. Methods**

**2.1. Development phase I**

The first phase of the present registered report (i.e., development phase I) consists of developing an initial item pool derived from the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001). In this phase, the primary objectives are to collect participant data with respect to an initial item pool derived from the original form and to ensure it presents adequate psychometric properties (i.e., content validity, construct validity, and internal consistency reliability) prior to proceeding with short-form development (see Table 2.1.).

Therefore, the research questions pertaining to the first phase of the present registered report are as follows:

* **RQ1.** What is the construct validity of the established 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50)?
* **RQ2.** What is the internal consistency reliability of the established 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50)?

**Box 2.1. An expert-driven methodological approach to construct-level content validity in short-form development and evaluation**

The *59-item original version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001) is a self-administered psychometric instrument that assesses the applicability of 59 statements related to the five different dimensions of the UPPS-P Impulsive Behavior Model, namely (1) *lack of premeditation* (e.g., item 1: “I have a reserved and cautious attitude toward life.”), (2) *negative urgency* (e.g., reverse-scored item 2\*: “I have trouble controlling my impulses.”), (3) *sensation seeking* (e.g., reverse-scored item 3\*: “I generally seek new and exciting experiences and sensations.”), (4) *lack of perseverance* (e.g., item 4: “I generally like to see things through to the end.”), and (5) *positive urgency* (e.g., reverse-scored item 5\*: “When I am very happy, I can’t seem to stop myself from doing things that can have bad consequences.”). Each of the five instrument’s dimensions includes 10 to 14 items that are scored (or reverse-scored) on a four-point Likert-type scale (from 1 = “Strongly agree” to 4 = “Strongly disagree”) and that provide arithmetic mean scores likewise ranging from 1 (i.e., the lowest level of endorsement of the corresponding impulsive behavior dimension) to 4 (i.e., the highest level of endorsement of the corresponding impulsive behavior dimension).

In examining the individual items comprised in the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001), we, members of the core research team, believe that some items fail to provide relevant information about one’s endorsement of the impulsive behavior dimensions and, therefore, that a revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) should not retain such items. To this end, we developed an initial item pool derived from the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001), to ensure that all items provide relevant information about one’s endorsement of the impulsive behavior dimensions. To develop the said initial item pool, we proceeded as follows. Three members of the core research team – Loïs Fournier, José C. Perales, and Joël Billieux – were instructed to independently review all 59 items of the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001), and, while adopting a conservative approach, to evaluate their item-level content validity by annotating them with “keep”, “revise”, or “discard”. Evaluations were then compared, and discrepancies were discussed until reaching a consensus. Overall, evaluations of the item-level content validity of the items of the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001) can be summarized in three different categories.

The first category regards items that fail to provide relevant information about one’s tendency to seek excitement and to be open to new experiences (i.e., sensation seeking) due to their specificity and dependence on external factors: one might present a high level of endorsement of sensation seeking, but might not like or enjoy the specific activities listed in such items, or might not be able to access such activities due to environmental, financial, mental, or physical factors. Moreover, one might like or enjoy the specific activities listed in such items independently of their level of endorsement of sensation seeking (Maples-Keller et al., 2016). Therefore, we argue that the seven items listed below should be discarded:

* Sensation seeking item 13\*: “I like sports and games in which you have to choose your next move very quickly.”.
* Sensation seeking item 18\*: “I would enjoy water skiing.”.
* Sensation seeking item 26\*: “I would enjoy parachute jumping.”.
* Sensation seeking item 36\*: “I would like to learn to fly an airplane.”.
* Sensation seeking item 46\*: “I would enjoy the sensation of skiing very fast down a high mountain slope.”.
* Sensation seeking item 51\*: “I would like to go scuba diving.”.
* Sensation seeking item 56\*: “I would enjoy fast driving.”.

The second category regards items that fail to provide relevant information about one’s emission of sudden actions in intense negative or positive emotional states (i.e., negative urgency, positive urgency) due to their specificity and explicit focus on “cravings”: one might present a high level of endorsement of negative urgency or positive urgency but might not experience the “cravings” listed in such items. Moreover, the explicit focus on “cravings” listed in such items conflates impulsive behavior with a feature that is specific to disorders due to substance use and addictive behaviors: whereas the associations between craving and symptoms across such disorders are indeed well-established, the associations between craving, negative urgency, and positive urgency are inconsistent across original research articles (López-Guerrero et al., 2023). Therefore, we argue that the two items listed below should be discarded:

* Negative urgency item 7\*: “I have trouble resisting my cravings (for food, cigarettes, etc.).”.
* Positive urgency item 57\*: “When I am very happy, I feel like it is ok to give in to cravings or overindulge.”.

The third and last category regards items that fail to provide relevant information about one’s emission of sudden actions in intense negative emotional states (i.e., negative urgency), for they do not incorporate the intense negative emotional states of the impulsive behavior dimension they purportedly assess. Moreover, the incorporation of the negative or positive intense emotional states in which sudden actions are emitted is relevant, as negative urgency and positive urgency are conceptualized as two distinct facets which are differentially associated with symptoms across various disorders (Cyders & Smith, 2007). Yet, we argue that this is straightforwardly addressable by appending intense negative emotional states to such items. To this end, we generated appendices incorporating different intense negative emotional states (e.g., “distress”, “bad mood”, “frustration”). Therefore, we argue that the five items listed below should be revised by appending what reads in italics:

* Negative urgency revised item 2\*: “*When I feel distressed,* I have trouble controlling my impulses.”.
* Negative urgency revised item 12\*: “*When I feel bad,* I often get involved in things I later wish I could get out of.”.
* Negative urgency revised item 39\*: “It is hard for me to resist acting on my *negative* feelings.”.
* Negative urgency revised item 53: “*Even when I am in a bad mood,* I always keep my feelings under control.”.
* Negative urgency revised item 58\*: “*When I feel frustrated,* I sometimes do impulsive things that I later regret.”.

In keeping 45 items, revising five items, and discarding nine items with respect to the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001), we, members of the core research team, believe that the initial item pool derived from the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001) – which we will refer to as the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50) – will provide relevant information about one’s endorsement of the impulsive behavior dimensions.

**Table 2.1. Development phase I**

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|   | **Development phase I** |   | **EstablishedUPPS-P-50** |   |
|   | **Materials** | **Data** | **Analyses** | **Results** |   |   |
|   | Sociodemographic information | Participant data collectionDevelopment phase I(826 ≤ *N* ≤ 992) | Descriptive analyses | Sociodemographic information |   |   |
|   | Pre-establishedUPPS-P-50 | Confirmatory factor analyses | Construct validity(RQ1) |   |   |
|   | Internal consistency reliability(RQ2) |   |   |
|   |   |   |   |   |   |   |   |   |

*UPPS-P-50 = 50-item version of the UPPS-P Impulsive Behavior Scale.*

**2.1.1. Materials**

We will collect participant data with respect to their sociodemographic information (i.e., level of English proficiency, age, gender of identification, and country of residence) and to their answers on the *50-item version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-50), the initial item pool derived from the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001).

The *50-item version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-50), the initial item pool derived from the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001), is a self-administered psychometric instrument that assesses the applicability of 50 statements related to the five different dimensions of the UPPS-P Impulsive Behavior Model, namely (1) *lack of premeditation* (e.g., item 1: “I have a reserved and cautious attitude toward life.”), (2) *negative urgency* (e.g., reverse-scored revised item 2\*: “*When I feel distressed,* I have trouble controlling my impulses.”), (3) *sensation seeking* (e.g., reverse-scored item 3\*: “I generally seek new and exciting experiences and sensations.”), (4) *lack of perseverance* (e.g., item 4: “I generally like to see things through to the end.”), and (5) *positive urgency* (e.g., reverse-scored item 5\*: “When I am very happy, I can’t seem to stop myself from doing things that can have bad consequences.”). Each of the five instrument’s dimensions includes 5 to 13 items that are scored (or reverse-scored) on a four-point Likert-type scale (from 1 = “Strongly agree” to 4 = “Strongly disagree”) and that provide arithmetic mean scores likewise ranging from 1 (i.e., the lowest level of endorsement of the corresponding impulsive behavior dimension) to 4 (i.e., the highest level of endorsement of the corresponding impulsive behavior dimension).

**2.1.2. Data**

Participants will be recruited using *Prolific* (<https://www.prolific.com/>), a third-party crowdsourcing platform for recruiting and compensating participants for online research, and will be redirected to *Qualtrics* (https://www.qualtrics.com/), a third-party crowdsourcing platform for implementing online surveys.

We will collect participant data with respect to their sociodemographic information and to their answers on the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50). Prior to proceeding with participant data collection, *N* = 32 “pilot” participants (Perneger et al., 2015) will be recruited to complete all statements implemented in the full online survey – strictly following the protocol of participant data collection – in order to (1) ensure the absence of technical and “pilot”-participant-reported issues in the full online survey, (2) estimate the time required to complete all statements implemented in the full online survey, and (3) determine how much participants will be paid for their full completion of the online survey. Of note, all “pilot” participant data will be permanently deleted prior to proceeding with participant data collection. As *Qualtrics* (https://www.qualtrics.com/) estimates that the time required to complete all statements implemented in the full online survey equals 10.0 minutes, “pilot” participants will be paid ⎡10.0⎤\*(9/60) = 1.5 GBP for their full completion of the online survey to equate to a “good” hourly rate of 9 GBP, in accordance with *Prolific* (<https://www.prolific.com/>). Let *T* be the median time (in minutes) it will take “pilot” participants to complete all statements implemented in the pilot full online survey; participants will be paid ⎡*T*⎤\*(9/60) GBP for their full completion of the online survey to equate to a “good” hourly rate of 9 GBP, in accordance with *Prolific* ([https://www.prolific.com/)](https://www.prolific.com/%29).

The inclusion criteria for data collection are as follows: (1) being fluent in English and (2) being 18 years of age or older. Endorsement of all of the aforementioned criteria establishes inclusion.

The exclusion criteria for data collection are as follows: (1) failing to complete the full online survey, (2) failing the attention check implemented in the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50) (i.e., “This is an attention check. Please select “Agree strongly” as an answer to the present statement.”), and (3) completing the full online survey in less time than three standard deviations below the mean time it will take participants to complete the full online survey. Endorsement of any of the aforementioned criteria establishes exclusion.

With respect to data collection, we will require that participants provide answers to all statements implemented in the full online survey and adopt a listwise deletion approach to missing data handling by excluding data from participants who will have failed to complete the full online survey. Missingness information will be reported in the “Results” section of the manuscript through (1) percentage frequency values of participant-wise missingness and (2) percentage frequency values of data-wise missingness.

To estimate the minimum number of participants to be recruited for data collection, Monte Carlo simulation analyses were performed with respect to the pre-established five-factor structure of the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001). In summary, using estimates from prior research conducted on the structural equation model of interest, the Monte Carlo simulation method is employed to iteratively generate samples of varying sample sizes, fit them to the said structural equation model, assess their quality of adjustment, and estimate the minimum sample size that consistently yields adequate quality of adjustment (Muthén & Muthén, 2002). In the present registered report, Monte Carlo simulation analyses were performed using the *R* packages *lavaan* version 0.6-17 (Rosseel et al., 2023) and *simsem* version 0.5-16 (Pornprasertmanit et al., 2021). The model parameter values employed in generating the data were derived from the model-implied standardized estimates obtained by Fournier et al. (2024) in their confirmatory factor analyses performed with respect to the pre-established five-factor structure of the 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20; Billieux et al., 2012). The mean model parameter values derived from the model-implied standardized estimates obtained by Fournier et al. (2024) were then employed in specifying the data generation model parameter values by assuming equivalence across the 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20; Billieux et al., 2012) and the 59-item original version of the UPPS-P Impulsive Behavior Scale (UPPS-P-59; Cyders et al., 2007; Whiteside & Lynam, 2001). Using the latter data generation model, 2,000 samples were generated across twenty incremental sample sizes (i.e., 100 samples per sample size of interest) varying from *N* = 59\*1 = 59 to *N* = 59\*20 = 1,180. To fit the 2,000 samples to the structural equation model, weighted least squares mean-and-variance-adjusted robust estimation methods were employed (Finney & di Stefano, 2013). Of note, in fitting the structural equation model, the ordered categorical nature of the observed variables was accounted for. To assess the quality of adjustment of the 2,000 samples to the structural equation model, three conventional model-implied fit indices were employed: the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Good fit was determined by a CFI ≥ 0.950, a TLI ≥ 0.950, and an RMSEA ≤ 0.050. As a result, the Monte Carlo simulation analyses suggested that the minimum sample size that consistently yielded good quality of adjustment – as determined by the 95th percentiles of the distributions of each of the three conventional model-implied fit indices – was equal to *N* = 59\*14 = 826.

All in all, with respect to the minimum number of participants to be recruited for data collection, which equals *N* = 826, we will terminate data collection upon reaching a 20% increment, i.e., upon reaching *N* = ⎡826\*(120/100)⎤ = 992.

**2.1.3. Analyses**

Descriptive analyses of the participant sociodemographic information will be performed with respect to the total sample. Subsequently, participant sociodemographic information will be reported in the “Results” section of the manuscript through (1) sample size, (2) mean, standard deviation, and range values of their age, (3) percentage frequency values of their gender of identification, and (4) percentage frequency values of their country of residence.

Confirmatory factor analyses of the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50) will be performed with respect to its pre-established five-factor structure using the *R* package *lavaan* version 0.6-17 or later (Rosseel et al., 2023). To fit the structural equation model, weighted least squares mean-and-variance-adjusted robust estimation methods will be employed (Finney & di Stefano, 2013). Of note, in fitting the structural equation model, the ordered categorical nature of the observed variables will be accounted for. Adequate model-implied standardized estimates will be determined by model-implied non-null λ standardized estimates ≥ 0.500. If the latter decision rule is not met, alternative structural equation models will be iteratively fitted by omitting the observed variables based on model-implied non-null λ standardized estimates until meeting the said decision rule. To assess the quality of adjustment to the data of the structural equation model, exact, approximate, and local fit will be examined. To examine exact fit, an exact fit hypothesis test will be performed under the null hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is null, against the alternative hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is non-null (Kline, 2023). If the corresponding probability value is lower than a significance level equaling α = 0.050, then the null hypothesis can be rejected at the said significance level, else the null hypothesis cannot be rejected at the said significance level. Adequate exact fit will be determined by a corresponding probability value equal to or greater than a significance level equaling α = 0.050. To examine approximate fit, three model-implied fit indices will be employed: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) (Kline, 2023). To estimate dynamic threshold values for the three aforementioned model-implied approximate fit indices, Monte Carlo simulation analyses will be performed with respect to the structural equation model using the *R* package *dynamic* version 1.1.0 or later (Wolf & McNeish, 2022). In summary, using estimates from the “correctly specified” structural equation model of interest, the Monte Carlo simulation method is employed to iteratively generate samples under varying magnitudes of misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest, fit them to the said “correctly specified” structural equation model, assess their quality of adjustment, and estimate the dynamic threshold values that consistently reject “incorrectly specified” models (i.e., misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest ≥ 0.500), as determined by the 95th percentiles of the distributions of each of the three model-implied fit indices (McNeish, 2023; McNeish & Wolf, 2023). Adequate approximate fit will be determined by a CFI greater than or equal to the dynamic lower-bound value, an RMSEA lower than or equal to the dynamic upper-bound value, and an SRMR lower than or equal to the dynamic upper-bound value, all of which are suggested by the results of the Monte Carlo simulation analyses. To examine local fit, the difference between the population covariance matrix and the model-implied covariance matrix will be inspected (Kline, 2023). If the aforementioned decision rules for adequate exact and approximate fit are not met, alternative structural equation models will be fitted based on local fit until meeting the said decision rules, if and only if such *post hoc* model modification can be carried out sparingly and be theoretically justified (MacCallum, 1986; MacCallum et al., 1992; Silvia & MacCallum, 1988). Subsequently, to highlight construct validity and internal consistency reliability evidence, confirmatory factor analysis results for all structural equation models that will have been relevant to this investigation will be reported in the “Results” section of the manuscript through (1) model-implied χ2 test statistics along with their corresponding degrees of freedom and probability values, (2) model-implied approximate fit indices (i.e., comparative fit indices (CFI), root mean square errors of approximation (RMSEA) along with their corresponding 90% confidence intervals, and standardized root mean square residuals (SRMR)) along with their corresponding dynamic threshold values, (3) differences between the population covariance matrices and the model-implied covariance matrices, and (4) model-implied McDonald’s ω internal consistency values. All highlighted construct validity and internal consistency reliability evidence will be employed to decide which structural equation model will correspond to the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50).

**2.2. Development phase II**

The second phase of the present registered report (i.e., development phase II) consists of developing a revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) from the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50). In this phase, the primary objectives are to develop a short form from the initial item pool derived from the original form and to ensure it presents adequate psychometric properties (i.e., content validity, construct validity, and internal consistency reliability) prior to proceeding with short-form evaluation (see Table 2.2.).

Therefore, the research questions pertaining to the second phase of the present registered report are as follows:

* **RQ3.** What is the content validity of the pre-established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ4.** What is the construct validity of the pre-established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ5.** What is the internal consistency reliability of the pre-established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?

**Box 2.2. A data-driven methodological approach to construct-level content validity in short-form development and evaluation**

In psychometrics, the network approach refers to a set of methods employed to model and analyze the relationships among psychological variables. Unlike traditional psychometric approaches, such as the structural equation approach focusing on latent variables, the network approach emphasizes the interconnections among observed variables. Due to the latter emphasis, modeling and analyzing network models to complement structural equation models when developing and evaluating psychometric instruments offers several advantages. Most notably, in undirected weighted network models, a subtype of network models, observed variables are represented by nodes, and associations between observed variables, each assigned a weight that represents the magnitude of associations, are represented by edges. In this perspective, undirected weighted network models provide estimates of the magnitude of associations (i.e., the shared variance) among items of psychometric instruments that structural equation models cannot, providing critical insight into the construct-level content validity of subsets of items of psychometric instruments. To illustrate, if an undirected weighted network model suggests that a subset of items of a psychometric instrument presents a high magnitude of associations with another subset of items, the shared variance of the said subsets of items is therefore high: the content they assess and the information they provide is highly similar. From the standpoint of the latter illustration, undirected weighted network modeling allows for the estimation of whether a subset of items assesses a “narrow” or a “broad” proportion of the construct-level content of a psychometric instrument. Hence, identifying an optimal subset of a desired number of items that assesses the “broadest” proportion of the construct-level content of a psychometric instrument consists of a combinatorial optimization problem.

Consider an undirected weighted network model $G=\left(V,E\right)$, where $V$ denotes the set of nodes, and $E$ denotes the set of edges. Each edge $e\_{ij}$ is associated with a positive or negative weight $w\_{ij}$. Let $S$ be a subset of nodes from $V$ with a fixed size $k$, and $‾$ denote the complement of $S$ in $V$. The objective is to identify the optimal subset $S$ of size $k$ such that the sum of the absolute values of the edge weights connecting $S$ with its complement $‾$ of size $n-k$ is maximized. Formally, the combinatorial optimization problem can be expressed as:

|  |  |  |
| --- | --- | --- |
|  | $$\max\_{S⊂V, \left|S\right|=k}\left(\sum\_{i\in S, j\in \overbar{S}}^{}\left|w\_{ij}\right|\right)$$ | (2.2.) |

Solving the combinatorial optimization problem expressed in Equation 2.2. allows identifying what optimal subset of a desired number of items presents the highest magnitude of associations (i.e., the highest shared variance) within the set of items. In this light, combinatorial search algorithms (e.g., brute force search algorithm, simulated annealing search algorithm) allow to identify what optimal subset of a desired number of items should be retained in a short version of a psychometric instrument to assess the “broadest” proportion of the construct-level content of the set of items included in the original version of the said psychometric instrument.

**Table 2.2. Development phase II**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   |   |   |   |   |   |   |   |
|   | **Development phase II** |   | **Pre-establishedUPPS-P-20-R** |   |
|   | **Materials** | **Data** | **Analyses** | **Results** |   |   |
|   | EstablishedUPPS-P-50 | Participant dataDevelopment phase I(826 ≤ *N* ≤ 992) | Network analyses | Content validity(RQ3) |   |   |
|   | Confirmatory factor analyses | Construct validity(RQ4) |   |   |
|   | Internal consistency reliability(RQ5) |   |   |
|   |   |   |   |   |   |   |   |   |

*UPPS-P-50 = 50-item version of the UPPS-P Impulsive Behavior Scale. UPPS-P-20-R = revised 20-item short version of the UPPS-P Impulsive Behavior Scale.*

**2.2.1. Materials and data**

We will employ participant data that will have been collected in the prior development phase (i.e., development phase I) with respect to their answers on the *50-item version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-50).

**2.2.2. Analyses**

Network analyses of the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50) will be performed with respect to its 50 items and to the 5 to 13 items comprised in each of its five factors using the *R* packages *bootnet* version 1.6 or later (Epskamp, 2024), *glasso* version 1.11 or later (Friedman et al., 2019), *huge* version 1.3.5 or later (Jiang et al., 2021), *igraph* version 2.0.3 or later (Csárdi et al., 2024), and *qgraph* version 1.9.8 or later (Epskamp et al., 2023). A prominent (undirected weighted) network model in psychometrics is the Gaussian graphical model (Borsboom et al., 2021; Epskamp et al., 2018; Lauritzen, 1996). In Gaussian graphical models, observed variables are represented by nodes, and associations between observed variables are represented by edges, each assigned a weight – derived from the partial correlation coefficient value of its corresponding nodes – that represents the pairwise conditional (in-)dependence between observed variables after conditioning on all other observed variables included in the model. Prior to fitting each of the 50-item and the five *n*-item Gaussian graphical models, as all items of the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50) on which network analyses will be performed are ordered categorical, data will be subjected to a non-paranormal transformation, a semi-parametric transformation designed to relax the assumption of multivariate normality inherent to Gaussian graphical models (Isvoranu & Epskamp, 2023; Liu et al., 2018). To fit each of the 50-item and the five 5-to-13-item Gaussian graphical models, the *ggmModSelect* algorithm will be employed to search for an optimal Gaussian graphical model by (1) fitting a hundred Gaussian graphical models using the graphical lasso regularization algorithm with varying tuning parameter values, (2) refitting all models without regularization, (3) selecting the model with the lowest Bayesian information criterion value, and (4) iteratively adding and removing edges to the latter model upon reaching minimal Bayesian information criterion value (Isvoranu & Epskamp, 2023). To estimate the community structure of each of the 50-item and the five 5-to-13-item Gaussian graphical models, 1,000 executions of the *spin glass* community detection algorithm will be employed to search for an optimal quality of partitioning by selecting the community structure with the highest modularity *Q* value (Newman & Girvan, 2004; Reichardt & Bornholdt, 2006; Traag & Bruggeman, 2009). To identify what five optimal subsets of four items should be retained in the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) to assess the “broadest” proportion of the construct-level content of the set of items included in the 50-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-50), a brute force search algorithm will be implemented to solve the combinatorial optimization problem expressed in Equation 2.2. with respect to each of the five 5-to-13-item Gaussian graphical models. Subsequently, to highlight construct-level content validity evidence, network analysis results for all Gaussian graphical models that will have been relevant to this investigation will be reported in the “Results” section of the manuscript through (1) model-implied graph drawings, (2) model-implied community structures and modularity *Q* values, and (3) model-implied optimal subsets.

Confirmatory factor analyses of the five model-implied optimal subsets of four items that should be retained in a revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) will be performed with respect to its pre-established five-factor structure using the *R* package *lavaan* version 0.6-17 or later (Rosseel et al., 2023). To fit the structural equation model, weighted least squares mean-and-variance-adjusted robust estimation methods will be employed (Finney & di Stefano, 2013). Of note, in fitting the structural equation model, the ordered categorical nature of the observed variables will be accounted for. Adequate model-implied standardized estimates will be determined by model-implied non-null λ standardized estimates ≥ 0.500. If the latter decision is not met, alternative Gaussian graphical models and structural equation models will be iteratively fitted by omitting the observed variables based on model-implied non-null λ standardized estimates until meeting the said decision rule. To assess the quality of adjustment to the data of the structural equation model, exact, approximate, and local fit will be examined. To examine exact fit, an exact fit hypothesis test will be performed under the null hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is null, against the alternative hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is non-null (Kline, 2023). If the corresponding probability value is lower than a significance level equaling α = 0.050, then the null hypothesis can be rejected at the said significance level, else the null hypothesis cannot be rejected at the said significance level. Adequate exact fit will be determined by a corresponding probability value equal to or greater than a significance level equaling α = 0.050. To examine approximate fit, three model-implied fit indices will be employed: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) (Kline, 2023). To estimate dynamic threshold values for the three aforementioned model-implied approximate fit indices, Monte Carlo simulation analyses will be performed with respect to the structural equation model using the *R* package *dynamic* version 1.1.0 or later (Wolf & McNeish, 2022). In summary, using estimates from the “correctly specified” structural equation model of interest, the Monte Carlo simulation method is employed to iteratively generate samples under varying magnitudes of misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest, fit them to the said “correctly specified” structural equation model, assess their quality of adjustment, and estimate the dynamic threshold values that consistently reject “incorrectly specified” models (i.e., misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest ≥ 0.500), as determined by the 95th percentiles of the distributions of each of the three model-implied fit indices (McNeish, 2023; McNeish & Wolf, 2023). Adequate approximate fit will be determined by a CFI greater than or equal to the dynamic lower-bound value, an RMSEA lower than or equal to the dynamic upper-bound value, and an SRMR lower than or equal to the dynamic upper-bound value, all of which are suggested by the results of the Monte Carlo simulation analyses. To examine local fit, the difference between the population covariance matrix and the model-implied covariance matrix will be inspected (Kline, 2023). If the aforementioned decision rules for adequate exact and approximate fit are not met, alternative structural equation models will be fitted based on local fit until meeting the said decision rules, if and only if such *post hoc* model modification can be carried out sparingly and be theoretically justified (MacCallum, 1986; MacCallum et al., 1992; Silvia & MacCallum, 1988). Subsequently, to highlight construct validity and internal consistency reliability evidence, confirmatory factor analysis results for all structural equation models that will have been relevant to this investigation will be reported in the “Results” section of the manuscript through (1) model-implied χ2 test statistics along with their corresponding degrees of freedom and probability values, (2) model-implied approximate fit indices (i.e., comparative fit indices (CFI), root mean square errors of approximation (RMSEA) along with their corresponding 90% confidence intervals, and standardized root mean square residuals (SRMR)) along with their corresponding dynamic threshold values, (3) differences between the population covariance matrices and the model-implied covariance matrices, and (4) model-implied McDonald’s ω internal consistency values. All highlighted construct validity and internal consistency reliability evidence will be employed to decide which structural equation model will correspond to the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) to be evaluated in posterior phases.

**2.3. Evaluation phase**

The third phase of the present registered report (i.e., evaluation phase) consists of evaluating the psychometric properties of the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R). In this phase, the primary objectives are to collect participant data with respect to the short form – along with forms assessing related psychological constructs – and to evaluate its psychometric properties (i.e., construct validity, internal consistency reliability, test-retest reliability, convergent validity, criterion validity) (see Table 2.3.).

Therefore, the research questions pertaining to the third phase of the present registered report are as follows:

* **RQ6.** What is the construct validity of the established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ7.** What is the internal consistency reliability of the established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ8.** What is the test-retest reliability of the established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ9.** What is the convergent validity of the established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?
* **RQ10.** What is the criterion validity of the established revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R)?

**Table 2.3. Evaluation phase**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   |   |   |   |   |   |   |   |
|   | **Evaluation phase** |   | **EstablishedUPPS-P-20-R** |   |
|   | **Materials** | **Data** | **Analyses** | **Results** |   |   |
|   | Sociodemographic information | Participant data collectionEvaluation phase(340 ≤ *N* ≤ 408) |   | Descriptive analyses | Sociodemographic information |   |   |
|   | Pre-establishedUPPS-P-20-R |   | Confirmatory factor analyses | Construct validity(RQ6) |   |   |
|   |   | Internal consistency reliability(RQ7) |   |   |
|   | Participant data collectionEvaluation phase(56 ≤ *N* ≤ 68) | Correlation analyses | Test-retest reliability(RQ8) |   |   |
|   | BSCS-13 |   | Convergent validity(RQ9) |   |   |
|   | GAD-7 |   | Criterion validity(RQ10) |   |   |
|  | PHQ-9 |  |  |  |
|   | PMPUQ-SV-15 |   |   |   |
|   |   |   |   |   |   |   |   |   |

*UPPS-P-20-R = revised 20-item short version of the UPPS-P Impulsive Behavior Scale. BSCS-13 = 13-item Brief Self-Control Scale (Tangney et al., 2004). GAD-7 = 7-item Generalized Anxiety Disorder Scale (Spitzer et al., 2006). PHQ-9 = 9-item Patient Health Questionnaire (Kroenke et al., 2001). PMPUQ-SV-15 = 15-item short version of the Problematic Mobile Phone Use Questionnaire (Lopez-Fernandez et al., 2018)*.

**2.3.1. Materials**

We will collect participant data with respect to their sociodemographic information (i.e., level of English proficiency, age, gender of identification, and country of residence) and to their answers on five different psychometric instruments: (1) the *revised 20-item short version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-20-R), (2) the *13-item Brief Self-Control Scale* (BSCS-13; Tangney et al., 2004), (3) the *7-item Generalized Anxiety Disorder Scale* (GAD-7; Spitzer et al., 2006), (4) the *9-item Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2001), and (5) the *15-item short version of the Problematic Mobile Phone Use Questionnaire* (PMPUQ-SV-15; Lopez-Fernandez et al., 2018).

The *revised 20-item short version of the UPPS-P Impulsive Behavior Scale* (UPPS-P-20-R) is a self-administered psychometric instrument that will assess the applicability of 20 statements related to the five different dimensions of the UPPS-P Impulsive Behavior Model, namely (1) *lack of premeditation*, (2) *positive urgency*, (3) *sensation seeking*, (4) *negative urgency*, and (5) *lack of perseverance*. An example of an item for each of the five instrument’s dimensions will be reported in this section of the manuscript. Each of the five instrument’s dimensions will include 4 items that will be scored (or reverse-scored) on a four-point Likert-type scale (from 1 = “Strongly agree” to 4 = “Strongly disagree”) and that will provide arithmetic mean scores likewise ranging from 1 (i.e., the lowest level of endorsement of the corresponding impulsive behavior dimension) to 4 (i.e., the highest level of endorsement of the corresponding impulsive behavior dimension).

The *13-item Brief Self-Control Scale* (BSCS-13; Tangney et al., 2004) is a self-administered psychometric instrument that assesses the applicability of 13 statements related to *self-control* (e.g., reverse-scored item 1\*: “I am good at resisting temptation.”). Participant data collected with respect to the present instrument will be employed to evaluate criterion validity evidence, as previous original research articles have suggested that self-control presents differential associations with impulsive behavior dimensions (Brevers et al., 2017; Hasegawa et al., 2020). The instrument includes 13 items that are scored (or reverse-scored) on a five-point Likert-type scale (from 1 = “Not at all like me” to 5 = “Very much like me”) and that provide a arithmetic mean score likewise ranging from 1 (i.e., the lowest level of endorsement of self-control) to 5 (i.e., the highest level of endorsement of self-control).

The *7-item Generalized Anxiety Disorder Scale* (GAD-7; Spitzer et al., 2006) is a self-administered psychometric instrument that assesses the applicability of 7 statements related to *anxiety* (e.g., item 1: “Feeling nervous, anxious or on edge.”). Participant data collected with respect to the present instrument will be employed to evaluate criterion validity evidence, as previous original research articles have suggested that anxiety presents differential associations with impulsive behavior dimensions (Billieux et al., 2012; Claréus et al., 2017; Lim & Kim, 2018). The instrument includes 7 items that are scored on a four-point Likert-type scale (from 0 = “Not at all” to 3 = “Nearly every day”) and that provide arithmetic mean scores likewise ranging from 0 (i.e., the lowest level of endorsement of anxiety) to 3 (i.e., the highest level of endorsement of anxiety).

The *9-item Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2001) is a self-administered psychometric instrument that assesses the applicability of 9 statements related to *depression* (e.g., item 1: “Little interest or pleasure in doing things.”). Participant data collected with respect to the present instrument will be employed to evaluate criterion validity evidence, as previous original research articles have suggested that depression presents differential associations with impulsive behavior dimensions (Billieux et al., 2012; Claréus et al., 2017; Lim & Kim, 2018). The instrument includes 9 items that are scored on a four-point Likert-type scale (from 0 = “Not at all” to 3 = “Nearly every day”) and that provide arithmetic mean scores likewise ranging from 0 (i.e., the lowest level of endorsement of depression) to 3 (i.e., the highest level of endorsement of depression).

The *15-item short version of the Problematic Mobile Phone Use Questionnaire* (PMPUQ-SV-15; Lopez-Fernandez et al., 2018) is a self-administered psychometric instrument that assesses the applicability of 15 statements related to three different dimensions of problematic mobile phone use, namely (1) *dependent use* (e.g., item 1: “It is easy for me to spend all day not using my mobile phone.”), (2) *dangerous use* (e.g., reverse-scored item 2\*: “I use my mobile phone while driving.”), and (3) *prohibited use* (e.g., item 3: “I don’t use my mobile phone when it is completely forbidden to use it.”). Participant data collected with respect to the present instrument will be employed to evaluate criterion validity evidence, as previous original research articles have suggested that dependent use, dangerous use, and prohibited use present differential associations with impulsive behavior dimensions (Billieux et al., 2008; Canale et al., 2021). Each of the three instrument’s dimensions includes 5 items that are scored on a four-point Likert-type scale (from 1 = “Strongly agree” to 4 = “Strongly disagree”) and that provide arithmetic mean scores likewise ranging from 1 (i.e., the lowest level of endorsement of the corresponding psychopathological symptom) to 4 (i.e., the highest level of endorsement of the corresponding psychopathological symptom).

**2.3.2. Data**

Participants will be recruited using *Prolific* (<https://www.prolific.com/>), a third-party crowdsourcing platform for recruiting and compensating participants for online research, and will be redirected to *Qualtrics* (https://www.qualtrics.com/), a third-party crowdsourcing platform for implementing online surveys.

We will collect participant data with respect to their sociodemographic information and to their answers on the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R), the 13-item Brief Self-Control Scale (BSCS-13; Tangney et al., 2004), the 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006), the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), and the 15-item short version of the Problematic Mobile Phone Use Questionnaire (PMPUQ-SV-15; Lopez-Fernandez et al., 2018). Prior to proceeding with participant data collection, *N* = 32 “pilot” participants (Perneger et al., 2015) will be recruited to complete all statements implemented in the full online survey – strictly following the protocol of participant data collection – in order to (1) ensure the absence of technical and “pilot”-participant-reported issues in the full online survey, (2) estimate the time required to complete all statements implemented in the full online survey, and (3) determine how much participants will be paid for their full completion of the online survey. Of note, all “pilot” participant data will be permanently deleted prior to proceeding with participant data collection. As *Qualtrics* (https://www.qualtrics.com/) estimates that the time required to complete all statements implemented in the full online survey equals 13.8 minutes, “pilot” participants will be paid ⎡13.8⎤\*(9/60) = 2.1 GBP for their full completion of the online survey to equate to a “good” hourly rate of 9 GBP, in accordance with *Prolific* (<https://www.prolific.com/>). Let *T* be the median time (in minutes) it will take “pilot” participants to complete all statements implemented in the pilot full online survey; participants will be paid ⎡*T*⎤\*(9/60) GBP for their full completion of the online survey to equate to a “good” hourly rate of 9 GBP, in accordance with *Prolific* ([https://www.prolific.com/)](https://www.prolific.com/%29). Furthermore, in order to evaluate the test-retest reliability of the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R), previously recruited participants will be invited to re-complete the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) following a four-week interval and will be paid ⎡*T*⎤\*(9/60) GBP for their full re-completion of the psychometric instrument.

The inclusion criteria for data collection are as follows: (1) being fluent in English and (2) being 18 years of age or older. Endorsement of all of the aforementioned criteria establishes inclusion.

The exclusion criteria for data collection are as follows: (1) failing to complete the full online survey, (2) failing the attention check implemented in the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) or – if applicable – failing two to five of the five attention checks implemented in the five psychometric instruments (e.g., “This is an attention check. Please select “Agree strongly” as an answer to the present statement.”), (3) completing the full online survey in less time than three standard deviations below the mean time it will take participants to complete the full online survey, and (4) having completed the full online survey in the prior development phase (i.e., development phase I). Endorsement of any of the aforementioned criteria establishes exclusion.

With respect to data collection, we will require that participants provide answers to all statements implemented in the full online survey and adopt a listwise deletion approach to missing data handling by excluding data from participants who will have failed to complete the full online survey. Missingness information will be reported in the “Results” section of the manuscript through (1) percentage frequency values of participant-wise missingness and (2) percentage frequency values of data-wise missingness.

To estimate the minimum number of participants to be recruited for data collection, Monte Carlo simulation analyses were performed with respect to the pre-established five-factor structure of the 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20; Billieux et al., 2012). In summary, using estimates from prior research conducted on the structural equation model of interest, the Monte Carlo simulation method is employed to iteratively generate samples of varying sample sizes, fit them to the said structural equation model, assess their quality of adjustment, and estimate the minimum sample size that consistently yields adequate quality of adjustment (Muthén & Muthén, 2002). In the present registered report, Monte Carlo simulation analyses were performed using the *R* packages *lavaan* version 0.6-17 (Rosseel et al., 2023) and *simsem* version 0.5-16 (Pornprasertmanit et al., 2021). The model parameter values employed in generating the data were derived from the model-implied standardized estimates obtained by Fournier et al. (2024) in their confirmatory factor analyses performed with respect to the pre-established five-factor structure of the 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20; Billieux et al., 2012). The mean model parameter values derived from the model-implied standardized estimates obtained by Fournier et al. (2024) were then employed in specifying the data generation model parameter values. Using the latter data generation model, 2,000 samples were generated across twenty incremental sample sizes (i.e., 100 samples per sample size of interest) varying from *N* = 20\*1 = 20 to *N* = 20\*20 = 400. To fit the 2,000 samples to the structural equation model, weighted least squares mean-and-variance-adjusted robust estimation methods were employed (Finney & di Stefano, 2013). Of note, in fitting the structural equation model, the ordered categorical nature of the observed variables was accounted for. To assess the quality of adjustment of the 2,000 samples to the structural equation model, three conventional model-implied fit indices were employed: the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Good fit was determined by a CFI ≥ 0.950, a TLI ≥ 0.950, and an RMSEA ≤ 0.050. As a result, the Monte Carlo simulation analyses suggested that the minimum sample size that consistently yielded good quality of adjustment – as determined by the 95th percentiles of the distributions of each of the three conventional model-implied fit indices – was equal to *N* = 20\*17 = 340.

To estimate the minimum number of participants to be recruited to re-complete the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) following a four-week interval, two-sided correlation test power analyses were performed. In summary, specifying all but the sample size *N* parameter values (i.e., correlation coefficient ρ, significance level α, power β) involved in the two-sided correlation test equation, the two-sided correlation test power method is employed to iteratively input varying sample size values to the said equation and estimate the minimum sample size that yields adequate effect size (Cohen, 1988). In the present registered report, two-sided correlation test power analyses were performed using the *R* package *pwr* version 1.3-0 (Champely, 2020). The parameter values employed in estimating the minimum sample size that yields adequate effect size, which was determined by ρ2 = 0.500 (ρ = 0.707), were equal to α = 0.001 and β = 0.999. As a result, the two-sided correlation test power analyses suggested that the minimum sample size that yielded adequate effect size was equal to *N* = 56.

All in all, with respect to the minimum number of participants to be recruited for data collection, which respectively equals *N* = 340 and *N* = 56, we will terminate data collection upon reaching 20% increments, i.e., upon reaching *N* = ⎡340\*(120/100)⎤ = 408 and *N* = ⎡56\*(120/100)⎤ = 68 respectively.

**2.3.3. Analyses**

Descriptive analyses of the participant sociodemographic information will be performed with respect to the total sample. Subsequently, participant sociodemographic information will be reported in the “Results” section of the manuscript through (1) sample size, (2) mean, standard deviation, and range values of their age, (3) percentage frequency values of their gender of identification, and (4) percentage frequency values of their country of residence.

Confirmatory factor analyses of the revised 20-item short version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) will be performed with respect to its pre-established five-factor structure using the *R* package *lavaan* version 0.6-17 or later (Rosseel et al., 2023). To fit the structural equation model, weighted least squares mean-and-variance-adjusted robust estimation methods will be employed (Finney & di Stefano, 2013). Of note, in fitting the structural equation model, the ordered categorical nature of the observed variables will be accounted for. To assess the quality of adjustment to the data of the structural equation model, exact, approximate, and local fit will be examined. To examine exact fit, an exact fit hypothesis test will be performed under the null hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is null, against the alternative hypothesis that the difference between the population covariance matrix and the model-implied covariance matrix is non-null (Kline, 2023). If the corresponding probability value is lower than a significance level equaling α = 0.050, then the null hypothesis can be rejected at the said significance level, else the null hypothesis cannot be rejected at the said significance level. Adequate exact fit will be determined by a corresponding probability value equal to or greater than a significance level equaling α = 0.050. To examine approximate fit, three model-implied fit indices will be employed: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) (Kline, 2023). To estimate dynamic threshold values for the three aforementioned model-implied approximate fit indices, Monte Carlo simulation analyses will be performed with respect to the structural equation model using the *R* package *dynamic* version 1.1.0 or later (Wolf & McNeish, 2022). In summary, using estimates from the “correctly specified” structural equation model of interest, the Monte Carlo simulation method is employed to iteratively generate samples under varying magnitudes of misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest, fit them to the said “correctly specified” structural equation model, assess their quality of adjustment, and estimate the dynamic threshold values that consistently reject “incorrectly specified” models (i.e., misspecification applied to the null λ parameters of the “correctly specified” structural equation model of interest ≥ 0.500), as determined by the 95th percentiles of the distributions of each of the three model-implied fit indices (McNeish, 2023; McNeish & Wolf, 2023). Adequate approximate fit will be determined by a CFI greater than or equal to the dynamic lower-bound value, an RMSEA lower than or equal to the dynamic upper-bound value, and an SRMR lower than or equal to the dynamic upper-bound value, all of which are suggested by the results of the Monte Carlo simulation analyses. To examine local fit, the difference between the population covariance matrix and the model-implied covariance matrix will be inspected (Kline, 2023). If the aforementioned decision rules for adequate exact and approximate fit are not met, alternative structural equation models will be fitted based on local fit until meeting the said decision rules, if and only if such *post hoc* model modification can be carried out sparingly and be theoretically justified (MacCallum, 1986; MacCallum et al., 1992; Silvia & MacCallum, 1988). Subsequently, to highlight construct validity and internal consistency reliability evidence, confirmatory factor analysis results for all structural equation models that will have been relevant to this investigation will be reported in the “Results” section of the manuscript through (1) model-implied χ2 test statistics along with their corresponding degrees of freedom and probability values, (2) model-implied approximate fit indices (i.e., comparative fit indices (CFI), root mean square errors of approximation (RMSEA) along with their corresponding 90% confidence intervals, and standardized root mean square residuals (SRMR)) along with their corresponding dynamic threshold values, (3) differences between the population covariance matrices and the model-implied covariance matrices, and (4) model-implied McDonald’s ω internal consistency values.

Using the participant data collected prior to and posterior to the four-week interval with respect to the revised 20-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R), correlation analyses will be performed using two-sided Spearman’s ρ rank correlation tests on the psychometric instrument’s arithmetic mean scores. Subsequently, to highlight test-retest reliability evidence, correlation analysis results for the psychometric instrument’s dimensions will be reported in the “Results” section of the manuscript through Spearman’s ρ2 rank correlation coefficient values. Test-retest reliability evidence will be labeled “strong” if ρ2 ≥ 0.500, “adequate” if ρ2 ∈ [0.250, 0.500[, “weak” if ρ2 ∈ [0.100, 0.250[, and “absent” if ρ2 < 0.100.

Using the participant data collected with respect to the revised 20-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R) and the 13-item Brief Self-Control Scale (BSCS-13; Tangney et al., 2004), correlation analyses will be performed using two-sided Spearman’s ρ rank correlation tests on the psychometric instruments’ arithmetic mean scores. Subsequently, to highlight convergent validity evidence, correlation analysis results for the psychometric instruments’ dimensions will be reported in the “Results” section of the manuscript through Spearman’s ρ rank correlation coefficient values. Convergent validity evidence will be labeled “strong” if ρ ≥ 0.500, “adequate” if ρ ∈ [0.250, 0.500[, “weak” if ρ ∈ [0.100, 0.250[, and “absent” if ρ < 0.100.

Using the participant data collected with respect to the revised 20-item version of the UPPS-P Impulsive Behavior Scale (UPPS-P-20-R), the 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006), the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), and the 15-item short version of the Problematic Mobile Phone Use Questionnaire (PMPUQ-SV-15; Lopez-Fernandez et al., 2018), correlation analyses will be performed using two-sided Spearman’s ρ rank correlation tests on the psychometric instruments’ arithmetic mean scores. Subsequently, to highlight criterion validity evidence, correlation analysis results for the psychometric instruments’ dimensions will be reported in the “Results” section of the manuscript through Spearman’s ρ rank correlation coefficient values. Criterion validity evidence will be labeled “strong” if ρ ≥ 0.500, “adequate” if ρ ∈ [0.250, 0.500[, “weak” if ρ ∈ [0.100, 0.250[, and “absent” if ρ < 0.100.

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