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# A Prospective Treatment for Selective Mutism through an Analysis of Social Anxiety Disorder

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## ABSTRACT

Selective mutism (SM) is a rare pediatric anxiety disorder in which a child fails to speak in specific social situations. Due to its classification as a rare disorder that affects less than 1% of the world's population, research on this disorder is limited, inhibiting available treatment options for SM patients. Thus, it is critical to research more on this relatively unexplored disorder. Social anxiety disorder (SAD) is a prevalent anxiety disorder characterized by the fear, self-consciousness, and embarrassment in social situations in which a person may be judged or evaluated negatively. SM is known to present with other anxiety disorders, primarily SAD. The main treatment for SM is cognitive-behavioral therapy (CBT), followed by pharmacological interventions such as selective serotonin reuptake inhibitors (SSRIs). With limited knowledge of this rare disorder, this paper attempts to suggest a potential novel treatment for SM, serotonin-norepinephrine reuptake inhibitors (SNRIs). SNRIs are a class of antidepressants used to increase both an individual's serotonin and norepinephrine levels in the brain. Previous case studies of SM and research on these specific antidepressants used commonly to treat comorbid SAD elucidate the antidepressant's potential on SM. With its strong usage in the treatment of SAD, SNRIs may also be effective as a treatment for SM, a disorder that has similar clinical presentations and therapeutic approaches to SAD. In conclusion, this review paper calls to attention the lack of research on SM and identifies a novel alternative approach for its effective treatment.

## Introduction

Selective mutism is recognized as a rare disorder with a prevalence ranging from 0.03% to 1% in the United States (American Psychiatric Association, 2013). According to the Diagnostic and Statistical Manual of Mental Health Disorders, Fifth Edition (*DSM-5*), selective mutism (SM) is classified as an anxiety disorder. Children with SM can typically talk and interact with immediate family members in their home but will fail to do so in front of others, including their relatives, close friends, and teachers. This lack of speaking in specific social situations indicates a high level of anxiety. Although children with SM may sometimes use nonverbal forms of communication such as writing, selective mutism often interferes with a child's ability to use social communication in his/her life. Academic and educational impairment can be caused by this disorder, as children typically refuse to speak at school, hindering teachers from accurately evaluating and assessing their knowledge in subjects (American Psychiatric Association, 2013; Kearney & Rede, 2021).

The diagnostic criterion for SM is described as a constant failure to speak in specific social situations for at least one month. The failure to speak cannot be attributed to a lack of knowledge on the spoken language or a communication disorder. The average age at which SM presents itself is between 2.7 and 4.6 years, while the disorder may go unnoticed until the child enters elementary school, around the age of five (Driessen et al., 2020). The disorder and its factors have been puzzling to research due to both the rareness of the disorder and its inconsistent terminology. SM was initially termed and labeled "voluntary aphasia" and later "elective mutism", suggesting the child's voluntary choice to not speak in particular situations. Now, the terminology includes the word "selective" to suggest that the

child is affected by the disorder in some situations but not in others (Muris & Ollendick, 2021). The shift in terminology allows for an accurate definition of selective mutism as an involuntary response.

Case studies have indicated a link between familial dysfunction and SM (Brown et al., 1975; Cunningham et al., 2004; Goll, 1979; Pustrom & Speers, 1964; Rosenberg & Linblad, 1978; Wright, 1968) as well as a connection with stressful circumstances and events. In fact, 31% of a sample of children with SM had undergone a traumatic life event prior to the development of SM (Cunningham et al., 2004; Steinhausen & Juzi, 1996). There have been several clinical profiles and studies confirming the heterogeneity of selective mutism around the themes of anxiety, communication, language, and developmental problems (Cohan et al., 2008; Kearney & Rede, 2021). Historical clinical presentations recognize the connection between selective mutism and externalizing behaviors including aggression, temper tantrums, lying, and defiance (Kearney & Rede, 2021; Krohn et al., 1992). Social anxiety disorder, a disorder characterized by intense fear and judgment in social situations, has a strong connection with SM as well.

This paper will synthesize research findings indicating that there is a close relationship between selective mutism and social anxiety disorders, which explains SM's recent reclassification as an anxiety disorder. Then, by elucidating selective mutism's link with social anxiety disorder, a potential alternative treatment for selective mutism is suggested. Using extant research on SAD and serotonin-norepinephrine reuptake inhibitors (SNRIs), this paper provides evidence for the use of SNRIs as a novel treatment on selective mutism. No paper to date has addressed SNRIs as a treatment option for SM. Based on this analysis on SAD and its treatments, SNRIs could be a useful, high-efficacy treatment for SM that may work more effectively than known treatments.

## Current Assessment and Treatment for Selective Mutism

Children with SM need a comprehensive evaluation and assessment of their condition, as there could be other reasons for the lack of speech (Dow et al., 1995). Comorbid factors also have to be assessed. The assessment should consist of physical examinations and parental interviews that ask for the child's symptom history, academic ability, medical history, family history, and evaluation of speech/language. The Diagnostic Interview for Children and Adolescents-Parent Version (Herjanic & Campbell, 1977) and the Schedule for Affective Disorders and Schizophrenia for School-Age Children- Epidemiologic Version are specific structured diagnostic interviews that can be used (Orvaschel & Puig-Anrich, 1987).

In general, prior studies and current treatments for disorders are used to establish more effective treatments. For SM, the two main forms of treatment are pharmacotherapy (medication-based treatment) and psychotherapeutic approaches (Kumpulainen, 2002; Wong, 2010). The most common psychotherapeutic approaches include cognitive-behavioral therapy (CBT) and family therapy. In CBT, the main goal is the improvement in a patient's functioning and the reduction in the patient's symptoms (Hofmann et al., 2012). The patient is an active participant in a process combining cognitive, behavioral, and emotion-focused techniques. In one case study, Fung et al. (2002) showed that a 7-year-old boy with SM had significant reductions in anxiety through a Web-based CBT program. In another review consisting of 23 studies on SM's therapeutic treatments, behavioral and cognitive-behavioral therapy were the most effective for SM (Cohan et al., 2006). Because manualized treatments need to be modified for children (due to the heterogeneity in SM), modular CBT is a fitting and promising treatment that allows an individualized treatment plan while also following evidence-based practices for treatment (Reuther et al., 2011). Family therapy is also another option for the treatment of SM, and it focuses on the familial factors that play a role in a disorder. However, the research on this therapy is limited, making the treatment's effectiveness unproven (Black & Uhde, 1995; Wong, 2010).

The most common pharmacotherapy for SM is selective-serotonin reuptake inhibitors (SSRIs). SSRIs are a class of clinically prescribed antidepressants that are diverse in their chemical structures. SSRIs increase serotonin levels by inhibiting the reuptake of serotonin and the serotonin transporter (SERT) at its presynaptic axon terminal, as the name suggests (Chu & Wadhwa, 2022; Feighner, 1999; Preskorn, 1997; Xue et al., 2016). The increased amount of serotonin (also called 5-hydroxytryptamine or 5HT) is left in the synaptic cleft and can stimulate postsynaptic receptors for longer. By increasing serotonin levels in a patient, SSRIs can help in modulating mood, emotions, and

anxiety level, which is helpful in the recovery process of SM. One case study evaluated the efficacy of fluoxetine, an SSRI, in a single-blind study of 16 patients (Black & Uhde, 1994; Wong, 2010). The results showed that SSRIs were beneficial and safe in the treatment of SM and had high levels of improvement. When using SSRIs, the dosage titration scale has to be used, and the patient has to start with a low initial dosage treatment and move upwards. Withdrawal symptoms should be avoided by slowly decreasing the dose when ending the treatment (Kaakeh & Stumpf, 2008). The treatment duration is unclear due to the lack of research on this disorder.

Overall, the present pharmacological and psychological-based treatments for SM have been proven to work on children with selective mutism, but further research needs to be undertaken with larger sample populations and case reports. Because of SM's recent classification as an anxiety disorder, there may be other potential treatments like the one being reviewed in this article (SNRIs) that have yet to be tested.

## The Association Between Selective Mutism and Social Anxiety Disorder

Social anxiety disorder (SAD), also referred to as social phobia (SOP), is an anxiety disorder characterized by intense fear or anxiety of social situations in which the person can be negatively evaluated, criticized, or judged (American Psychiatric Association, 2013; M. R. Liebowitz et al., 2000). The disorder can develop after stressful or humiliating experiences and can be caused by temperamental, environmental, or genetic factors. The diagnostic criteria for the disorder, according to the *DSM-5*, is the presence of marked fear of social situations that are either avoided or endured with high levels of anxiety. The level of fear or anxiety should be unusual or abnormal compared to the actual threat of the situation and should cause significant impairment and distress in important areas of functioning for at least six months. The average age of onset is 13 years, and its lifetime prevalence is around 12% (Leichsenring & Leweke, 2017). The primary treatment options for SAD are CBT or pharmacological treatment (SSRIs and SNRIs).

Selective mutism is typically associated with other anxiety disorders, mainly social anxiety disorder (SAD). A meta-analysis by Driessen et al. (2020) found a 75% prevalence of SAD in patients with SM from multiple case studies. One case study evaluated 30 children with SM and concluded that mutism severity correlates with anxiety severity. The study's results show that 97% of the subjects were also diagnosed with social anxiety disorder or avoidant personality disorder (Black & Uhde, 1995). Several studies including those done by Chavira et al. (2007), Dummit et al. (1997), Lang et al. (2016), Oerbeck et al. (2015), and Vecchio & Kearney (2005, 2009) found a 100% comorbidity rate of SAD in SM patients. These studies had a sample size ranging from 9 to 70 patients. There are also several empirical studies reporting similarities in the symptoms of SAD and SM (Carbone et al., 2010; Cohan et al., 2008; Driessen et al., 2020; Manassis et al., 2007; Muris & Ollendick, 2015; J. L. Vecchio & Kearney, 2005). Most children with SM have high levels of shyness, are easily distressed, and have a tendency to withdraw from unfamiliar situations, which are all symptoms of SAD. Besides previous case studies on symptomatology and comorbidity, SAD and SM both have comparable indicators, including a fear of being scrutinized and negatively evaluated by others (Muris & Ollendick, 2021).

However, there are some studies that show low comorbidity of SAD in children with SM (Edison et al., 2011; Nowakowski et al., 2011). Both studies employed different diagnostic criteria and assessments for SM and SAD than is standardly used, which may be why the studies showed a low comorbidity of SAD. Excluding these two reports, it is generally accepted that there is an association between SAD and SM (J. L. Vecchio & Kearney, 2005). Some even suggest that SM is a variant of SAD, rather than a different disorder, but this has not been empirically proven (Black & Uhde, 1992, 1994, 1995; Crumley, 1990; Golwyn & Weinstock, 1990). Based on previous case studies and empirical evidence showing an association between SAD and SM, it is reasonable to suggest that SM may be treated and assessed similarly to that of SAD.

**Table 1:** Data Showing the Prevalence of Comorbid Anxiety Disorders in Patients with SM

| Study | N | Mean Age (SD) | Social Anxiety Disorder | Separation Anxiety Disorder | Special Phobia | Generalized Anxiety Disorder | Obsessive-Compulsive Disorder |
|---|---|---|---|---|---|---|---|
| Alyanak et al., 2013 | 26 | 8.11 (2.1) | 61.5 | 23.1 | | | |
| Brix Andersson & Hove Thomsen, 1998 | 37 | 9.43 (3.8) | 45.9 | 8.1 | | 0 | 8.1 |
| Arie et al., 2007 | 18 | 8.89 (1.9) | 44.4 | 5.6 | | | |
| Bar-Haim et al., 2004 | 16 | 8.21 (3.5) | 62.5 | | | | |
| Black & Uhde, 1995 | 30 | 8.40 (2.0) | 96.7 | 16.7 | | 10 | 3.3 |
| Carbone et al., 2010 | 37 | 8.20 (3.4) | 18.2 | 13.6 | 29.5 | 2.3 | |
| Chavira et al., 2007 | 70 | 6.37 (2.5) | 100 | 40 | | 11.4 | 8.6 |
| Dummit et al., 1997 | 50 | 8.20 (2.7) | 100 | 26 | | 14 | |
| Edison et al., 2011 | 21 | | 14.3 | 14.3 | 14.3 | | |
| Gensthaler et al., 2016 | 95 | 9.70 (4.5) | 93.7 | 20 | 21.1 | 5.3 | |
| Henkin et al., 2010 | 10 | 9.35 (2.6) | 60 | 10 | | | |
| Kristensen, 2000 | 54 | 9.00 (3.4) | 66.7 | 31.5 | 13 | 13 | 9.3 |
| Lang et al., 2016 | 24 | 6.40 (3.1) | 100 | 41.7 | 45.8 | 4.1 | |
| Manassis et al., 2007 | 44 | 7.87 (1.6) | 61.4 | | 2.3 | | |
| Nowakowski et al., 2011 | 14 | 6.36 (0.9) | 0 | 21.1 | 21.1 | | |
| Oerbeck et al., 2015 | 24 | 6.50 (2.0) | 100 | 29.2 | 25 | 8.3 | 8.3 |
| Vecchio & Kearney, 2005 | 15 | 6.58 (1.9) | 100 | 40 | 20 | 6.7 | 0 |
| Vecchio & Kearney, 2009 | 9 | 6.60 (1.9) | 100 | 22.2 | 22.2 | 11.1 | |
| Young et al., 2012 | 10 | 7.00 (1.8) | 80 | 0 | 0 | 0 | |

*Note: Data retrieved from Jim Driessen, Jan Dirk Blom, Peter Muris, Roger K. Blashfeld, and Marc L. Molendijk in Anxiety in Children with Selective Mutism: A Meta-analysis. Child Psychiatry Hum Dev 51, 330–341 (2020). https://doi.org/10.1007/s10578-019-00933-1*

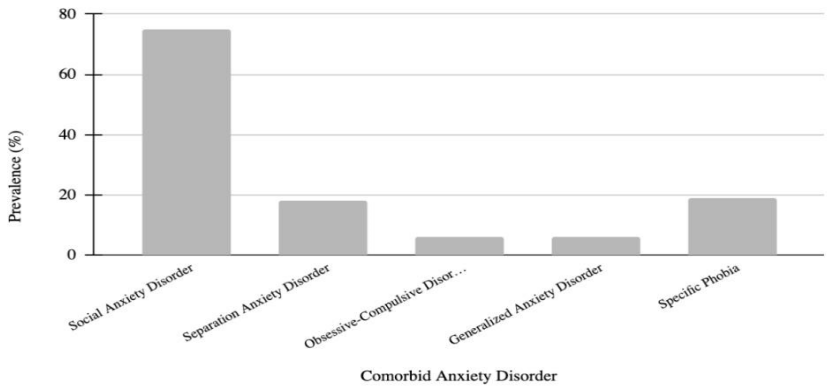


**Figure 1:** Bar Graph on Case Studies Showing the Prevalence of Comorbid Anxiety Disorders in Patients with SM

*Note: Data retrieved from Jim Driessen, Jan Dirk Blom, Peter Muris, Roger K. Blashfeld, and Marc L. Molendijk in Anxiety in Children with Selective Mutism: A Meta-analysis. Child Psychiatry Hum Dev 51, 330–341 (2020). https://doi.org/10.1007/s10578-019-00933-1*

## SNRIs as Potential Treatment for Selective Mutism

Serotonin-norepinephrine reuptake inhibitors (SNRIs), the novel treatment for SM being discussed in this paper, are a class of antidepressants used to treat depression and anxiety disorders (Lambert & Bourin, 2002). SNRIs are characterized by action on norepinephrine (NE) and serotonin (5-HT), two monoamine neurotransmitters that send chemical messages across neurons. Both SNRIs and SSRIs are the primary pharmacological option for SAD (Garakani et al., 2020). However, the only FDA-approved SNRI to treat SAD is Venlafaxine. Other SNRIs such as Duloxetine, Desvenlafaxine, and Milnacipran have off-label uses in the treatment of SAD (Garakani et al., 2020; Lambert & Bourin, 2002).

The chemical structure of the FDA-approved SNRI, Venlafaxine, is a mixture of R-enantiomers that inhibit 5-HT and NE and S-enantiomers that inhibit 5-HT (Lambert & Bourin, 2002). The dose at which NE reuptake inhibition appears is uncertain and is around 75 -225 mg/day. Venlafaxine's recommended duration for treatment varies from around three months to two years (Garakani et al., 2020). Its side effects, most commonly nausea, typically become less severe after the first few weeks of treatment (Lambert & Bourin, 2002). With the use of Venlafaxine, there is significant improvement in social activity, brain functioning, and quality of life. At low doses, Venlafaxine can act as an SSRI. SSRIs and SNRIs have similar pharmacological features, safety profiles, and efficacy at commonly recommended doses, hence they share the established role as standard pharmacological agents in the treatment of SAD (Lambert & Bourin, 2002).

As shown in Table 2, several case studies show greater improvement in the treatment of SAD using Venlafaxine compared to placebo treatments (Allgulander et al., 2001; Davidson et al., 1999; Gelenberg et al., 2000; Hackett et al., 2003; Rickels et al., 2000; Silverstone, 2004). The studies all report decreases in symptoms of SAD with the use of Venlafaxine. One of these studies, done by Rickels et al. (2000), claims that Venlafaxine is an effective treatment for generalized SAD, its core symptoms, and its clinical and functional impairments. Venlafaxine has been shown to improve SAD and its symptoms, but no research has been done yet on its effectiveness on SM (Jakubovski et al., 2019).

**Table 2:** Data on Case Studies of Venlafaxine on the Treatment of Social Anxiety Disorder

| Study | Duration | Treatment Group, Daily Dose, (N) | Results at Endpoint |
|---|---|---|---|
| Allgulander et al., 2004 | 12 weeks | Venlafaxine ER 75-225 mg (N=122), Paroxetine 20-50 mg (N=122), Placebo (N=119) | Venlafaxine ER and Paroxetine had significant improvement vs. placebo ($p \leq 0.001$) |
| Liebowitz et al., 2005 | 12 weeks | Venlafaxine ER 75-225 mg (N=103), Paroxetine 20-50 mg (N=102), Placebo (N=113) | Venlafaxine ER and Paroxetine had significant improvement vs. placebo ($p \leq 0.001$) |
| Rickels et al., 2004 | 12 weeks | Venlafaxine ER 75-225 mg (N=126), Placebo (N=135) | No significant improvement or difference between treatment groups; Venlafaxine ER was favored over Paroxetine |
| Stein et al., 2005 | 28 weeks | Venlafaxine ER 75 mg (N=131), Venlafaxine ER 150-225 mg (N=130), Placebo (N=134) | Venlafaxine ER had significant improvement vs. placebo ($p \leq 0.001$) |
| Liebowitz & Mangano, 2002 | 12 weeks | Venlafaxine ER 75-225 mg (N=133), Placebo (N=138) | Venlafaxine ER had significant improvement vs. placebo ($p \leq 0.001$) |

*Note: ER* extended-release. *Data retrieved from Peter H. Silverstone, M.D., in Qualitative Review of SNRIs in Anxiety. 10. (2004) https://www.psychiatrist.com/wp-content/uploads/2021/02/16671_qualitative-review-snris-anxiety.pdf*

Generally, treatments used for anxiety disorders need to be effective for a range of anxiety symptoms, have a favorable tolerability proven in prior trials, and have the capacity to reduce present and future symptoms or recurrences (Dell'Osso et al., 2010). When choosing between pharmacotherapy treatments, the choice should be based on the medication's highest efficacy and reproducibility in clinical studies, ability to treat other comorbid conditions or disorders, and ability to have the lowest potential side effects (Blanco et al., 2013). Based on these guidelines, SNRIs would be a viable option for the treatment of SM. There are several clinical studies mentioned above that show SNRIs' efficacy and reproducibility on SAD, a disorder closely associated with SM. The antidepressant, by reducing the symptoms for other anxiety disorders, makes SNRIs a useful treatment option for other comorbid disorders such as SAD (Dell'Osso et al., 2010). The side effects of SNRIs also reduce in severity quickly. Due to their similarity with SSRIs and their ability to inhibit the reuptake of two neurotransmitters, SNRIs may help in the treatment of SM in a more effective way than SSRIs.

## Conclusion

SNRIs' potential usage for SM is emphasized by prior case studies of the disorder and research on these particular antidepressants frequently used to treat associated social anxiety disorders. Due to their widespread use in the treatment of SAD, SNRIs may also be useful in the management of SM, a condition that shares specific symptoms and forms of treatment with SAD. This review highlights the limited research on selective mutism and proposes a novel approach for its treatment. As mentioned above, there are a multitude of studies proving SNRIs as an effective treatment for anxiety disorders. SNRIs also fit under the general guidelines described above for useful pharmacological treatment of a disorder.

This paper reinforces the association between SAD and SM and suggests a novel alternative treatment option for SM. It seeks to promote further research on SM and its comorbid anxiety disorders. The paper is the first to propose SNRIs as a potential treatment option for SM. This novel treatment has the potential to prevent and delay complications related to or as a consequence of SM. Due to the limited research on SM, this study will notably contribute to the relatively understudied field of SM. Further research should be done on the testing of SNRIs on SM to confidently conclude its efficacy, reproducibility, and safety. Through this paper and future research, SNRIs may be able to be used as a first-line pharmacological treatment for SM, perhaps as a more preferable and efficacious treatment option than SSRIs. SM's association with SAD can also draw several further conclusions on treatment options, side effects, and the underlying mechanisms of anxiety disorders.

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