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The Effect of School-Related Stress on Individuals with Tic-Related Obsessive-Compulsive Disorder

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ABSTRACT

Many people across the world experience tic-related Obsessive-Compulsive Disorder (OCD). Stress is a universal experience that can vary in intensity. School-related stress, however, is caused specifically by pressure from academic studies and/or social situations faced at school. While there are studies covering the relationship between school-related stress and tics or OCD individually, there have been fewer studies focusing on comorbid tics and OCD. This paper aims to analyze how and to what extent school-related stress influences symptoms of tic-related OCD. Additionally, numerous studies researched the effect of stress on tic-related OCD yet focus less or not at all on stress caused by school. By covering the transdisciplinary aspect of mind, brain, health, and education (MBHE), this paper's goal is to discuss how all these factors relate to each other on a larger, broader scale. The reviewed literature suggests that school-related stress may worsen symptoms of tic-related OCD. This was proposed after reviewing studyings associating excess dopamine in the brain to exacerbated symptoms; however, this mechanism remains multifaceted and is influenced by additional variables. The process of how and the extent to which this occurs is discussed throughout this review in more depth. By continuing to learn about this area of literature, progress can be made toward improving the quality of life for individuals who experience tic-related OCD.

Keywords: tic-related OCD, tics, OCD, school-related stress, school, stress, MBHE, dopamine, social.

INTRODUCTION

OCD is a chronic mental health condition which is characterized by both obsessions and compulsions that are consistently time consuming and cause anxiety or distress (Singh et al., 2023). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), obsessions are recurrent and persistent thoughts, urges, or images that are intrusive and unwanted, while compulsions are repetitive behaviors or mental acts that an individual feels driven to perform in response to an obsession (American Psychiatric Association, 2013). An example of a compulsion based on an obsession includes the urge to repetitively wash one's hands due to the obsession that they are "contaminated" (Guazzini, 2022).

Tic-related OCD is a subtype of OCD which, based on a DSM-5 diagnostic subtype, is marked by the experience of tics—sudden, repetitive movements or sounds that are involuntary (Jones et al., 2023)—along with OCD (Pringsheim & Piacentini, 2018). Tics can range from movements (motor) to

sounds (vocal), such as jerking one's arm or making a whistle sound (Jones et al., 2023). While OCD itself is not a direct cause of tics, OCD and tic disorders are highly comorbid (Jalenques et al., 2024). Tic-related OCD differs from tic disorders (TD) such as Tourette's Syndrome (TS) in that they are generally driven more by compulsions and the urge to tic, rather than being completely involuntary (Conelea et al., 2014). Throughout the world, it is estimated that 1-3% of people experience OCD while another 1% of people experience tics (Franklin et al., 2012). Additionally, 20-30% of individuals with OCD experience tics while 22-44% of individuals with any form of tic disorders have OCD (Franklin et al., 2012). Although this data had been collected over a decade ago, there have been little repeated studies conducted to measure the same statistics, implying such evidence is the closest estimate available.

Individuals who experience tics are likely to experience more frequent tic attacks when dealing with high levels of stress (Leisman & Sheldon, 2022). Leisman and Sheldon (2022) discuss the potential relationship between external stressors, the hypothalamic-pituitary-adrenal (HPA) axis, and neural pathways that may produce tics. They report that when external stressors activate the hypothalamic-pituitary-adrenal (HPA) axis, higher amounts of dopamine are released (Leisman & Sheldon, 2022). They add that this may potentially further excite these neural pathways (Leisman & Sheldon, 2022). External stressors refer to any factor that induces stress, including but not limited to environmental changes, social experiences, and workplace events.

When looking into external stressors, a factor of stress in children and young adults is school and school workload (Reddy et al., 2018). For many students, the last two years of high school especially, which involve preparations for higher education entrance exams, are a period of intense anxiety, stress, and worry for young students (Stromájer et al., 2023). Many students deal with high levels of pressure due to intense workload, intense competition to get into college, and numerous examinations (Reddy et al., 2018).

Background

Much research has been done on tics in relation to OCD, with studies focusing on symptomatology (e.g., Mukai et al., 2021), factors that impact its severity (e.g., Tan et al., 2024), and its relationship with other tic disorders (TD; e.g., Yu et al., 2022); however, less is known regarding how school-related stress influences this. Yu and colleagues (2022) discuss the comorbidity between OCD and tic disorder. They found that OCD and TD often co-occur, indicating a potential overlap. Comorbidity, however, does not necessarily establish that OCD and TD have a causal relationship. Mukai and colleagues (2021) detail the connection between tics and OCD, comparing individuals with just OCD to those with tic-related OCD. They found that patients with tic-related OCD start exhibiting symptoms at an earlier age, are predominantly male, have higher frequency and greater severity of specific symptom dimensions (including symmetry/ordering and arranging dimensions), and have a higher prevalence of sensory phenomena (the physical or mental sensations that are associated with urges; Mukai et al., 2021).

Additionally, research has been conducted on how stress impacts the frequency of tics. Psychosocial stress factors such as family-related stress and personal relationship stress have been found to exacerbate tics in patients with any type of TD (Tan et al., 2024). Bortolato and colleagues (2021) point to environmental stress as a pivotal influence for tic severity. For example, abundant evidence has documented that tic severity is associated with the intensity of stressful life events including losing a job or moving schools (Bortolato et al., 2021). Furthermore, much research has been conducted on the effect that stress has on individuals with OCD, with Mahjani and colleagues (2021) reporting that stressful life events contribute to the development of OCD.

Researchers are aware of the extent to which school contributes to stress, with it being a significant cause (Reddy et al., 2018) along with the effects of stress on OCD symptoms and the frequency of tics. While research may seem prevalent with an abundance of sources (e.g., Fernández et al., 2025; Vallani et al., 2022) discussing the relationship between OCD and school, taking a closer look reveals that the majority of these sources focus on how OCD inhibits an individual's ability to achieve their full potential in school. With such an abundance of research centered around OCD, tic-related OCD, school, and stress, it is important to narrow in on areas that have yet to be researched. The effect school-related stress has on individuals with tic-related OCD epitomizes an area of research that receives less attention due to its specificity.

The Problem

While stress as a contributor to OCD severity has been researched by a variety of researchers (e.g., Ferreira et al., 2021; Li et al., 2021), there are fewer studies on how stress caused specifically by school affects tic-related OCD. Li and colleagues (2021) point out that stress is one of the main risk factors for the development of the disorder and note that OCD patients have an impaired stress response. Similarly, Iverson and Black (2022) found that nearly all patients report that stress worsens their tics.

In terms of causes of stress, academic stress may be the single most dominant stress factor that affects the mental well-being of college students (Barbayannis, 2022). India's National Crime Records Bureau, for example, registered 1.8% of students who died by suicide due to failing examinations (Reddy et al., 2018). Although stress as a contributor to OCD and tics as well as school as a contributor to stress have been extensively studied, the two have been understudied altogether in relation to each other.

Research Question

To address the gap in the literature discussed, this paper will aim to answer the question: how and to what extent does school-related stress influence the severity of tics and OCD symptoms in an individual with tic-related OCD?

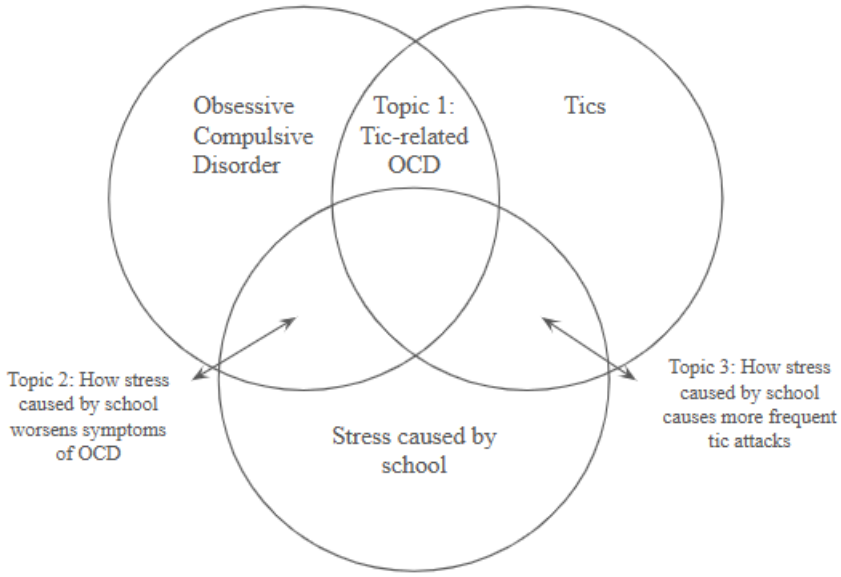
LITERATURE REVIEW

In order to respond to the research question analyzing how and the extent that school-related stress influences the severity of tics and OCD symptoms in an individual with tic-related OCD, this literature review is divided into three topics: Tic-Related OCD, Stress (Primarily School-Related) and OCD, and Stress (Primarily School-Related) and Tics.

Literature Genres

The reviewed sources were primarily peer-reviewed articles from academic journals specializing in related topics. Sources used were predominantly published within the past seven years to ensure accurate and up-to-date research. A majority of the literature was gathered from Google Scholar, covering the transdisciplinary nature of the Mind, Brain, Health, and Education disciplines. For research on tics, articles focusing on tics in relation to either OCD or stress were used. Any research gathered on stress focused on psychosocial or academic stressors, to certify relevance to the education field.

Figure 1



As shown in figure 1, this literature review was divided up into three subtopics by grouping together variable combinations of the broader categories. Each of the three categories relate to each other to a certain degree. Tics/OCD and stress caused by school are related, with the reviewed literature demonstrating a potential cause-and-effect relationship between them, whereas tics and OCD have a comorbid relationship.

Tic-Related OCD

Tic-related OCD is a subtype of OCD that has potentially received the strongest empirical support, which was shown by the DSM-5's inclusion of a new tic-related specifier as of 2013 (Brander et al., 2019).

Brander and colleagues (2019) published an article in the journal Molecular Psychiatry, which specializes in psychiatric topics and undergoes extensive peer review to ensure validity. They researched the familial load of tic-related OCD in comparison to non-tic-related OCD. After gathering data on individuals from six Swedish national registers, they created sub-cohorts consisting of all twins, full siblings, half siblings, and cousins to analyze the risk of tic-related OCD among individuals in relation to genetic relatedness. The hazard ratio (HR) was higher across most types of relatives of individuals with tic-related OCD compared to those with non-tic-related OCD, indicating that tic-related OCD has a higher heritability and familial risk than non-tic-related OCD (Brander et al., 2019). Benatti and colleagues (2020) found similar results and included in their research of the relationship between OCD and TD and SA that tic-related OCD showed higher rates of positive psychiatric family history.

Many potential treatment options for tic-related OCD have been proposed, such as cognitive behavioral therapy (CBT; Pringsheim & Piacentini, 2018) and selective serotonin reuptake inhibitors (SSRIs; Jalenques et al., 2024). After extracting relevant publications from five medical databases, Jalenques and colleagues (2024) found several studies concluding that youths with OCD and comorbid TS/chronic tic disorder (CTD) could benefit from SSRIs to treat their obsessive-compulsive symptoms. According to Pringsheim and Piacentini (2018), children with tic-related OCD should in addition be given high priority for CBT as initial treatment as there is evidence to support the efficacy of remote CBT for OCD.

Stress (Primarily School-Related) and OCD

When discussing the effects of stress on OCD (primarily caused by academic pressure), Adams and colleagues (2018) included that it may lead directly to the development of symptomatology, such as additional obsessions and compulsions. High school and middle school students who reported stressful life events were 21% more likely to go on to meet criteria for OCD 12 months later when compared to students who reported no such events (Adams et al., 2018). However, Adams and colleagues (2018) limit their discussion to stress in general and its effect on generic OCD symptoms, with no mention of tic-related OCD. Similarly, Ferreira and colleagues (2021) further emphasize the lack of research conducted on stress as a contributor to tic-related OCD by focusing on OCD symptoms in general, failing to discuss tics. They assert that increases in general stress and changes in routines throughout life are features associated with the development and severity of OCD (Ferreira et al., 2021). Raposo-Lima and Morgado (2020) and Debnath and Sarkar (2024) reported similar findings through differing meta-analyses in which they synthesized findings from other research articles, concluding that stress exacerbated symptoms of OCD. In terms of identifying factors that induce stress, various studies categorize school as a major cause of stress (e.g., Barbayannis et al., 2022; Reddy et al., 2018). Stromájer and colleagues (2023) emphasize the importance of addressing the stress induced by the school environment. This could

potentially be done by integrating anxiety prevention programs into the school curriculum and within the local school environment, particularly for school-going children.

Additionally, Loscalzo (2024) discusses a new potential clinical condition, studyholism (or obsession with study), in relation to OCD, with it potentially being defined as an OCD-related disorder. Based on numerous previous studies (e.g., Loscalzo & Giannini, 2017; Loscalzo & Giannini, 2018), Loscalzo (2024) reviews literature studying how studyholism should be classified. Through Loscalzo and Giannini (2019)'s findings, Loscalzo (2024) established that problematic overstudying is better conceptualized as an OCD-related disorder since the compulsion component is better aligned with that of OCD than addiction.

The brains of individuals with OCD have been revealed to have abnormalities in specific brain regions (Yang et al., 2023). Yang and colleagues (2023) conducted a whole-brain voxel-wise meta-analysis to investigate differences of functional activity and gray matter volume between patients with OCD and those without. While they found no significant difference between participants with OCD and those without (taking into consideration age in resting-state functional imaging studies), they found significant differences in functional activity among various regions of the brain. Such differences in brain regions in patients with OCD included altered spontaneous functional activity in certain structures. These regions are linked with depression, suicidal tendencies, and emotional/motoric responses (Peng et al., 2024; Xu et al., 2019).

Furthermore, while testing polygenic risk for OCD, Heinzel and colleagues (2021) used a whole-brain analysis of functional magnetic resonance imaging (fMRI) data on 128 participants, including patients with OCD, unaffected first-degree relatives of OCD patients, and healthy controls. Supporting what Yang and colleagues (2023) found regarding abnormalities in brain regions, they found decreased neural activity in the bilateral inferior parietal lobule and dorsolateral prefrontal cortex in both patients and relatives, which also indicates a level of heritability (Heinzel et al., 2021).

Stress (Primarily School-Related) and Tics

Numerous studies have been conducted to give insight into the relationship between children with tic disorders and school (e.g., Tan et al., 2024; Ueda & Black, 2021). For instance, a study led by Tan and colleagues (2024) focused on the effect of psychosocial stress (stress due to social and environmental factors) on the severity of TDs, concluding that psychosocial stress (including school-related stress) is a consistent influence on tic exacerbation in pediatric patients. While they discuss school-related stress, they do not mention tics in relation to OCD. Conversely, Carneiro (2022) mentions the effect that psychosocial stress has on tics in relation to obsessive-compulsive symptoms yet fails to connect psychosocial stress factors to school.

Ueda and Black (2021) found in a direct observational study where the researchers went to multiple schools to rate children's tics that at least one motor tic was noted in 47% of first grade students and 15%

of sixth grade students. Other observational studies which used questionnaires revealed that tics were found in 22% of preschool children, 7.8% of elementary school children, and 3.4% of adolescents, with a similar tendency observed in other countries outside of the U.S. such as Poland and Spain (Ueda & Black, 2021). However, Ueda and Black (2021) establish that detecting and addressing students' difficulties at school is needed to support their educational needs and enable them to reach their academic potential. This could be done in the future by providing extra time to finish tasks, establishing a private space to release tics, etc.

Iverson and Black (2022) support previous claims by Tan and colleagues (2024) about TDs and further mention TS, discussing the factors that exacerbate symptoms. They included that according to a survey, conducted by Bornstein and colleagues (1990), one of the most common factors that patients with TS and their families associated with worsened tics included the return to school (Iverson & Black, 2022). Some patients report that tics become worse in scenarios where they are particularly self-conscious of their tics, which oftentimes include school (Iverson & Black, 2022). Tan and colleagues (2024) similarly obtained ratings and reports of tic severity for 373 children with TS and CTD between January 2018 and December 2020. They operationally defined stress using the Yale Global Tic Severity Scale (YGTSS) and deduced that family-related stress, personal relationship stress, and school-related stress were independently associated with increasing YGTSS global severity, total tic score, and impairment rating over time (Tan et al., 2024). This suggests a positive correlation; as external stress factors increase, tic severity increases as well.

Tics can be associated with neurological disorders and are thought to be the result of dysfunctional basal ganglia pathways (Leisman & Sheldon, 2022). Specifically, dysregulation of dopaminergic signaling in the striatum has been attributed to be a potential cause of many tic disorders (Leisman & Sheldon, 2022). In terms of school-related stress, psychosocial stress-induced elevations in cortisol levels (indicative of stress) have been associated with amphetamine-induced dopamine release (Bloomfield et al., 2019). These findings indicate a possible relationship between psychosocial stress, cortisol responses, and dopaminergic signaling. Given dopamine's proposed involvement in tic disorders and/or severity, such relationship may connect school-related stress changes to tic severity. This mechanism, however, has not been directly established and remains a suggested pathway. It is also not a linear pathway and involves several variables not included in the literature reviewed by this paper.

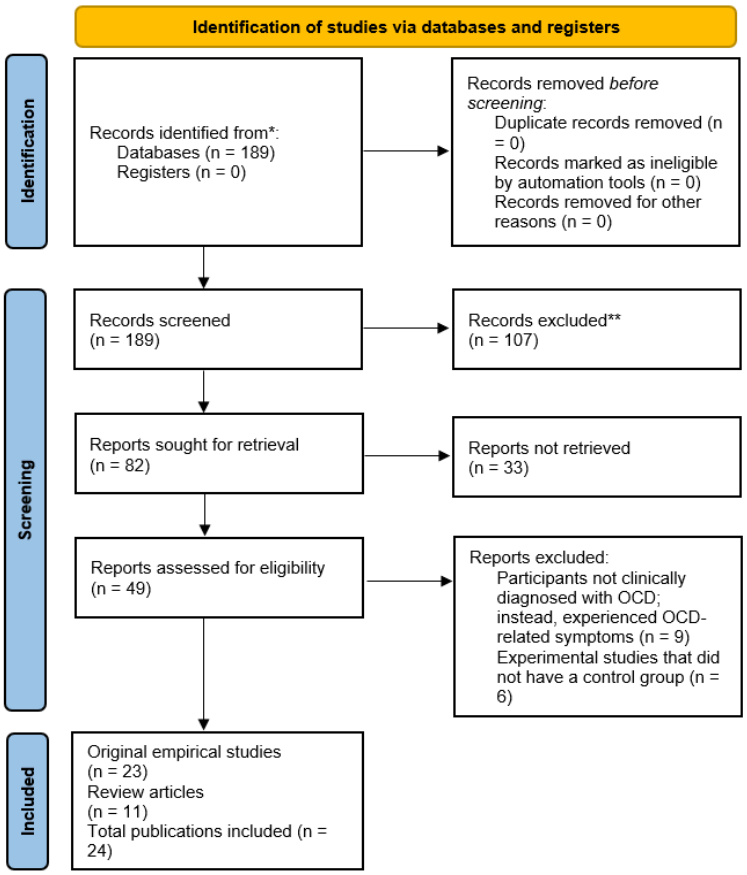
Literature Summary

With tic-related OCD garnering more attention as a subtype of OCD, research continues to expand on areas including but not limited to genetics (e.g., Brander et al., 2019), mental health (e.g., Benatti et al., 2020), and treatment (e.g., Jalenques et al., 2024; Pringsheim & Piacentini, 2018). Additionally, as researchers make conclusions on the effects of stress, primarily school-related, on OCD, studies will continue to emerge on its scientific background and the areas of the brain that are impacted. The relationship between school-related stress and the severity of tics is an area that will also continue to be

researched. The evidence already gathered on how individuals with tics are influenced by academic environments provides insight to further support studies targeting impacted areas in the brain.

METHODOLOGY

In order to understand the connection between tic-related OCD and school-related stress in regard to psychology, neuroscience, health, and education, studies were found via the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model. Eligible sources were evaluated based on their relation to tic-related OCD, the relationship between stress (primarily school-related), and the relationship between stress (primarily school-related) and tics. This PRISMA flow diagram displays the number of sources included and excluded.



Note: Flow diagram created in accordance with PRISMA 2020 guidelines (Page et al., 2021)

Studies that did not meet the inclusion criteria were excluded. The inclusion criteria were as follows:

- Studies relating to OCD, tics, and/or stress.
- Studies relating to neurobiological processes.

- Studies relating to OCD and tics must involve humans who are diagnosed with OCD or experience tics.
- Studies must use validated tools of measurement.
- Experimental studies must have been conducted in accordance with all necessary ethical guidelines.
- Studies must be peer-reviewed.

Sources were excluded when their findings were unrelated to the research question, when their methods did not meet the listed requirement(s), when they were not peer-reviewed, or a combination of the factors above. The exclusion criteria were as follows:

- Studies involving patients who are not clinically diagnosed and instead experience OCD-related symptoms.
- Studies that did not contain a control group.
- Studies not published in English.
- Studies without accessible full text.
- Studies that do not provide findings relevant to the topic of inquiry.
- Studies that do not sufficiently describe their methods.

Articles were screened based on their titles and abstracts to determine if they met the requirements within the inclusion criteria. Sources that met the inclusion criteria were evaluated further by reading through the full study, with greater emphasis on the methodology section.

Rudimentary research was conducted by reading peer-reviewed articles found through Google Scholar. Keywords such as "OCD," "tics," "stress," and "school" were most frequently used to examine how tic-related OCD and school-related stress are related. Once it was established that this area in the literature covered all transdisciplinary aspects of mind, brain, health, and education, a more extensive search was conducted to find articles that were both recent and accurate. To gather research on each of the three subtopics, such keywords were used in various combinations with each other. Search combinations included: "tic-related OCD"; "tics" AND "OCD"; "OCD" AND "stress" AND "school"; "tics" AND "stress" AND "school." For research on the first subtopic, tic-related OCD, "tic-related OCD" was initially used; however, this key word did not yield as many relevant sources as using "tics" and "OCD" did. Occasionally, "Tourette's Syndrome" was excluded to keep the focus on tics in relation to OCD, rather than other disorders. For the second subtopic, stress and OCD, the words "OCD," "stress," "school," and occasionally even "dopamine" were used. For the third subtopic, stress and tics, "tics," "stress," and "school" were used, which generated an abundance of sources.

With the frequent use of the date range search parameter offered by Google Scholar, most sources used were published after 2018, with the exception of four sources falling between 2012 and 2017, and a 2022 source referencing a survey from 1990. The literature search was conducted in July 2025. The parameters also ensured the use of peer-reviewed sources. Any sources found through the World Wide Web rather than Google Scholar were reviewed to ensure that they were still peer-reviewed and credible by noting the reputations and publication processes of the journals; for example, Pringsheim and Piacentini (2018).

Pringsheim and Piacentini published an article at the *Journal of Psychiatry* which specializes in researching psychiatry and neuroscience. All articles are first reviewed by an editor and once approved, are then sent for a peer review process before getting published to ensure credibility.

The sources were then inspected for validity of their methods and conclusions by cross-referencing them with other peer-reviewed sources that conducted similar studies to verify any claims. The authors and researchers were also checked for their level of education and affiliation with any universities and/or research institutions. Additionally, only journals specialized in the corresponding area of research were considered (e.g., *Journal of Psychiatric Research*). When operationally defining variables (e.g., stress levels, tic severity), both quantitative and qualitative data were used, with references to the DSM-5 when defining OCD. Kevin J. Black (e.g., Iverson & Black, 2022; Ueda & Black, 2021) and Yura Loscalzo (Loscalzo, 2024; Loscalzo & Giannini, 2018; Loscalzo & Giannini, 2019) were referenced multiple times in varying articles due to their specialization in TDs and studyholism, respectively.

ANALYSIS

Overall, the collective body of literature on tic-related OCD and its relationship to school-related stress exhibited more results on the school and stress aspect than on tics and OCD. The difference may reflect the broader scope of research examining the relationship between school and stress, which relates to a larger portion of the population. Comparatively fewer studies focused on the effect that school has on the severity of tic-related OCD, with much of the research focusing on how tic-related OCD may impact a person's ability to perform in school (e.g., Fernández et al., 2025; Vallani et al., 2022). While less literature focused on the relationship between school and the worsened severity of tic-related OCD, there was more research on psychosocial stressors' effect on tic-related OCD as a more general topic. Furthermore, literature focusing on psychosocial stressors specifically highlighted school as an included factor (e.g., Bloomfield et al., 2019). This was considered alongside the literature on tic-related OCD to examine potential connections between school as a stressor and the severity of tic-related OCD (e.g., Carneiro, 2022). Since the literature primarily examined these aspects independently, the findings were extrapolated via indirect synthesis. Additionally, many sources oftentimes included school-related stress in relation to either tics or OCD (e.g., Adams et al., 2018; Tan et al., 2024; Ueda & Black, 2021). When this was the case, the symptomatology included was compared with findings from research focusing on tic-related OCD (e.g., Mukai et al., 2021; Yu et al., 2022). This comparison was used to examine whether the findings and association between academic stress and symptom severity could be applied to individuals with tic-related OCD.

A portion of the literature pointed to abnormalities causing decreased spontaneous functional activity in the brains of patients with OCD in areas linked with depression (e.g., right precuneus cortex; Xu et al., 2019), suicidal tendencies (e.g., left caudate nucleus; Yang et al., 2023), and emotional/motoric responses (e.g., bilateral paracentral lobule; Peng et al., 2024). The finding that OCD is linked with disruptions to brain function was consistent with existing research identifying altered neural activity in relation to OCD, due to its classification as a neurological and/or cognitive disorder. The link between OCD and the brain

also ties back to the finding that OCD has a major genetic component (Heinzel, 2021), since the abnormalities Yang and colleagues (2023) found in these brain structures are not caused by environmental components, but rather hereditary elements.

The literature suggests that greater stress may be associated with worsened tic and OCD symptom severity, with studies identifying that both tics and OCD are linked heavily to anxiety and tension (Bortolato et al., 2021; Mahjani et al., 2021). Additionally, academic demands, such as coursework and exams, may contribute to stress among students. Academic stress is considered to be a dominant stress factor that affects the mental well-being of college students (Barbayannis, 2022). While these findings establish academic demands as a source of psychosocial stress for many individuals, they do not explicitly demonstrate that these stressors increase tic-related OCD severity. The incorporation of these findings instead are based on their individual relevance to stress, tics, or OCD.

The reviewed literature also indicates significant comorbidity between TDs and OCD, with 20-30% of individuals with OCD having tics and 22-44% of individuals with any form of TDs having OCD (Franklin et al., 2012). Tic-related OCD is also a subtype of OCD that has potentially received the strongest empirical support (Brander et al., 2019). Additionally, there is a higher risk of heritability for those with tic-related OCD compared to those with non-tic-related OCD (Brander et al., 2019). Tics have been documented in school-aged children, with Ueda and Black (2021) reporting at least one motor tic found in 47% of 1st-grade students and 15% of 6th-grade students (Ueda & Black, 2021). The literature also identified an association between SA and OCTD. SA rates were significantly higher in patients with OCTD compared to patients with only OCD (Benatti et al., 2020).

Though the reviewed literature largely addresses the individual aspects of this paper, such as the effect of stress on tics disorders, the relationship between stress and OCD, how school influences stress levels, and the comorbidity between tics and OCD, less research was found on how all of these factors relate to each other. Limited research directly examines the relationship between academic stress and the severity of tics and OCD symptoms in an individual with tic-related OCD. Although a Google Scholar search using key words such as “tics,” “OCD,” “stress,” and “school” returned numerous studies, many did not directly address the research question.

The research question of this paper is: how and to what extent does school-related stress influence the severity of tics and OCD symptoms in an individual with tic-related OCD? Based on the literature reviewed, this question is aligned with a gap in the body of knowledge. While research focusing on the different aspects of this topic have been synthesized to come to a current proposed association between school-related stress and tic-related OCD symptom severity, to further address the deficiency in the literature, additional studies analyzing the direct relationship between tic-related OCD and school-related stress would establish a better developed understanding.

CONCLUSION

This paper aimed to address the research question: how and to what extent does school-related stress influence the severity of tics and OCD symptoms in an individual with tic-related OCD? The synthesis of the reviewed literature suggests a pathway that school-related stress is associated with worsens symptoms in an individual with tic-related OCD. Alterations in dopaminergic signaling is a potential contributor to this relationship. However, this is not a single-variable relationship nor is it definitively established by evidence that directly examines this connection. This pathway was proposed based on numerous sources (e.g., Bloomfield et al., 2019; Iverson & Black, 2022; Tan et al., 2024) that analyzed different aspects of the deficiency in the literature (tics, OCD, school, stress, etc.). Tics and OCD have a high level of comorbidity (~30%; Franklin et al., 2012). While the two are often related through shared comorbidity, this shared comorbidity alone does not directly suggest that the two are caused by similar and/or related factors. It was also noted that compulsions and tics oftentimes present themselves in similar ways—typically as repetitive movements or sounds (American Psychiatric Association, 2013; Jones et al., 2023). After finding that OCD and tics are both worsened by increased levels of stress (Leisman & Sheldon, 2022; Mahjani et al., 2021), research then shifted to causes of stress. In sources analyzing the relationship between stress and tics/OCD, psychosocial stressors were listed as a significant factor (Tan et al., 2024; Bloomfield et al., 2019). Psychosocial stress factors, according to Tan and colleagues (2024), include school-related stress. It was further supported by Reddy and colleagues (2018) and Stromájer and colleagues (2023) that school is a major cause of stress. This was then used to connect school to a major exacerbator of tic-related OCD. These findings form the bases of the supposed causal relationship; however, this relationship is not definitive as it is based on indirect synthesis as opposed to direct evidence.

Although the reviewed literature may suggest a possible association between school-related stress and increased tic-related OCD symptom severity, the strength of this relationship, specifically in comparison to other factors, is unspecified. Additionally, recommendations for future work include focusing on how stress levels are shaped by the varying levels of academic pressure that students place on themselves. Students who enroll in more challenging classes and receive a more rigorous workload would be likely to hold higher expectations for themselves and experience more excessive levels of stress. In the future, it is necessary for further research to be conducted on ways to counteract the worsened symptoms caused by school-related stress to ensure a better quality of life for individuals with tic-related OCD.

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