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Procrastination as a Transdiagnostic Construct: A Psychopathological and Conceptual Scoping Review †

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† This study was initially developed for the residency conclusion paper of the Medical Residency program in Psychiatry at the Federal University of Health Sciences of Porto Alegre (UFCSPA) 2021-2024. It was presented in January 2024, with the original title "Procrastination as a transdiagnostic construct in psychiatric disorders: a Conceptual Scope Review". Subsequently, it was presented as a poster at the European Congress of Psychiatry in Madrid, Spain, in April 2025.

Abstract

Background: Procrastination is the voluntary and irrational delay of action despite negative consequences. We aimed to identify/suggest procrastination definition, assessment, and psychopathological features (within the contexts of attention-deficit/hyperactivity disorder and obsessive-compulsive disorder. **Method:** This scoping systematically reviewed original research studies with conceptual and clinical data related to procrastination. Data were extracted regarding definitions, populations, instruments used, and psychopathology. **Results:** A total of 387 studies were included. Only 13% utilized clinical/subclinical populations. Definitions of procrastination showed no single consensus. The most cited elements involved irrational delay, awareness of consequences, task aversiveness, and self-regulation failure. The most frequently used assessment tool was Lay's General Procrastination Scale. A considerable number of studies identified associations between procrastination and clinical constructs such as impulsivity, perfectionism, executive dysfunction, low self-esteem, and mood instability. Few studies directly assessed procrastination in formal diagnostic categories, suggesting that procrastination shares neurocognitive and emotional regulation deficits with these disorders, especially in domains involving task initiation, inhibitory control, and intolerance to discomfort. **Conclusion:** Procrastination is a transdiagnostic construct rather than a unitary behavioral trait. Its multifactorial nature calls for further clinical investigation, particularly in structured diagnostic settings. A unified definition is needed to distinguish between normative delay and clinically relevant procrastination.

Keywords: attention deficit disorder with hyperactivity; emotional regulation; procrastination; perfectionism; obsessive-compulsive disorder

1. Introduction

Procrastination is commonly conceptualized as an irrational, conscious, and sometimes intentional tendency to delay the start or to complete tasks or decisions, whether important or not, despite the negative and deleterious effects that this practice may have, potentially causing harm to the individual or others [1–3]. Conceptions of procrastination imply inaction, postponement, delays, and difficulty in decision-making [4]. However, there is no consensus definition of procrastination, nor established pathophysiology or motivation. It is believed that cognitive aspects, personality, and

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motivational processes may be intertwined with 'putting off until later'. Rozental and Carlbring (2014) state that procrastination is not considered a psychiatric condition. Thus, determining its occurrence is complicated, precluding the use of diagnostic criteria or a structured clinical interview [5]. Some subjective discomfort or suffering is important and should always be considered when evaluating individuals with a repetitive procrastinatory pattern; distress may be manifested as, for instance, interpersonal problems, physical illness, stress, anxiety, depression, and financial difficulties [5].

It is theorized that some individuals have a failure in self-regulating emotions and aversive feelings towards some tasks– as anxiety, for example, with procrastination being the peak of this erratic processing [6]. These individuals may exhibit what we call anxiety trait, defined as an aspect of personality where nervousness, apprehension, or tension is a stable personality trait in an individual [7]. Previous studies have revealed a positive effect in the association between procrastination and anxiety trait [8,9], potentially with an underlying neural basis. Supporting this, in Broadbent's selective attention filter theory, it is believed that there is a limited attention capacity, with only relevant stimuli being attended to or processed [10,11]. However, individuals with higher anxiety trait show lower prefrontal cortex activation [12] and greater difficulty inhibiting irrelevant stimuli [13], which may interfere with decision-making, balancing task aversion, incentive of the outcome, and lead to dysfunctional procrastination. A Chinese study observed that individuals with higher trait anxiety tend to procrastinate more due to lower individual self-control capacity and demonstrated a positive correlation between hippocampus-frontal cortex connection activity and levels of anxiety and procrastination [14]. Procrastination, although not an official Research Domain Criteria (RDoC) construct [15], can be interpreted as a transdiagnostic phenomenon resulting from the dysfunctional interaction of multiple domains, as for example: cognitive systems (difficulty initiating or maintaining tasks, failure to inhibit distractions, poor organization); arousal/regulatory systems (task avoidance due to emotional overload or perceived aversiveness); negative valence systems (fear of failure, perfectionism, avoidance of evaluation or discomfort); positive valence systems (preference for immediate gratification over long-term goals; poor future-oriented motivation); and systems for social processes (fear of judgment, low self-esteem, avoidance of socially evaluative situations).

In addition to the lack of a consensus definition of procrastination, this behavior is quite common and, when chronic, can lead to worsened productivity, poorer academic and professional performance, and even damage to health and personal well-being. A study showed that about 20% of adults in the general population are affected by chronic procrastination [16], while in students, this rate can reach up to 50% (2). Aside from the lack of a defined concept, there is also an existing gap concerning the motivations that lead to procrastination and its potential relation to dysfunctional attempts at emotional regulation to alleviate unwanted emotions [17]. Figure 1 summarizes the main motivations/aspects to understand the procrastination construct.

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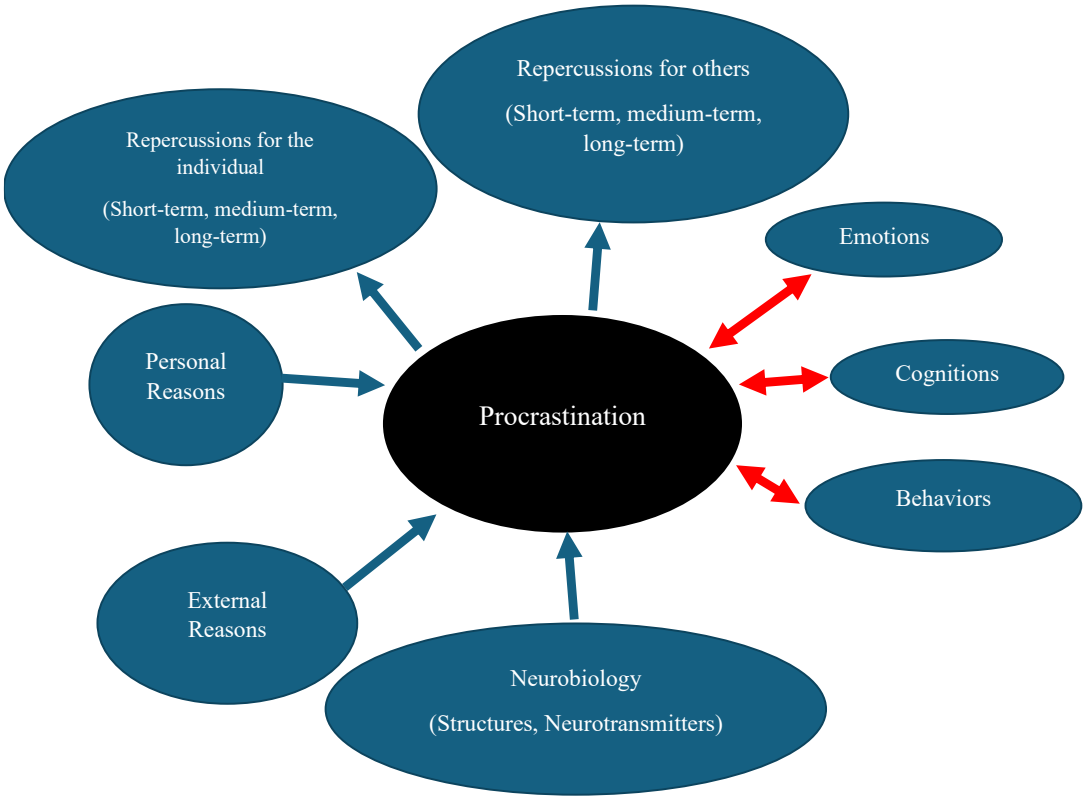

Figure 1. Main motivations/aspects related to procrastination (Blue arrows = unidirectional; red arrows = bidirectional).

Otherwise, procrastination may be present in various psychiatric disorders, such as Major Depressive Disorder [18,19], Attention Deficit Hyperactivity Disorder (ADHD) and Obsessive-Compulsive Disorder (OCD). In DSM-5, procrastination is mentioned only once in the chapter on OCD and Related Disorders as an associated feature supporting the diagnosis [20]. When researched on ADHD and procrastination, numerous non-scientific publications can be found, indicating a gap in scientific literature.

ADHD is a neurodevelopmental disorder characterized by persistent attention and motor activity changes – hyperactivity and/or impulsivity, leading to overall impairment in the individual. OCD, on the other hand, is characterized by the presence of recurring obsessions and/or compulsions that cause impairment to the individual [21]. Despite distinct pathophysiological and clinical differences, both can result in procrastination as a deleterious consequence.

Thus, three central gaps emerge from the literature:

1. Conceptual ambiguity (absence of a unified, clinically relevant definition);
2. Measurement inconsistency (proliferation of instruments with limited psychometry validation and poor comparability); and
3. Underrepresentation of clinical populations (disproportionate reliance on student samples, limiting generalizability of psychiatric context).

These gaps underscore the need for a comprehensive mapping of how procrastination has been defined, assessed, and associated with psychopathological constructs. Thus, this scoping review aims to analyze the descriptive transdiagnostic psychopathology of procrastination (especially in the OCD and ADHD context), as well as the presence or absence of associated symptoms, motivations, and consequences of procrastination, resulting in a consensual definition.

2. Methodology

 doi:10.20944/preprints202603.0016.v1

A comprehensive search strategy was developed to capture all relevant literature on procrastination and its association with psychopathology. Electronic databases included PubMed, Scopus, Web of Science and SciELO. After the search using Mesh Terms (Procrastination; Procrastination and Obsessive-Compulsive Disorder; Procrastination and Attention Deficit and Hyperactivity Disorder), 16,363 articles were found. Abstract selection was done on the Rayyan platform [22], allowing for the exclusion of duplicated abstracts, article selection based on inclusion and exclusion criteria, and independent title and abstract review by two authors (MSMB and VRX). In cases of disagreement, a third author (YAF) determined the remaining abstracts. Cohen's kappa coefficient was calculated for random subset of 200 articles, yielding and iter-rater agreement of 0.81, indicating substantially reliability. The review protocol was not prospectively registered in PROSPERO, as this platform does not accept scoping reviews; however, we adhered to the Preferred Reporting items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) to ensure transparency and reproducibility. Figure 2 summarizes this process following the recommendations of the PRISMA-ScR (PRISMA, 2020) [23].

The inclusion criteria consisted of research conducted in humans, published in English, Portuguese, and Spanish languages, from 1973 to 2024. The exclusion criteria encompassed research conducted in animals, poster's abstracts publications, conferences in scientific conclaves, and letters to the author. After selecting the remaining articles, their references were reviewed, and a search for "gray literature" was conducted through Google Scholar and ProQuest Dissertations and Theses Global to minimize publication bias.

Subsequently, data extraction from the articles was carried out using a standardized spreadsheet specially designed for this review. Extracted variables included:

- Article Data: authors, year, journal, journal impact factor, language, research design, existence of a sample group (and sample size) of individuals diagnosed with OCD and/or ADHD, as well as assessment of other psychiatric populations (and sample size), presence of a control group (and sample size), differentiation of procrastination between genders (and rate of women), description of the mean age of the sample (with mean age and SD), marital status (and % of individuals with spouses), and description of occupation (and % of individuals with some occupation).
- Clinical Data: use of a scale to assess procrastination, which scale, whether it defined Procrastination, if it used another author's definition or its own definition, from which author the definition was, transcription of the definition of procrastination, if it associates procrastination with any psychopathological factor and which one, if it associates procrastination with any sociodemographic aspect and which one, if it associates procrastination with any clinical aspect and which one.

To ensure accuracy, a random 15% of the extracted data was cross-checked by a senior reviewer (YAF), with discrepancies resolved by consensus.

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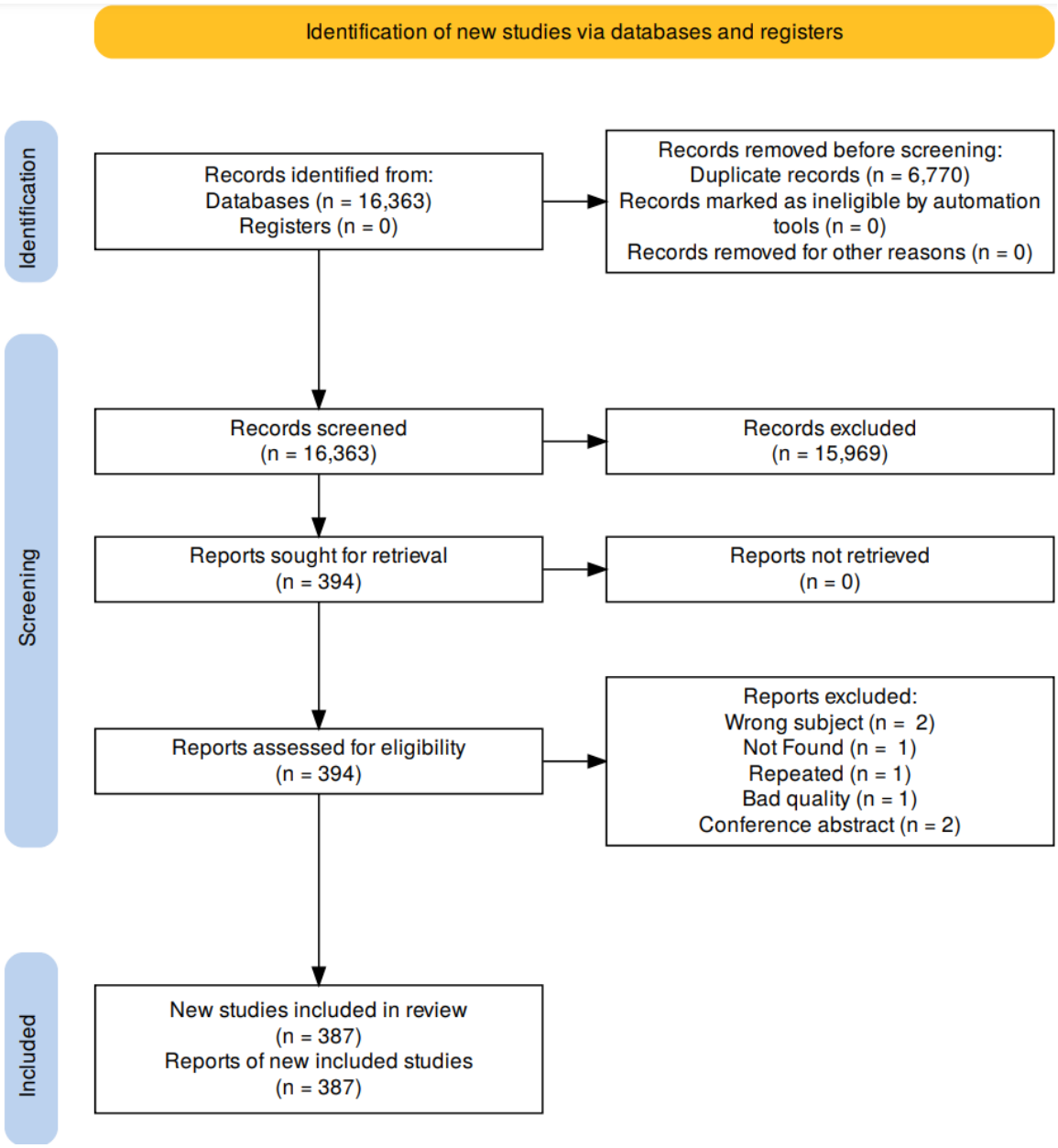

Figure 2. Flowchart of the article selection process according to PRISMA (2020).

Data synthesis and Statistical Analysis

Data synthesis was primarily descriptive, in line with the objectives of a scoping review. Categorical variables were described as absolute values (n) and relative values (%). Continuous variables were assessed for distribution using the Kolmogorov-Smirnov test and were expressed as means and standard deviations (SD) or weighted means. Minimum and maximum values were also used.

Following the extraction of the most frequently used terms across the reviewed definitions, a qualitative grouping process was conducted to reduce redundancy and overlap. Translations were applied when necessary, and terms were standardized into English. A frequency threshold (85th percentile) identified 64 most recurrent terms. These were retained for subsequent analyses. To visually represent the most frequent conceptual descriptors, a word cloud was generated using WordClouds.com, while frequency tables summarized the top terms and their original sources. As a secondary and exploratory step, we employed two freely available large language models (LLM) (ChatGPT [24] and Gemini [25]) to generate synthetic definitions of procrastination based on the 64 most recurrent terms extracted from the literature. The objective was to illustrate whether

 doi:10.20944/preprints202603.0016.v1

computational language models converge with the conceptual elements most frequently identified in published studies. The same prompt was given for both LLM: "Use all 64 words that I will attach below to build the concept of procrastination."

3. Results

After the pre-selection of these, only 394 articles remained. After data extraction, 7 were excluded (see Figure 2), leaving 387 articles to be reviewed. There has been an increase in procrastination research in the recent decade: 80.9% of the selected studies published between 2013 and 2023.

The 387 publications were distributed across 192 journals, with the top 10 most used being: Frontiers in Psychology (7.5%), Personality and Individual Differences (5.4%), Current Psychology (3.4%), Propósitos y Representaciones (2.1%), Journal of Research in Personality (2.1%), Frontiers in Psychiatry (1.8%), Psychological Reports (1.6%), International Journal of Environmental Research and Public Health, European Journal of Personality, Journal of Prevention and Intervention in Community, North American Journal of Psychology, and Psicología, Conocimiento y Sociedad.

The prevalences of the languages used were English (86.8%), Spanish (9.3%), and Portuguese (3.9%). The predominant research design was the cross-sectional (n=295, 76.2%), followed by instrument/scale validation design (n=22, 5.7%), cohort studies (n=19, 4.9%), and integrative reviews (n=12, 3.1%). It is worth noting that there were 12 (3.1%) systematic reviews on procrastination, but only 5 (1.3%) conducted meta-analysis.

Regarding the studied populations, 5 studies (1.3%) used populations with attention deficit hyperactivity disorder (ADHD), with a total number of 831 participants. Only 1 study (0.02%) used a population with obsessive-compulsive disorder (OCD), with a sample size of 65 participants. Another 7 studies (1.8%) used populations with other disorders or symptoms, such as depression and anxiety). The remaining 374 studies (96.4%) involved students (mainly university students), workers, or the general population.

3.1. Pooled Descriptive Statistics

Of the population features, 53,714 were female, with mean prevalence of 63.98% (SD = 14.19). Across studies reporting gender differences, procrastination was slightly higher in males ($r \approx 0.04$). The mean age was described in 287 (74.2%) of the articles (mean age = 24.24 years (mean SD = 4.16 years) ranging from 14 to 68 years old. Marital status was described in 41 articles (10.6%), in which 39.97% (5,231 individuals) reported having a spouse/sexual partner. In 281 publications (72.6%), it was described by 19,173 subjects (95.2%) they had an occupation (students or professionals).

3.2. Cited Scales and Instruments

In 323 (83.5%) articles, at least one scale was used to assess procrastination. Precisely, 40 different scales were applied, which were cited a total of 359 times (some articles used more than one scale). The 10 most used scales were, in descending order: Lays's General Procrastination (13.1%), Adult Inventory of Procrastination Scale (12.3%), Academic Procrastination Scale (11.1%), Procrastination Assessment Scale Students (8.9%), Tuckman Procrastination Scale (8.4%), Pure Procrastination Scale (8.1%), Decisional Procrastination Scale (5%), Active Procrastination Scale (3.9%), Busko's Academic Procrastination Scale (3.9%), Irrational Procrastination Scale (3.9%), Aitken Procrastination Inventory (3.3%). A supplementary table (S1) summarizes the main psychometric characteristics of such instruments, including internal reliability (Cronbach's α values typically >0.80), factor structure (unidimensional vs. multidimensional), test-retest stability, cross-cultural adaptations, and identified limitations.

Most of the papers, 87.1% (n=337), define procrastination, with the most cited words to define procrastination listed below and summarized in the word cloud (Figure 3). The 433 words were

 doi:10.20944/preprints202603.0016.v1

grouped into 383 terms (the 64 most used are highlighted, along with the number of citations in Table 1. The complete table with all terms is in the supplementary material – Table S2).

Figure 3. Wordcloud of the most cited words for the definition of Procrastination from the 387 selected papers.

Table 1. Prevalence of the main key words/terms used in the definitions of Procrastination in the 387 selected articles.

Number of times of the appearance in the papers	Words/terms
328	Delay
199	action/act/activity/to do
165	Tasks
149	intentional
109	despite/even/althoug
107	Completing/conclusion/finish/end
88	voluntary/voluntariness
76	negative
74	postpone
73	consequences
70	expectation
65	behavior
64	course
61	beginning/starting
57	tendency
45	putting off
44	Decision/deliberate
43	Performance; worse
37	failure
35	time/timelines
33	irrational

 doi:10.20944/preprints202603.0016.v1

28	self-regulation
26	individual
25	necessary
23	Knowing/information/instruction; unnecessary
22	Goal; important
20	Discomfort, purposeful, results
18	Making
17	Autorregulation/control, deadlines
16	subjective
15	Outcomes; achievement
14	Trait; avoidance
13	Work
12	experience
11	Anxiety; assignment; defer; emotional; engage; leading; motivation; personal; phenomenon; planned; positive
10	problems
9	Awareness; lack
8	difficult; disposition; effect; last; reasons; regulation; specific

Out of 387 articles, 78.8% (n=305) use the definition of other authors (98 authors were cited), with the most frequently cited ones highlighted in Table 2.

Table 2. Main authors defining procrastination in articles selected for this scope review.

Authors defining Procrastination	Number of citations (%)
Steel	121 (31,3)
Ferrari	46 (11,9)
Klingsieck	27 (6,98)
Rothblum	27 (6,98)
Solomon	25 (6,46)
Lay	20 (5,2)
Chu	10 (2,6)
Milgram	10 (2,6)
Sirois	10 (2,6)

3.3. LLM's Definition of Procrastination

According to the ChatGPT [24], the definition of "Procrastination" was:

"Procrastination is the delaying or postponing intention of actions, tasks, or activities, despite knowing the negative consequences and being aware of the importance or necessity of completing them. It involves postponing decision-making and the start or completion of tasks, often resulting in poorer performance, missing deadlines, irrational time management, and emotional distress.

This phenomenon is characterized by a lack of self-regula tion and a tendency to avoid the discomfort associated with engaging in necessary but undesirable activities. Procrastination can be present in personal and professional contexts, impacting motivation, emotional experience, and overall achievement.

Reasons for procrastination can include lack of awareness, difficulty with self-regulation, anxiety, avoidance of problems, and the preference for engaging in more immediately rewarding activities. The postponing of tasks is often planned, with subjective outcomes affecting the individual's ability to achieve specific goals and obtain positive results.

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> Procrastination contrasts with purposeful and goal-oriented behavior because it involves delaying tasks even when one is aware of the negative effects and the need to complete them. It is a common human experience that can be addressed through increased self-awareness, effective time management, and enhanced self-regulation skills".
>
> According to the Gemini [25], the definition of "procrastination" was:
>
> "Procrastination is a voluntary and irrational delay of an intended action or task, even knowing the likely negative consequences. It is a failure in self-regulation, characterized by the avoidance of necessary or important tasks, often associated with feelings of discomfort or anxiety."

The key elements of procrastination, as outlined by the Gemini, are intentional delay, awareness of consequences, irrationality, self-regulation failure, and negative emotions. It also emphasizes that: 1) the act of procrastination is a common phenomenon, but chronic procrastination can lead to negative impacts on personal and professional life, 2) It is a behavior that can be changed with effort and strategies, 3) Understanding the underlying causes of procrastination, such as fear of failure, perfectionism, or difficulty in initiating tasks, can help change behavior, 4) In rare cases, procrastination can have positive outcomes as some individuals thrive under pressure and intentionally delay tasks to create a sense of urgency.

3.4. Related Psychopathological Aspects

Only 191 (49.4%) of the articles sought or found psychopathological aspects associated with procrastination. Twenty-eight (7.2%) associated psychopathological conditions were described, with the top 10, in descending order, being: anxiety, depression, ADHD, stress, more physical health problems/cardiovascular health/poor perceived health, Burnout/academic Burnout, low testosterone levels, sleep disorders, chronic fatigue, sadness, low motivation, compulsions.

Just 21.4% (n=83) of the publications sought and/or found sociodemographic aspects associated with procrastination (the main ones are highlighted in Table 3).

Table 3. Demographic aspects addressed in articles selected for this scope review.

Associated demographic aspect	Number of citations
Gender/ Sex	31
Age / Young Age	18
Student	8
Educational level/ Years in college	7
Nationality	6

4. Discussion

4.1. The Exploratory Consensual Definition of Procrastination

Both LLM's produced definitions that emphasized voluntary but irrational delay, self-regulation failure, emotional discomfort, and awareness of negative consequences. Interestingly, ChatGPT provided a broader and behaviorally nuanced definition, whereas Gemini offered a more concise formulation and uniquely highlighted the potential adaptative aspects of procrastination.

But neither AI emphasized that to be considered pathological, procrastination must be a repetitive behavioral pattern that fails to generate learning, despite the harm caused by previous experiences. Table 2S (supplementary material) resumes such comparison between ChatGPT and Gemini.

While innovative, this approach must be interpreted with caution. LLM are not yet validated scientific tools, and their outputs reflect training biases and lack methodological transparency. Therefore, these results should not be considered part of the formal review methodology, but rather

 doi:10.20944/preprints202603.0016.v1

as an illustrative exercise that highlights the potential of computational tools for future work in construct validation. Otherwise, recent literature demonstrates that approaches based on machine learning and natural language processing (NLP) have been used to investigate the validity of psychopathological constructs, both in terms of diagnostic differentiation and dimensional analysis, as well as the validity of psychometric instruments. Studies show that machine learning algorithms, such as Random Forest, Support Vector Machine, and deep learning-based models, can identify patterns in clinical, neurobiological, and linguistic data that correspond to classic psychopathological constructs, such as depression, anxiety, and risk for psychosis. These approaches have been able to distinguish diagnostic groups, identify specific linguistic markers, and even suggest subtypes or transdiagnostic dimensions [26–28]. In the psychometric context, AI strategies have been used to assess the construct validity and criterion validity of clinical scales, demonstrating that computational models can provide an additional layer of evidence to traditional validation by inferring relationships between items and theoretical constructs and replicating clinical rules across different samples [29,30]. However, the literature highlights important limitations: most studies are still in the exploratory phase, with few clinically validated models; there is a lack of methodological standardization, a risk of bias in the input data, and challenges regarding the interpretability of models and the generalization of findings to diverse populations [26,30,31].

4.2. Assessment of Procrastination

Almost all the papers presented a cross-sectional design published in English in psychology-related journals, which reflects descriptive aspects of the papers, as some scale validation studies. It was also possible to find a great variety of applied scales (a total of 40), which may indicate that there is no consensus about how to assess procrastination. The three most used were: Lay's General Procrastination Scale [32], Adult Inventory of Procrastination Scale [33], and Academic Procrastination Scale [34].

Instruments used to assess procrastination exhibit a variety of psychometric qualities that are fundamental to their validity and usefulness in clinical and research contexts. Most widely used scales demonstrate high internal reliability, indicating consistency among the items that comprise the instrument, which show that the items cohesively measure the procrastination construct [35]. Several studies employ confirmatory and exploratory factor analyses to demonstrate that the scales exhibit robust, often multidimensional, factor structures, reflecting different facets of procrastination, such as decisional and behavioral procrastination, and time management difficulties [35]. Some scales demonstrate satisfactory temporal stability, indicating that scores remain consistent over time in stable populations. Although self-report scales exhibit moderate concurrent validity, there are inconsistencies regarding their ability to predict actual procrastination behaviors, such as delay in completing tasks [36]. Some scales have been validated in different languages and cultural contexts, maintaining good psychometric properties, which reinforces their applicability across diverse populations [37]. While most instruments demonstrate acceptable reliability, their validity is distinguishing between normative delay and clinically maladaptative procrastination remains limited. Only a minority explicitly assessed the functional impairment or negative consequences associated with procrastination, highlighting the need for refined tools in clinical contexts. New proposals suggest the inclusion of scales that specifically assess these consequences for better clinical discrimination [38]. In general, the instruments remain more speculation regarding predictive validity and distinguishing between different types of delay.

4.3. Sociodemographic and Clinical Features of the Reviewed Papers

As our main results, an analysis of the sociodemographic profile of individuals prone to procrastination in the literature reveals a multifaceted picture, with some statistically significant associations but small effects, and others absent or inconsistent. A robust meta-analysis involving over 100,000 participants demonstrated that men have a slightly greater tendency to procrastinate, both in general and academic contexts, compared to women, although the magnitude of this

 doi:10.20944/preprints202603.0016.v1

difference is small (r ≈ 0.04) [39]. However, other classic sociodemographic factors, such as socioeconomic status, nationality, multiculturalism, family size, and educational background, showed no significant association with the tendency to procrastinate in broad quantitative analyses [39].

Age is a relevant factor: procrastination seems to be more prevalent in younger individuals, especially between the ages of 14 and 29, with a progressive decline throughout adulthood and old age [40]. Within this younger group, men tend to procrastinate more than women, but this gender difference does not persist in older age groups [40]. Furthermore, as our results have shown, procrastination is associated with unemployment and lack of a marital relationship, suggesting that contextual factors of social and occupational stability may influence procrastination behavior [40].

In university populations, procrastination is highly prevalent, but there is no consensus on striking differences by gender or age within this group, although the severity of procrastination is associated with greater psychological distress and poorer quality of life [41].

The clinical profile of procrastinators, as indicated by our results and outlined in the literature, is strongly associated with deficits in self-regulation, impulsivity, difficulties with attentional control, and problems with emotional regulation [42,43].

As we expected, procrastinators have a higher prevalence of symptoms of anxiety, depression, stress, fatigue, and lower life satisfaction, especially in domains related to work, income, and interpersonal relationships [44]. The severity of the condition can vary, with subgroups ranging from mild to severe procrastinators, including a subgroup in which procrastination is strongly associated with depression. Furthermore, impulsiveness and difficulties regulating negative emotions are central factors, suggesting that procrastination may function as a short-term emotion regulation strategy, to the detriment of long-term goals [42,43]. Low self-discipline, lower self-efficacy, disorganization, and task aversion are also frequently observed characteristics [42]. Unfortunately, we could not assess such features.

4.4. Procrastination and ADHD

Although only 5 papers were found investigating procrastination in ADHD patients, it seems to be an association between them. Procrastination in people with ADHD is strongly related to deficits in executive functions, such as difficulties with time management, organization, problem-solving, and emotional regulation. These executive functions act as mediators between ADHD symptoms and the tendency to procrastinate, with deficits in self-management of time and organization/problem-solving being particularly relevant [45–47].

Furthermore, procrastination is frequently observed in adults with ADHD and may be an important target for interventions, especially when there are associated internalizing symptoms, such as depression and anxiety [48,49].

In the neuropsychological context, procrastination in ADHD may also be related to delay aversion and difficulty postponing rewards, phenomena mediated by alterations in brain regions such as the amygdala and dorsolateral prefrontal cortex [48,50]. Individuals with ADHD tend to prefer immediate rewards and have greater difficulty sustaining effort on long-term tasks, which contributes to procrastination [48,50]. Among the symptom domains of ADHD, inattention appears to have a more robust correlation with procrastination than impulsivity or hyperactivity [51]. This suggests that difficulty maintaining focus, following instructions, and completing tasks is directly linked to the tendency to postpone activities.

4.5. Procrastination and OCD

In contrast to ADHD, the literature on procrastination in OCD remains relatively scarce but conceptually relevant. Three transdiagnostic constructs appear to link OCD and procrastination: compulsivity, perfectionism, intolerance of uncertainty.

It is already well established that OCD is characterized by obsessions and/or compulsions that consume time and cause significant functional impairment, often accompanied by avoidance

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behaviors and difficulties initiating or completing tasks due to interference from obsessive-compulsive symptoms [52,53]. Neuropsychological studies demonstrate that individuals with OCD have deficits in executive control mechanisms, especially in tasks that require suppression of automatic behaviors and selection of goal-directed tasks. This deficit in task control can contribute to difficulties initiating or completing tasks, which can manifest clinically as procrastination [53]. Furthermore, the need for perfectionism and the fear of making mistakes can lead to avoidance or postponement of tasks, as the individual may feel that they will not be able to perform the activity "perfectly" or without risk of error, perpetuating the cycle of procrastination. It is important to differentiate OCD from obsessive-compulsive personality disorder (OCPD). In OCPD, perfectionism and rigidity can lead to procrastination due to excessive concern with details and an inability to consider a task "finished," resulting in frequent delays and postponements [20,54]. However, in classic OCD, procrastination tends to be more related to direct interference from obsessions and compulsions, as well as avoidance of situations that may trigger anxiety [55,56].

4.6. Limitations

Because the aim of this study was to explore the transdiagnostic psychopathological aspects of ADHD and OCD associated with procrastination and to attempt to build a consensual definition of the procrastination construct, the authors avoided did not conduct a formal assessment of the methodological quality or risk of bias of the included studies. While this approach is consistent with PRISMA-ScR recommendations, it limits the interpretation of findings, as no judgment about the robustness of individual studies could be made. Consequently, the results should be considered descriptive and exploratory, providing a broad mapping of the literature rather than a critical appraisal of evidence quality. By using literature based primarily on samples of university students, the procrastination construct may have been built biasedly, hindering adequate clinical generalization to psychiatric samples. However, the application of the procrastination concepts suggested here closely resemble those used in clinical practice, but it still needs to be tested in clinical samples. The analysis of definitions with LLM, although innovative, lacks robust methodological validity in a scientific review. We chose to maintain the LLM-generated definitions in the results only as an illustrative exercise and to facilitate reading and propose the use of consensual definitions in accordance with the current literature.

4.7. Clinical Implications

Our findings suggest that procrastination can be better understood as a transdiagnostic construct, with clear relevance for clinical practice. In ADHD, procrastination appears closely linked to executive dysfunction, time management difficulties and emotion regulation deficits. These features suggest that procrastination may serve as a treatment target, complementing established interventions focused on attention and impulsivity. In OCD, procrastination is often driven by perfectionism, intolerance of uncertainty, and compulsions that interfere with task initiation and completion. In these cases, procrastination may function as a prognostic marker, as patients with higher levels of task avoidance may experience more severe impairment and resistance do standard treatments.

5. Conclusions

In conclusion, this review has contributed to demonstrating the presence of gaps in the literature, so far, on the aspects involving a more detailed conceptualization of procrastination [57,58] and how it may be transdiagnostically present in several psychiatric disorders [57]. In addition, it allowed for an exploratory construction of a definition of procrastination that reconciles most of the definitions used in the reviewed articles, including some clinical aspects. Procrastination still needs to be investigated in a more systematic way and with appropriate methodologies (as validated

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instruments, for instance) for understanding this construct in psychiatric disorders, especially in ADHD and OCD.

Procrastination is a complex event, so far without a defined concept, which seems to be related to negative consequences and affects individual productivity and, thus, mental health. The possibility of there being an underlying neuronal basis for procrastination and/or associated psychopathological conditions that manifest with dysfunctional procrastination may motivate investigations that substantiate not only such neurobiological aspects, but that reinforce the definitions constructed thus far. Further investigation into related psychopathological aspects, motivations, and the consequences of procrastinating, on a social, psychopathological, and functional level, with appropriate methodology applied to clinical populations, is necessary for a more comprehensive understanding of this phenomenon. Conceptualizing procrastination as a clinically meaningful phenomenon opens possibilities for its integration into transdiagnostic psychotherapeutic models, such as cognitive-behavioral strategies for emotion regulation, time management interventions, and exposure-based techniques targeting avoidance. Future clinical trials should investigate whether reducing procrastination improves broader symptomatology and functioning across psychiatric conditions.

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Abbreviations

The following abbreviations are used in this manuscript:

RDoC	Research Domain Criteria
ADHD	Attention Deficit Hyperactivity Disorder
OCD	Obsessive-Compulsive Disorder (OCD).
DSM-5	Diagnostic and statistical manual of mental disorders : DSM-5. — 5th ed.
PubMed	National Library of Medicine's (NLM) free, searchable bibliographic database supporting scientific and medical research
SciELO	Scientific Electronic Library Online
PROSPERO	International Prospective Register of Systematic Reviews
PRISMA-ScR	Preferred Reporting items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews
N	absolute values
%	relative values
SD	standard deviations
LLM	large language models
AI	artificial inteligence
NLP	natural language processing

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OCPD obsessive-compulsive personality disorder

References

1. Lay, C.H. At Last, My Research Article on Procrastination. *J Research Personality* **1986,***20,*474-495.
2. Steel, P. The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psycholog Bull* **2007**, *133(1),* 65.
3. Klingsieck, K.B. Procrastination: When good things don't come to those who wait. *Eur Psychologist* **2013**, *18*(1), 24–34
4. Yan, B.; Zhang, X. What Research Has Been Conducted on Procrastination? Evidence From a Systematical Bibliometric Analysis. *Front. Psychol* **2022**,*13,*809044.
5. Rozental, A.; Carlbring, P. Understanding and Treating Procrastination: A Review of a Common Self-Regulatory Failure. *Psychology* **2014**, *5(13),* 1488–1502.
6. Sirois, F.; Pychyl, T. Procrastination and the priority of short-term mood regulation: Consequences for future self. *Soc and Personal Psychol Compass* **2013,** *7(2),* 115–127.
7. Ming, X.; Luo, G.; Wang, J.; et al. Integrating Behavioral and Neurophysiological Insights: High Trait Anxiety Enhances Observational Fear Learning. *NeuroImage* **2025,***307,*121037.
8. Constantin, K.; English, M.M.; Mazmanian D. Anxiety, depression, and procrastination among students: Rumination plays a larger mediating role than worry. *J Rational-Emotive & Cognitive-Behavior Ther* **2018,** *36(1),* 15–27.
9. Eerde, W.V. A meta-analytically derived nomological network of procrastination. *Personal & Individ Diff.* **2003**, *35(6),* 1401–18.
10. Eysenck, M.W.; Keane, M.T. Limitações da atenção e do aprendizado. In: Psicologia Cognitiva: um manual introdutório. Eysenck, M.W.; Keane, M.T., Eds. Artes Médica: Porto Alegre, Brazil, 1994; pp.88-117.
11. Gazzaniga, M.S.; Ivry, R.B.; Mangun, G.R. Attention and selective perception. In: Cognitive Neuroscience. Norton, W.W. and cols. W.W. Norton & Company: New York, USA, 1998. pp. 207-245.
12. Bishop, S.J. Trait anxiety and impoverished prefrontal control of attention. *Nature Neurosc* **2009**, *12(1),* 92–8.
13. Derakshan, N.; Eysenck, M.W. Anxiety, Processing Efficiency, and Cognitive Performance. **Eur Psychol 2009**, *14(2),* 168–76.
14. 14Zhang, S.M.; Verguts, T.; Zhang, C.Y.; Feng, P.; Chen, Q.; Feng, T.Y. Outcome value and task aversiveness impact task procrastination through separate neural pathways. *Cerebral Cortex* **2021,** *31,* 3846–855.
15. Cuthbert, B.N.; Kozak, M.J. Constructing constructs for psychopathology: The NIMH Research Domain Criteria. *J Abnorm Psychol* **2013**, *122(3),* 928-37.
16. Harriott, J.; Ferrari, J.R. Prevalence of procrastination among samples of adults. *Psycholog Reports* **1996**, *78(2).* 611–16.
17. Schuenemann, L.; Scherenberg, V.; von Salisch, M.; Eckert, M. "I'll worry about it tomorrow" – Fostering emotion regulation skills to overcome procrastination. *Front Psycholog* **2022,** *13,* 1–13.
18. Solomon, L.J.; Rothblum, E.D. Academic procrastination: Frequency and cognitive-behavioral correlates. *J Counsel Psychol* **1984,** *31,* 503–9.
19. Beutel, M.E.; Klein, E.M.; Aufenanger, S.; Brahler, E.; Dreier, M.; Muller, K.W.; Quiring, O.; Reinecke, L.; Schmutzer, G.; Stark, B.; et al. Procrastination, distress and life satisfaction across the age range—A German representative community study. *PLoS ONE* **2016**, *11*, e148054.
20. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th edition.). Arlington, VA: USA, 201.
21. Rebetez, M.M.L.; Rochat, L.; Barsics, C.; Van der Linden, M. Procrastination as a Self-Regulation Failure: The Role of Impulsivity and Intrusive Thoughts. *Psycholog Reports* **2018**, *121(1),* 26-41.
22. Ouzzani, M..; Hammady, H.; Fedorowicz, Z.; Elmagarmid, A. Rayyan — a web and mobile app for systematic reviews. *Systematic Reviews* **2016,** *5*, 210.
23. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Rev Panam Salud* **2022**, *46,* e112.

 doi:10.20944/preprints202603.0016.v1

24. OpenAI. ChatGPT response to prompt: if I give you a set of words, could you build the definition of the term 'procrastination'? [Generative artificial intelligence]. 2023 [cited 2023 Oct 27]. Available from: https://openai.com/blog/chatgpt.
25. OpenAI. Gemini (formerly Bard) for response to prompt: if I give you a set of words, could you build the definition of the term 'procrastination'? [Generative artificial intelligence]. 2023 [cited 2023 Oct 27]. Available from: https://bard.google.com/chat.
26. Chen, J.; Patil, K.R.; Yeo, B.T.T.; Eickhoff, S.B. Leveraging Machine Learning for Gaining Neurobiological and Nosological Insights in Psychiatric Research. *Biol Psychiat* **2023**, *93(1),*18-28.
27. Eyrikaya, E.;Dağ, İ. From the P-Factor to Cognitive Content: Detection and Discrimination of Psychopathologies Based on Explainable Artificial Intelligence. *Depress Anxiety* **2025**, *2025*, 9943590.
28. Bilgrami, Z.R.; Sarac, C.; Srivastava, A.; et al. Construct Validity for Computational Linguistic Metrics in Individuals at Clinical Risk for Psychosis: Associations With Clinical Ratings. Schizoph Research **2022**, *245,* 90-96.
29. Trognon, A.; Cherifi, Y.I.; Habibi, I.; Demange, L.; Prudent, C. Using Machine-Learning Strategies to Solve Psychometric Problems. *Scientific Reports* **2022**, *12(1),* 18922.
30. Luo, X.; Li, Y.; Xu, J.; et al. AI in Medical Questionnaires: Innovations, Diagnosis, and Implications. *J of Med Internet Res* **2025**, *27,* e72398.
31. Lett, T.A.; Vaidya, N.; Jia, T.; et al. Framework for Brain-Derived Dimensions of Psychopathology. *JAMA Psychiatry* **2025**, 2835502.
32. 32-Hasanagić, A.; Ozsagir, C.B. The validity exploration of General Procrastination Scale. *Epiphany J Transdiscipl Stud* **2018**, *11,* 55–74.
33. McCown, W.; Johnson, J.; Petzel, T. Procrastination, a principal components analysis. *Personal Individ Differences* **1989,** *10,* 197–202.
34. Fior, C.A.; Polydoro, S.A.J.; Rosário, P.S.L. Validity evidence of the Academic Procrastination Scale for undergraduate. *Rev Psico-USF* **2022**, *27 (2),* 307-17.
35. Svartdal, F.; Steel, P. Irrational Delay Revisited: Examining Five Procrastination Scales in a Global Sample. *Front in Psychol* **2017**, *8,*1927.
36. Vangsness, L.; Voss, N.M.; Maddox, N.; Devereaux, V.; Martin, E. Self-Report Measures of Procrastination Exhibit Inconsistent Concurrent Validity, Predictive Validity, and Psychometric Properties. *Front in Psychol* **2022**,*13*,784471.
37. Yip, M.C.W.; Chung, O.L.L. Psychometric Properties of the Chinese Version of Procrastination Assessment Scale for Students. *Front in Psychology* **2022**, *13,* 1016116.
38. Svartdal, F.; Nemtcan, E. Past Negative Consequences of Unnecessary Delay as a Marker of Procrastination. *Front in Psychology* **2022**,*13*,787337.
39. Lu, D.; He, Y.; Tan. Y. Gender, Socioeconomic Status, Cultural Differences, Education, Family Size and Procrastination: A Sociodemographic Meta-Analysis. *Front in Psychology* **2021**, *12*, 719425.
40. Akbari, M.; Seydavi, M.; Zahrakar, K.; Ferrari, J.R.; Griffiths, M.D. Chronic Procrastination Among Iranians: Prevalence Estimation, Latent Profile and Network Analyses. *Psychiatr Q* **2024**, *95(3),* 341-65.
41. 41- Rozental, A.; Forsström, D.; Hussoon, A.; Klingsieck, K.B. Among University Students: Differentiating Severe Cases in Need of Support From Less Severe Cases. *Front in Psychology* **2022**, *13,* 783570.
42. 42-Rebetez, M.M.L.; Barsics, C.; Rochat. L.; D'Argembeau, A.; Van der Linden, M. Procrastination, consideration of future consequences, and episodic future thinking. *Conscious Cogn* **2016,***42,* 286-292.
43. Wypych, M.; Matuszewski, J.; Dragan,W.Ł. Roles of Impulsivity, Motivation, and Emotion Regulation in Procrastination - Path Analysis and Comparison Between Students and Non-Students. *Front in Psychol* **2018**,*9*,891.
44. Rozental, A.; Forsell, E.; Svensson, A.; et al. Differentiating Procrastinators From Each Other: A Cluster Analysis. *Cognitive Behav Ther* **2015**,*44(6),*480-90.
45. Bolden, J.; Fillauer, J.P. "Tomorrow Is the Busiest Day of the Week": Executive Functions Mediate the Relation Between Procrastination and Attention Problems. *J of ACH* **2020**,*68(8),*854-63.
46. Bodalski, E.A.; Flory, K.; Canu, W.H. ADHD Symptoms and Procrastination in College Students: The Roles of Emotion Dysregulation and Self-Esteem. *J Psychopathol Behav Assess* **2023**,*45*, 48–57.

 doi:10.20944/preprints202603.0016.v1

47. Shirdel, S.; Shadbafi, M.; Shirdel, S.; et al. Structural relationships of the Adult Attention-Deficit/Hyperactivity symptoms, Sluggish Cognitive Tempo, and driving behavior: mediating role of procrastination. *Curr Psychol* **2024,** *43,* 17879–88.
48. Oguchi, M.; Takahashi, T.; Nitta, Y.; Kumano, H. The Moderating Effect of Attention-Deficit Hyperactivity Disorder Symptoms on the Relationship Between Procrastination and Internalizing Symptoms in the General Adult Population. *Front in Psychol* **2021,***12,*708579.
49. Müller, V.; Mellor, D.; Piko, B.F. How to Procrastinate Productively With ADHD: A Study of Smartphone Use, Depression, and Other Academic Variables Among University Students With ADHD Symptoms. *J Attent Dis* **2023,***27(9),*951-959.
50. Van Dessel, J.; Sonuga-Barke, E.; Mies, G.; et al. Delay Aversion in Attention Deficit/Hyperactivity Disorder Is Mediated by Amygdala and Prefrontal Cortex Hyper-Activation. *J Child Psychol Psychiat Allied Discipl* **2018,***59(8),*888-99.
51. Niermann, H.C.; Scheres, A. The relation between procrastination and symptoms of attention-deficit hyperactivity disorder (ADHD) in undergraduate students. *Int J Methods Psychiatr Res* **2014,** *23(4),*411-21.
52. Hirschtritt, M.E.; Bloch, M.H.; Mathews, C.A. Obsessive-Compulsive Disorder: Advances in Diagnosis and Treatment. *JAMA* **2017**,*317(13),*1358-67.
53. Kalanthroff, E.; Henik, A.; Simpson, H.B.; Todder, D.; Anholt, G.E. To Do or Not to Do? Task Control Deficit in Obsessive-Compulsive Disorder. *Behav Ther* **2017,***48(5),*603-13.
54. Pinto, A.; Steinglass, J.E.; Greene, A.L.; Weber, E.U.; Simpson, H.B. Capacity to Delay Reward Differentiates Obsessive-Compulsive Disorder and Obsessive-Compulsive Personality Disorder. *Biol Psych* **2014**, *75(8),*653-9.
55. Gupta, M.; Singh, P. Relationship between Locus of Control, Desirability of Control and Obsessive-Compulsive symptomology. *IJIAP* **2024**, *2(5),* 1428:45.
56. Palizhati, M.; Xiafon, Y.; Ping, H. The relationship between self-control and obsessive-compulsive symptoms: the chain mediating effect of procrastination and anxiety. *Chinese J Behav Med Brain Science* **2023,** *32(8),*727-732.
57. Gustavson, D.E.; Pont, A.; Hatoum, A.S.; Rhee, S.H.; Kremen, W.S.; Hewitt, J.K.; Friedman, N.P. Genetic and Environmental Associations Between Procrastination and Internalizing/Externalizing Psychopathology. Clin Psychol Sci **2017,***5(5),*798–815.
58. Pereira, L.C.;Ramos, F.B. Academic Procrastination in University Students: a Systematic Review of the Literature. *Psicologia Escolar e Educacional* **2021,** *5*, e223504.
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