

The Interplay between Social Anxiety Disorder, Priming, and First Impressions

Kin To Zeng^{1,*}

¹ Woodbridge High School, Irvine
CA 92604, The United States of
America

*26zengkinto@iusd.org

Abstract:

People form first impressions quickly and often without conscious awareness, which significantly shapes social judgments. While the rapidity of forming impressions can be adaptive in everyday social interactions, they bring biases that may lead to consequential outcomes. Such seriousness is manifested particularly in areas where objectivity matters, such as clinical diagnosis, hiring decisions, and political evaluation. One symptom of Social Anxiety Disorder (SAD) is a profound sensitivity to social evaluation. This intense fear of judgment often results in negative interpretation biases, which leads to distorted perceptions of both self and others. In parallel, priming can subtly activate associations, which implicitly affects impression formation. This review synthesizes results from multiple studies to examine the interaction between SAD, priming, and the formation of first impressions, as well as proposing integration of priming into clinical settings - as a way to quantify treatment progress to enhance transparency, and as a possible unconscious intervention tool to reduce the impact of SAD.

Keywords: Social Anxiety Disorder, Priming Effects, First Impressions.

1 Introduction

In today's rapid changing world, the ability to make quick evaluation of other individuals can be both adaptive but risky. While it enables a efficient decision-making process in everyday interactions, it also lead to misjudgment. In domains such as clinical diagnosis, hiring decisions, or political evaluation, consequences of errors of the speedy but biased judgmental process can be weighty, considering the powerfulness of first impressions in shaping ongoing thoughts and decisions. For instance, a clinician

might unconsciously evaluate a patient based on facial appearance. If heuristics shortcuts lead a clinician to interpret a patient's facial appearance as "disorganized" and to generalize this perception into a dispositional trait, they may misinterpret symptoms and diagnose depression when none exists. Consequently, the patient, despite being psychologically healthy, may receive a stigmatizing label and unnecessary medication, thereby causing preventable psychological or physiological harm. These risks imply the significant role implicit biases play in shaping first impressions, and the importance of grasping

and mitigating their effects. While current research has independently examined Social Anxiety Disorder (SAD), priming, and first impressions in considerable depth, their interconnections remain underexplored. To fill that gap, this review synthesizes existing findings and identifies the interplay between SAD and priming of which influence impression formation, offering implications for both theoretical understanding and clinical practice.

2 Key Concepts

2.1 SAD

According to the Cleveland Clinic, approximately 5% to 10% people worldwide experience SAD [1]. This condition involves a persistent fear of potential negative evaluations by others [1,2]. Its symptoms may manifest in specific situations, such as public speaking, or across a wide range of social settings - regardless of whether an individual with SAD is actively presenting or passively responding, and whether the audience consists of a single person or a group [1]. A diagnosis of SAD by a licensed mental health professional is typically made in accordance with the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria, while also taking into account patient's medical background, psychiatric profile, and family history [1]. One of the most common treatments for SAD is Cognitive Behavioral Therapy (CBT), which targets the maladaptive thoughts and avoidance behaviors that sustain the disorder [1,2]. In line with therapeutic frameworks, Hofmann proposes a comprehensive model that explains how cognitive and behavioral factors contribute to the maintenance of SAD [2]. At the core of this model is a bi-directional relationship between individuals' perception of excessively high social standards, vague social goals and their social apprehension, which increases self-focused attention [2]. This heightened self-monitoring triggers a range of cognitive biases, including negative self-perception, overestimation of social costs, low perceived emotional control, and the belief in having poor social skills [2]. These biases lead to an anticipation of social mishap, which reinforces avoidance and safety behaviors aimed at minimizing perceived risks [2]. Post-event rumination further heightens social apprehension, thereby sustaining the cycle of anxiety [2]. Importantly, the persistent negative interpretation bias in SAD may shape how first impressions are formed.

2.2 Priming

Priming is a psychological process in which exposure to a stimulus influences subsequent thoughts or behaviors

without conscious awareness, such as being faster to recognize the word "doctor" after seeing the word "nurse" [3-5]. Higgins, Rholes, and Jones conducted one of the earliest experimental demonstrations of the priming effect. In their study, participants were first exposed to personality trait terms (e.g., "self-confident," "conceited") under the pretext of a memory task [4]. They were then given a paragraph describing a target person's ambiguous behaviors [4]. Afterwards, participants completed a questionnaire evaluating the target's personality traits [4]. The results show that the previously primed trait concepts shaped how participants interpreted the neutral information, contributing to early empirical examination of accessibility - referring to how easily certain concepts or attitudes come to mind and shape judgments [4]. Priming can be categorized into seven types - positive and negative, semantic, associative, repetition, perceptual, conceptual, and masked [3]. This review will only covers three types of priming - semantic priming, masked priming, as well as positive and negative priming. Semantic priming describes the activation of related concepts through prior exposure to words with similar meanings, and masked priming involves the presentation of an obscured stimulus that is not entirely visible [3]. Positive and negative priming is the change in processing speed due to prior exposure - with positive priming accelerating and negative priming slowing [3]. Priming influences perception, behavior, and learning processes - identical sensory input, such as a neutral facial expression, may be interpreted differently by the same individual depending on prior exposure to related cues, shaping both immediate reactions and later reflection. These findings highlight that priming is a pervasive cognitive mechanism underlying many everyday social judgments, including how first impressions are formed.

2.3 First Impressions

First impressions are rapid initial judgments formed about others, often without conscious evaluation. Building on this foundation, Hehman et al. propose a comprehensive model of first impression formation that identifies three sources of variance - the characteristics of the perceiver, the characteristics of the target, and the perceiver-target characteristics interaction [6]. Much of the existing research on first impressions has focused on static facial cues, as facial features provide immediately accessible information for social evaluation. Trait inferences based on facial appearance can occur extremely quickly, often within as little as 34 to 200 milliseconds of exposure, such as a brief glimpse of a political candidate's photo [7]. Such impressions can exert influence across a wide range of social contexts, including political voting, strategic deci-

sion-making, real-world interpersonal behavior, and more [7,8]. For example, perceptions of facial competence have been found to reliably predict actual electoral outcomes [7]. However, these predictions often lack diagnostic validity due to the limited evidence supporting dispositional inferences from facial cues [7,8]. These errors in judgment are due to perceivers' reliance on heuristics and unconscious biases, such as assuming people with smiling faces as more trustworthy, distorting interpretations and producing systematic errors in social judgment based on facial cues [7,8]. Despite lacking diagnostic validity, first impressions reliably predict outcomes across various domains. This disconnect between predictive reliability and diagnostic validity can bring serious consequences in areas such as clinical diagnosis, hiring decisions, and political evaluation. For instance, it may result in medical misdiagnoses, recruitment mismatches, and the election of incompetent political leaders. These concerns highlight the need to critically evaluate factors that sustain or mitigate such systematic errors in social perception.

3 Social Anxiety Disorder & First Impressions

Based on the foundational understanding of SAD, a critical mechanism that may distort initial impressions is interpretation bias, which is the inclination to interpret ambiguous social cues as negative or threatening. In a study by Wang et al., this bias was demonstrated by first assessing participants using the Social Interaction Anxiety Scale (SIAS) and then classifying them into groups with high or low anxiety based on their scores [9]. The experiment includes multiple phases, beginning with a pre-test where participants were presented with pairings of facial expressions and instructed to determine which face appeared more positive and which appeared more negative [9]. For the purposes of this review, only the pre-test results are discussed. According to the findings, when plotting the percentage of trials in which participants identified a facial expression as negative in pre-test against the actual emotion of the faces (ranging from positive to negative on the x-axis), both the low and high anxiety groups exhibited a similar upward trend [9]. However, the high anxiety group's curve shifted to the left, indicating a greater tendency in the high anxiety group to interpret facial expressions as negative than that of the low anxiety group at equivalent levels of facial emotion [9]. This study demonstrates how interpretation bias in individuals with higher social anxiety can lead to a more negative first impressions in ambiguous social situations.

Guo et al. further discovered that, in individuals with

high social anxiety, interpretation biases are more closely associated with judgments of approachability than with perceptions of trustworthiness [10]. They also explored whether wearing a face mask affects how participants with different levels of social anxiety evaluate traits during the formation of first impressions. Their findings suggest that although wearing a mask generally enhanced perceived approachableness and trustworthiness, individuals with higher social anxiety continued to rate faces as less approachable regardless of whether a mask is worn, emphasizing the stable interpretation bias tendency among individuals with high social anxiety [10].

Zabag et al. investigated whether individuals' level of social anxiety affects their ability to learn and update social information that could correct first impressions. To measure participants' levels of social anxiety, researchers administered the LSAS-SR and the Social Phobia Inventory at the beginning of the study [11]. Then, participants were shown images of nine faces with happy, angry or neutral expressions [11]. These faces were divided into three outcome groups - rewarding, punishing, neutral - with each group containing one face of each expression [11]. These outcomes were operationally defined by varying the number of points earned based on participants' engagement decisions [11]. Through repeating trials, participants formed associations between each face and the corresponding outcome [11]. In the updating phase, the original associations were reversed with the neutral stimuli-outcome association remained unchanged [11]. Afterward, participants were instructed to earn as many points as possible [11].

The findings indicate that social anxiety levels were inversely correlated with the accuracy of engagement decisions during the updating phase when participants needed to update negative stimulus-outcome associations to positive ones [11]. However, there was no significant correlation with accuracy when updating positive associations to negative ones [11]. In the second study, a larger and more diverse sample - 336 participants drawn from Amazon's Mechanical Turk (MTurk) compared to 88 undergraduate students in the first study - was used for replication [11]. MTurk provides access to a broader range of mental health backgrounds, ensuring representation of individuals exhibiting greater severity of social anxiety symptoms [11]. With the adaptation of removing the neutral outcome group, the second study successfully replicated the finding that higher social anxiety scores were associated with less accurate decisions when initial negative stimulus-outcome associations were reversed [11].

Together, these findings highlight that individuals with higher social anxiety not only tend to form more negative first impressions and perceive strangers as less approach-

able, but also struggle to update these negative impressions when later social information contradicts their initial judgments, possibly due to cognitive rigidity or confirmation bias.

4 Priming & First Impressions

Priming can significantly influence the formation of first impressions. As previously discussed, Higgins, Rholes, and Jones' classic study demonstrated how semantic priming - through the prior activation of trait-related concepts - can shape subsequent evaluations of an ambiguous target [4]. Extending this idea, Aksentijevic et al. showed that masked priming using abstract visual symmetry could also alter the perceived first impressions [12].

Specifically, they used Change Symmetry (CS) - a type of complex palindromic pattern based not on the symmetry of the symbols themselves but on the sequence or arrangement of changes between elements - and non-Change Symmetry (non-CS) strings - which do not exhibit CS - as priming stimuli [12]. An example of a CS string is "0101100100101," where the pattern of changes (the digits switch from 0 to 1 or 1 to 0) is arranged so that, from both ends towards the center - the seventh position being the central point - the changes occur in a mirrored and symmetric way. Some CS strings are more complex, containing multiple layers of internal symmetry, often arranged in a nested or hierarchical form [12]. In the experiment, CS strings were presented visually as a sequence of squares, with 0s represented by white squares and 1s as black squares, each displayed for 500 ms [12]. This is considered mask priming because the pattern is not consciously noticeable. The results suggest that CS strings - an abstract and non-apparent form of symmetry, unrelated to facial features and imperceptible to the naked eye - can still enhance the perceived attractiveness of a face when presented for just 500 milliseconds of exposure [12].

Furthermore, Brunet demonstrated the influence of positive priming on impression formation. In the experiment, participants - 28 undergraduate students (7 males, 21 females) - were shown one face (positive, neutral, negative) at a time, each displayed for approximately 1.1 to 2.1 seconds [5]. Facial expressions were sourced from the Karolinska Directed Emotional Faces dataset, a standard and frequently employed database in emotion and face perception studies [5]. They were then asked to rate the emotionality of each image on a scale from 1 (very positive) to 9 (very negative) [5]. After each rating, a cross was displayed at screen's center for 1 second before the next face display [5]. Each face acted as a primer for the following one, which then, with the three categories of faces, created nine possible primer-target combinations

(e.g. neutral-positive, positive-negative) [5].

The results indicate that when the emotional expression of the prime and target faces align - both being positive or both being negative - participants tend to rate the target emotion more extremely [5]. For example, if both the prime and target display positive emotions, the target is rated as more positive than when the prime is positive but the target is negative [5]. However, such priming effect was not observed when the target face displayed a neutral expression, regardless of the emotional category of the primer [5]. Participants also exhibited faster responses when the emotions of the primer and target faces were congruent, indicating a phenomenon of positive priming [5]. This direct illustration of positive priming influencing perceived facial emotion ratings support its role in shaping impression formation.

Priming substantially influences first impressions by shaping how individuals perceive and evaluate social stimuli. Three studies with each focusing on a different type of priming - semantic, masked, and positive - demonstrate different cognitive mechanisms through which prior exposure to a primer can affect subsequent judgments. These different forms of priming demonstrate how even subtle cues, such as trait-related concepts, imperceptible symmetry patterns, or emotionally congruent facial expressions, can still bias the initial impression and plays a crucial role in impression formation.

5 Discussion & Suggestions

To put SAD, priming, and first impressions into a broader perspective, it is valuable to critically examine their interconnected dynamics. These three factors form an influential cycle. Individuals with SAD are prone to negative priming, or may interpret neutral stimuli as negative due to the underlying cognitive biases. This may result in the development of negative first impressions of others, fostering rumination and cognitive dissonance, and promoting avoidance behaviors. Such avoidance, in turn, intensifies the symptoms of SAD and reinforces the conditioned association between social interaction and discomfort.

While some studies have explored the connection between SAD and priming, few have systematically examined how different types of priming interact with SAD to shape social perception and behavior. Breaking down and understanding the mechanisms of SAD and priming may offer novel intervention strategies to break the negative cycle between the three factors.

One possibility is to incorporate the theoretical framework of priming into cognitive-behavioral therapy (CBT) as a tool for quantitatively assessing therapeutic progress. For example, measuring how quickly individuals respond to

positively or negatively primed social cues can serve as an implicit indicator of cognitive bias changes over time. This approach enables objective tracking of treatment effectiveness, allows therapists to adjust intervention strategies, and increases transparency for both clinicians and clients regarding the course of therapy.

Another possibility is to use the implicit nature of priming to enhance reconditioning strategies for individuals with SAD. Instead of relying on explicit cognitive restructuring, this approach would focus on subtly activating positive interpretations of how others perceive the self. For instance, subliminally presenting affirming phrases such as “people appreciate me” or briefly showing approving facial expressions before a social interaction could serve as implicit primers. These cues may help induce a more relaxed physiological state and foster more positive meta-perceptions, with the following exposure of social contexts, reconditioning how individuals associate themselves with social contexts, all without requiring conscious cognitive effort.

These insights exemplify the interconnected roles of SAD, priming, and first impressions as components of a mutually reinforcing system. Developing this integrated understanding can deepen theoretical knowledge and provide more nuanced perspectives for treatments that target implicit cognitive processes. Future studies could dive into how different types of priming interact with symptoms of SAD to influence the formation of first impressions. Additionally, longitudinal studies research is needed to assess whether interventions based on priming produce lasting improvement in social functioning for people with SAD, providing both theoretical and practical validation.

First impressions consistently predict important outcomes in areas such as clinical diagnosis, hiring decisions, and political evaluation, despite often lacking diagnostic accuracy. The broadness of its influence indicates the effects of biased first impressions extend beyond individual level to impact social systems. Advancing the understanding of strategies to reduce inaccuracies in first impressions may mitigate systemic errors in social judgement, thereby improving interpersonal interactions in everyday life as well as decision-making processes in high-stakes professional domains such as law and politics.

6 Conclusion

First impressions are influential yet often prone to error, especially when affected by factors such as SAD and priming. This review emphasizes that individuals with SAD are particularly susceptible to interpretation biases during initial social evaluation, and that priming can subtly strengthens these misinterpretations. Such combined

effects may reduce the accuracy of social judgments in sensitive contexts such as clinical diagnosis, hiring decisions, and political evaluation. Understanding this interaction between SAD, priming, and first impressions thus opens new possibilities for both clinical assessment and intervention. For example, integrating priming within diagnostic settings could provide more transparency measures for tracking therapeutic progress while serving as implicit interventions to help individuals with SAD adjust their social interpretations. Future research should further investigate these interrelated processes to promote more accurate and effective social decision-making.

References

1. Social anxiety disorder: Symptoms, tests, causes & treatments, <https://my.clevelandclinic.org/health/diseases/22709-social-anxiety>, last accessed 2025/07/27
2. Hofmann, S. G.: Cognitive factors that maintain social anxiety disorder: A comprehensive model and its treatment implications. *Cognitive Behaviour Therapy* 36(4), 193–209 (2007)
3. How priming affects the psychology of memory, <https://www.verywellmind.com/priming-and-the-psychology-of-memory-4173092>, last accessed 2025/07/27
4. Higgins, E. T., Rholes, W. S., Jones, C. R.: Category accessibility and impression formation. *Journal of Experimental Social Psychology* 13(2), 141–154 (1977)
5. Brunet, N. M.: Affective evaluation of consciously perceived emotional faces reveals a “correct attribution effect.” *Frontiers in Psychology* 14, (2023)
6. Hehman, E., Stoler, R. M., Freeman, J. B., Flake, J. K., Xie, S. Y.: Toward a comprehensive model of face impressions: What we know, what we do not, and paths forward. *Social and Personality Psychology Compass* 13(2), (2019)
7. Todorov, A., Olivola, C. Y., Dotsch, R., Mende-Siedlecki, P.: Social attributions from faces: Determinants, consequences, accuracy, and functional significance. *Annual Review of Psychology* 66(1), 519–545 (2015)
8. The first impression bias, <https://thedeclarationlab.com/reference-guide/psychology/the-first-impression-bias>, last accessed 2025/07/27
9. Wang, X., Qian, M., Yu, H., Sun, Y., Li, S., Yang, P., Lin, M., Yao, N., Zhang, X.: Social anxiety and interpretation bias. *Psychological Reports* 119(2), 539–556 (2016)
10. Guo, K., Hare, A., Liu, C. H.: Impact of face masks and viewers’ anxiety on ratings of first impressions from faces. *Perception* 51(1), 37–50 (2021)
11. Zabag, R., Azoulay, R., Rinck, M., Becker, E., Levy-Gigi, E., Gilboa-Schechtman, E.: You never get a chance to undo a negative first impression: Social anxiety is associated with impaired positive updating of social information. *Personality and Individual Differences* 203, 111993 (2023)

- Springer Nature will add OpenAccess standard text here during typesetting. Springer Nature will add OpenAccess standard text here during typesetting Springer Nature will add OpenAccess standard text here during typesetting. Springer Nature will add OpenAccess standard text here during typesetting. Springer Nature will add OpenAccess standard text here during typesetting. Springer Nature will add OpenAccess standard text here during typesetting.

Springer Nature will add OpenAccess standard text here during typesetting.