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**Final Dissertation**

**Unlocking Social Anxiety Disorder: A Personalized Approach  
Through Formal Psychological Assessment**

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## **Abstract**

The study looks into the application of Formal Psychological Assessment (FPA), a new methodology that seeks to transcend the assessment of symptoms by delving into the individual's psychological functioning in a structured and dynamic way to guide personalized therapeutic interventions (Spoto et al., 2013), as applied to Social Anxiety Disorder (SAD), a mental disorder characterized by intense fear of social situations involving the possibility of being evaluated or criticized by others, often leading to significant distress and functional impairment (American Psychiatric Association, 2013). For this study, nine widely recognized questionnaires for assessing social anxiety disorder on a self-reported basis were initially chosen; however, only seven of them were included in the final model. The criteria for diagnosing social anxiety disorder were established using the DSM-5, relevant literature, and the theories proposed by Seligman and Beck. A Boolean matrix was constructed for the items evaluating SAD, with 137 questionnaire items in the rows and 20 diagnostic attributes selected from the symptoms of this disorder. The matrix indicated whether each item addressed a specific attribute, allowing for the analysis of relationships both between items and attributes and among the items themselves. During the construction of the Boolean matrix, it was discovered that none of the seven tools completely captured all aspects of social anxiety. As a result, the clinical context was redefined, and representative items were selected from the Boolean matrix, which led to the exclusion of some items, but all the important diagnostic items were preserved. At the end of the analysis, 42 items in total were covered for all 20 attributes - 36 drawn from existing clinical items and 6 new items to ensure complete representation. As a result of this structured approach, each item's relationship to its attribute was emphasized, which allows future analyses of response patterns to be made, thereby opening the way for the development of a more adaptive assessment tool to diagnose SAD.

*Keywords: Formal Psychological Assessment (FPA), Questionnaire, Social Anxiety Disorder (SAD), Psychopathology*

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## Introduction

In society, when someone dies from cancer, people tend to blame cancer cells - the disease itself - as the culprit behind death. However, in the case of death due to a mental disorder, such as depression, the blame is often placed on the individual, labeling the person as weak. Psychology as a science holds the potential to correct this widespread misconception. While being a reasonable observer and listener alongside displaying empathy is crucial, it is not sufficient to fully comprehend the multifaceted and complex nature of human psychology, which denotes the need for more advanced tools and knowledge. To diagnose and treat mental disorders, reliable and valid assessment tools must be used. Psychological constructs, such as depression, anxiety, and motivation, pose a significant challenge because they are inherently abstract and refer to internal processes that cannot be directly observed but must be derived from behavior, self-reports, and physiological indicators (APA Dictionary of Psychology, n.d.). Formal Psychological Assessments (FPA) aim to move beyond simple score interpretation to gain a deeper understanding of symptoms while accounting for individual differences (Serra et al., 2015). The purpose of this work is to show how FPA can be applied to Social Anxiety Disorder (SAD), a highly prevalent yet often misunderstood clinical condition that is frequently confused with shyness (Stein & Stein, 2008).

Starting with an overview of SAD, in the continuation, the primary tools used for conducting a psychological assessment and the theoretical background of formal psychological assessment are explained. The methodology and procedure used to apply FPA to SAD are then presented in detail. Lastly, the results of this application, the discussion, and the conclusion are provided respectively.

# 1. An Overview of Social Anxiety Disorder (SAD)

## 1.1 Historical Background of SAD

Even though the concept of social anxiety—also known as social phobia—existed throughout human history, it was not formally recognized as such until more recent times (Moutier & Stein, 1999). With changes in the formulation of the Diagnostic and Statistical Manual of Mental Disorders (DSM) over time, understanding and diagnostic frameworks for Social Anxiety Disorder (SAD) have evolved (American Psychiatric Association, 2013). The DSM did not recognize SAD as a distinct condition in its early versions (Moutier & Stein, 1999). Phobias, instead of being divided into categories, were all viewed as the outcome of repressed instinctual drives. A landmark study by Marks and Gelder (1966) distinguished social phobia from other anxiety-related disorders by examining the onset ages of various types of phobias. However, it was the release of DSM-III (APA, 1980), which formally acknowledged social phobia as a distinct disorder, along with growing attention to its biological and psychological underpinnings (Moutier & Stein, 1999). This edition built the foundation for modern psychiatric classification based on diagnostic criteria and was accompanied by the identification of specific symptoms for social phobia. The term “Social Anxiety Disorder” gained prominence after the launch of the DSM-IV (APA, 1994); this was due to its diagnostic criteria being broadened. With its revision, DSM-IV-TR (APA, 2000), the scope expanded from performance-only anxiety to include generalized social anxiety. Although Social Anxiety Disorder was already included in the list of anxiety disorders in the DSM-IV, it was not until the DSM-V (APA, 2013) that the name was officially used and the criteria for diagnosis were further developed.

Alongside these advances in the diagnostic aspects, other research has tried to disentangle the links between generalized social phobia and avoidant personality disorder (AvPD), as these two conditions are often closely related (Hudson & Rapee, 2000). Hudson and Rapee (2000) summarize in their work that the literature consistently bears out that generalized social phobia and AvPD do not differ in type but in degree, suggesting that AvPD reflects a lasting and widespread variant of social anxiety. As per Stein and Stein’s (2008) study, individuals with a more general subtype of social anxiety tend to have extensive apprehension regarding most social situations, as opposed to just a few social situations, and often have co-occurring AvPD.

## 1.2 The Theoretical Framework of SAD

When looking around, at some point in our lives, we encounter or recognize someone who struggles in social situations. This person can be a family member, a relative, a friend, or the individual themselves. In the fifth edition text revision of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.; American Psychiatric Association, 2022), Social Anxiety Disorder (SAD) is defined as: “*Marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others. Examples include social interactions (e.g., having a conversation, meeting unfamiliar people), being observed (e.g., eating or drinking), and performing in front of others (e.g., giving a speech)*” (APA, 2022, p. 230). According to Hooley et al. (2021), due to their fear of negative evaluation, individuals with SAD commonly exhibit avoidance behaviors or endure such situations with intense fear or anxiety. In other words, avoidance serves as a coping mechanism to reduce the anxiety caused by social situations; however, it can also significantly impact their academic, professional, and personal lives. SAD affects roughly 12% of individuals at some point in their lives, making this disorder quite common. This condition has a higher prevalence in women, with about 60% of affected individuals being female, and symptoms most often begin to manifest during adolescence or early adulthood (Kessler et al., 2005; Bruce et al., 2005; Ruscio et al., 2008, as cited in Hooley et al. (2021).

The introduction of various cognitive behavioral models has played a key role in explaining both the causes and persistence of social anxiety disorder. Beck’s cognitive behavioral model (Beck, 1964; as cited in Beck, 2021) and the model by Clark and Wells (Clark & Wells, 1995; as summarized in Clark, 2001) emphasize the role of negative self-beliefs and safety behaviors. Other influential models — including those proposed by Rapee and Heimberg (1997), Hofmann (2007), Moscovitch (2009), and Stopa (2009) — also emphasize maladaptive coping strategies, attentional biases, and distorted self-perceptions (*as cited in Wong et al., 2014*).

Beck (Beck, 1964; as cited in Beck, 2021) proposed a cognitive behavioral model that serves as the basis for the development of Cognitive Behavioral Therapy (CBT), suggesting that the root of psychological distress tends to originate from some form of dysfunctional thinking. Cognitive processes function across three distinct levels:

automatic thoughts, intermediate beliefs, and core beliefs. For example, individuals may have automatic thoughts such as 'I am too awkward to talk to people', based on an underlying belief, 'If I attempt to initiate a conversation, I will be turned away'. Even deeper, a core belief might lie, like 'I'm unworthy'. CBT attempts to resolve all three levels by aiding people in reframing negative automatic thoughts, counterproductive and rigid intermediate underlying assumptions, and altering gradually core beliefs. Intervention at all levels is essential in addressing emotional and behavioral change.

Clark and Wells's cognitive behavioral model (Clark & Wells, 1995; as summarized in Clark, 2001) consists of two components: the first outlines the psychological processes that occur during exposure to a feared social situation, while the second addresses the anticipatory and post-event processes that take place before and after social interaction. According to this model, individuals with SAD form specific beliefs concerning themselves and their social surroundings, which are influenced by early life experiences that fall into three categories: unrealistically demanding social performance standards, beliefs that certain behaviors will result in specific outcomes depending on how one acts in social contexts, and deeply rooted negative self-perceptions. These assumptions cause people to view social situations as more threatening than they really are and themselves as more prone to social failure. Such perceptions, in turn, increase anxiety and enable the disorder to be maintained through self-reinforcing cognitive and behavioral patterns. In case of a perceived threat, attention is redirected toward oneself. The person is likely to become very self-aware of how they act and of their physiological symptoms (e.g., blushing, sweating) that they think are noticeable to others. To avoid feared outcomes, people take "safety behaviors" (e.g., not looking people in the eye and practicing sentences). Although they are designed to reduce anxiety, these behaviors reinforce negative beliefs, perpetuating anxiety. Safety behaviors, alongside self-focused attention, contribute to the formation of distorted negative self-images (e.g., seeing oneself as socially inept, awkward), which strengthens the perception of social failure. Individuals with SAD often recall previous failures and negative perceptions of themselves, which cause anticipatory anxiety before the event. This may lead to avoidance or entering the situation with negative expectations and heightened self-consciousness. Even after the event, they tend to ruminate on their performance, interpreting it more negatively than it was, which reinforces feelings of shame and beliefs of social inadequacy.

The cognitive behavioral model proposed by Rapee and Heimberg (1997, as cited in Wong et al., 2014) suggests that SAD exists on a spectrum where individuals with social anxiety tend to interpret social signals more negatively than others, often due to previous negative experiences and a focus on criticism. According to this model, anxiety can be induced not only through active social engagements but also by the presence of people perceived as critical or intimidating, and individuals with SAD create distorted mental images of how they are perceived by others. Other research indicates that this fear extends beyond merely negative feedback; it also includes a sensitivity to positive evaluation, as both reflect forms of social judgment (Weeks, Heimberg, Rodebaugh, & Norton, 2008, as cited in Wong et al., 2014). In their updated model, Rapee and Heimberg (2010, as cited in Wong et al., 2014) also highlight the importance of post-event processing (PEP), where individuals reflect deeply on and negatively evaluate past social interactions, reinforcing unproductive beliefs and extending avoidance behaviors.

Hofmann's model (2017, as cited in Wong et al., 2014) emphasizes the role of self-focused attention in SAD, where individuals excessively monitor their internal sensations and self-criticisms during social situations, often accompanied by an exaggerated perception of external threats. Ambiguous social signals are typically interpreted in a negative light, reinforcing dysfunctional assumptions. To cope, individuals frequently use safety behaviors, such as avoiding eye contact, that serve to reduce immediate discomfort but prevent long-term corrective learning, thereby maintaining the disorder. Moreover, Moscovitch's model (2009, as cited in Wong et al., 2014) positions the self as the center of anxiety experienced by individuals with SAD. According to his model, people with SAD fear revealing perceived fundamental imperfections, which can be based on their physical appearance, character traits, or social skills. They hold the belief that others will inevitably uncover and judge these alleged imperfections unfavorably. As a result, they come to view themselves as intrinsically inadequate and assume that others see them the same way. Likewise, Stopa's model (2009, as cited in Wong et al., 2014) noted the role of self-concept in SAD, where the anxiety stems from the gap between one's ideal and perceived actual self, leading to self-criticism and excessive ruminative worry about rejection.

### *1.3 The Primary Tools Used in Psychological Assessment*

There are several methods used in psychological assessment, such as clinical interviews, behavioral observation, self-report inventories, and psychophysiological measurements. Clinical interviews enable clinicians to gather information about various aspects of a client's current situation, behavioral patterns, and personality traits through face-to-face interaction and are, therefore, often considered the central element of the assessment process (Hooley et al., 2021). Semi-structured interviews, which are commonly used in clinical settings, adhere to a set order of questions but also permit the clinician to ask supplementary questions based on the client's responses. According to Nock et al. (2007, as cited in Hooley et al., 2021), semi-structured interviews can lead to more valid diagnoses. However, Hooley et al. (2021) also point out that this method requires extensive interviewer training and is more time-consuming.

According to Haynes and O'Brien (2000, p. 226), "behavioral observation is the systematic recording of behavior by an external observer." Barrios (1993) and Tryon (1998), as cited in Haynes and O'Brien (2000), emphasized that the collection of reliable and valid data on a client's behavior and the factors influencing it is made possible through behavioral observation techniques that are based on systematic and predefined procedures. This method is often used when studying nonverbal organisms or behaviors that occur naturally in daily life. It is handy for examining how behaviors develop and change over time, rather than just focusing on outcomes. However, it usually takes more time and effort than other methods (Bakeman & Quera, 2012).

Self-report inventories involve assessments or questionnaires wherein individuals provide feedback pertaining to their own thoughts, feelings, behaviors, or experiences (Levin-Aspenson & Watson, 2018). In psychological evaluation, self-reports are popular because they are easily interpretable, informative, motivated, and functional (Paulhus & Vazire, 2007). In comparison to other methods, they have a common measurement error of anchoring effects, recency and primacy effects, time limitation, and motivation for consistency. Perhaps the most urgent problem among many issues is response credibility, in which individuals respond to questions in a socially acceptable manner (Paulhus & Vazire, 2007).

Indicators of abnormal behavior that psychophysiological change can capture help in the diagnosis as well as the evaluation of treatment. In some cases, like anxiety disorders, monitoring physiological changes through techniques like biofeedback can become part of the treatment. Such measures capture responses that are not externally expressed through actions or speech, providing a “glimpse” into one’s mind and brain. For example, emotionally significant and subjective stimuli, possibly even outside of conscious awareness, can trigger substantial physiological changes, highlighting mental states that are crucial to both researchers and clinicians (Hugdahl, 1995).

## **2. Formal Psychological Assessment (FPA)**

### *2.1 Understanding FPA and Its Role in Clinical Practice*

For a tool to be useful in a psychological assessment, it is essential that it strike a balance between evaluative efficiency and diagnostic exhaustiveness. In an ideal situation, it meets the practicality of self-report questionnaires and clinical insights of interviews while guaranteeing validity, reliability, relevance, and flexibility to diverse diagnostic needs. The Formal Psychological Assessment (FPA) was specially designed to address these criteria through integrating self-reporting and semi-structured interviews in an attempt to reduce the shortcomings of each approach (Serra et al., 2015).

FPA employs self-report data to assess psychological factors and delineate individual differences, further tailoring the treatment to the client's needs. Unlike traditional approaches, where assessment is based on fixed cut-off scores, FPA enables progress evaluation through the reduction of specific psychological traits (i.e., diagnostic features or symptoms). Additionally, FPA has been shown to apply adaptive algorithms to increase assessment efficiency and accuracy, especially in complex situations involving comorbidities (Spoto et al., 2013).

## 2.2 Theoretical Foundations of FPA

A Formal Psychological Assessment (FPA) draws on two mathematical frameworks: Knowledge Space Theory (KST; Doignon & Falmagne, 1999) and Formal Concept Analysis (FCA; Ganter & Wille, 1999; Wille, 1982). KST (Doignon & Falmagne, 1999) was created to represent a learner's knowledge state within a particular domain. KST defines a knowledge domain (e.g., the clinical domain in FPA) as the full set of assessable items, symbolized by  $\mathbf{Q}$ . A knowledge state, represented as  $K$ , is any subset of  $Q$  that reflects the specific items an individual is assumed to have mastered (formally,  $K \subseteq \mathbf{Q}$ ). According to KST, a skill map is formally represented as a triple  $(\mathbf{Q}, \mathbf{S}, \mathbf{f})$ , where  $\mathbf{Q}$  denotes the knowledge domain,  $\mathbf{S}$  is a non-empty set of skills, and  $\mathbf{f}$  is a mapping from  $Q$  to the set of all non-empty subsets of  $S$  — that is,  $2^S \setminus \{\emptyset\}$  (Doignon & Falmagne, 1999). In FPA, the skills denoted by  $S$  are associated with clinical symptoms, and instead of sorting items by difficulty, FPA arranges them based on prerequisite connections among clinical symptoms. This method enables the structured application of acceptable response patterns (ARPs) in adaptive evaluations (Doignon & Falmagne, 1999).

The complete set of possible knowledge states in a domain defines the knowledge structure, represented as  $(\mathbf{Q}, \mathbf{K})$  where  $\mathbf{K}$  encapsulates all feasible knowledge states, constrained by logical or prerequisite relations among items. However, since these structures do not consistently represent real-world performance with adequate accuracy, KST additionally utilizes a probabilistic model—namely, the Basic Local Independence Model (BLIM)—to address issues of false positives and negatives (Doignon & Falmagne, 1999).

The Formal Concept Analysis (FCA; Ganter & Wille, 1999; Wille, 1982) stands for a theoretical basis for relating a set of objects with attributes associated with them. In FCA, such a relation is called a formal context, which is a triple  $(\mathbf{G}, \mathbf{M}, \mathbf{I})$ , where  $\mathbf{G}$  stands for the collection of objects,  $\mathbf{M}$  denotes the collection of attributes, and  $\mathbf{I} \subseteq \mathbf{G} \times \mathbf{M}$  represents a binary relation stating which objects have which attributes. The formal context is usually visually represented by a Boolean matrix whose rows state objects and whose columns indicate attributes. An object  $\mathbf{g} \in \mathbf{G}$  either has or does not have an attribute  $\mathbf{m} \in \mathbf{M}$ . If the object does have the attribute, the relation  $\mathbf{gIm}$  holds, and a '1' is

entered into the matrix; if it does not, a '0' is entered. A formal concept would then be a pair (A, B) where the objects in A share all the attributes in B, whereas B consists of all attributes commonly possessed by all the objects of A. This condition, characteristic of a formal concept, is exemplified by  $A' = B$  and  $B' = A$ , signifying conceptual closure (Ganter & Wille, 1999; Wille, 1982).

FPA builds on KST and FCA by creating a more advanced model of adaptive psychological testing. Within this integrated approach, the prerequisite relationships among objects and attributes can be systematically modeled through knowledge structures into formal contexts. One of the important elements is the conjunctive model from KST, which states that if a respondent endorses an item that covers various attributes, it is likely that they have each of these attributes. For example, people endorsing statements that contain a few symptoms of SAD, such as fear of negative evaluation and social avoidance, are assumed to have each of these symptoms individually. This relationship allows the use of Admissible Response Patterns (ARPs) in the development of dynamic and personalized assessments (Doignon & Falmagne, 1999; Spoto, 2011).

### **3. Application of FPA to SAD**

#### *3.1 Procedure of FPA Application to SAD*

In FPA, constructing a psychometric instrument begins with outlining the clinical context relevant to the theoretical construct in question (e.g., Serra et al., 2015; Spoto et al., 2013). This domain is commonly presented in a matrix form, with each item placed in a row and each column indicating a particular attribute. The intersections between items and attributes are marked using a binary system: a '1' indicates the presence of a relationship, while a '0' indicates its absence.

In this study, the clinical domain involved examining the relationships between 20 attributes associated with SAD and 137 items sourced from 7 different psychometric instruments. Initially, nine psychometric instruments were considered; however, two of them were eliminated during the refinement phase. The Liebowitz Social Anxiety Scale for Adults (LSAS), consisting of 24 items (Liebowitz, 1987), was excluded because

numerous items could relate to several identified attributes, potentially complicating the analysis by exaggerating the associations. Moreover, the Social Appearance Anxiety Scale (SAAS), consisting of 16 items, was excluded due to its specific focus on appearance (Hart et al., 2008), which resulted in redundancy with identical attributes being represented throughout all of its items. Consequently, 40 items were eliminated, and the conclusive clinical domain analysis was performed using 137 items selected from the other seven psychometric tools.

### *3.1.1 Selection of Questionnaires*

Seven self-assessment questionnaires were selected for the formation of the Boolean matrix. The psychometric tools chosen for this study are listed and described below.

1) The Social Phobia Inventory (SPIN) developed by Connor et al. in 2000, consists of 17 items designed to measure three fundamental aspects of social anxiety: fear, avoidance, and physical discomfort, with each item rated on a 5-point Likert scale, resulting in a total score between 0 and 68. It has shown strong psychometric properties, including high internal consistency, test-retest reliability, and also the ability to distinguish between individuals with and without social phobia. The tool responds to changes in severity over time, making it an efficient tool for both screening and assessing treatment outcomes in clinical settings (Connor et al., 2000).

2) The Social Interaction Anxiety Scale (SIAS) created by Mattick and Clarke in 1998, comprises 20 items intended to measure anxiety during social interactions such as meetings and conversations, using a 5-point Likert scale, with 0 denoting "never" and 4 denoting "extremely". It is a useful tool for evaluating social phobia because it has shown strong discriminant validity, high internal consistency, and good test-retest reliability. The scale is sensitive to treatment effects while remaining stable in untreated populations, supporting its utility for both clinical assessment and research purposes (Mattick & Clarke, 1998).

3) Social Phobia Scale (SPS), is also created by Mattick and Clarke in 1998, consists of 20 self-report items designed to assess anxiety symptoms that emerge when being observed by others eating, drinking or writing in public and rated using a 5-point Likert scale as "never" (0) and "extremely" (4). It has been found to possess high internal

reliability, strong test-retest reliability, and has also been shown to discriminate well between social phobics, control individuals and patients in other clinical populations. The SPS is also responsive to treatment-related change and is stable over time without intervention. These features mean that it is a strong tool for clinical diagnosis but also that it is suitable for assessing treatment responses in research settings (Mattick & Clarke, 1998).

4) Social Anxiety Questionnaire for Adults (SAQ-A30), developed by Caballo, Salazar, Irturia, Arias, and the CISO-A Research Team, was initially introduced in 2010, but the final version and comprehensive psychometric validation were published in 2012. Five dimensions of social anxiety were assessed by a 30-item questionnaire covering difficulty expressing negative emotions assertively, uneasiness when engaging with unfamiliar individuals, fear of criticism or embarrassment, discomfort in situations involving the opposite sex, and anxiety experienced during formal speech or interactions with authority figures. Respondents evaluate their discomfort or anxiety for each scenario using a Likert scale from 1 to 5, where 1 indicates minimal to no anxiety and 5 indicates extreme distress. The SAQ-A30 has demonstrated strong cross-validated factorial validity in both clinical and nonclinical groups, good discriminant ability between healthy controls and socially anxious individuals, and good internal consistency. Its gender-sensitive nature and cross-cultural equivalence across more than 20 nations make it a suitable and adaptable tool for clinical evaluation and research (Caballo et al., 2012).

5) Brief Fear of Negative Evaluation Scale (BFNE), developed by Leary in 1983, is a shortened version of the original Fear of Negative Evaluation Scale (FNE) created by Watson and Friend in 1969. In place of the original true-false format, it employs a 5-point Likert scale and has 12 items, including two that are reverse-scored. It measures cognitive concerns about negative judgment in social or evaluative contexts. It has been commonly used in individuals with and without clinical diagnoses and has proved to be highly reliable and valid (Leary, 1983).

6) Fear of Positive Evaluation Scale (FPES) developed by Weeks, Heimberg, and Rodebaugh in 2008, employs a 10-point Likert-type scale, of which 2 are reverse-scored items intended to detect response biases, where responses range from 0 (not

at all true) to 9 (very true), to specifically measure fear of positive evaluation, with items designed to reflect social hierarchy by referencing group settings and engagements with individuals of higher social status, such as authority figures or those the respondent perceives as appealing. Research involving both undergraduate (Weeks et al., 2008) and clinical samples (Fergus et al., 2009; Weeks et al., 2012, cited in Weeks et al., 2008) supports the scale's reliability and validity, highlighting its consistent internal structure and strong factorial and construct validity.

7) The Social Avoidance and Distress Scale (SAD) developed by Watson and Friend in 1969, comprises 28 true-false questions designed to evaluate feelings of discomfort, distress, fear, and anxiety in social contexts, including the intentional avoidance of such situations. The higher one's score, the greater the level of social anxiety and avoidance. Additionally, the scale showed good reliability and high homogeneity indexes. Moreover, it successfully discriminated between high- and low-anxious individuals and was shown to have high internal consistency (Watson & Friend, 1969).

### *3.1.2 Selection of Attributes*

The attributes chosen to illustrate Social Anxiety Disorder (SAD) in this research were obtained from an extensive review of the relevant literature, encompassing the Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.; American Psychiatric Association, 2022), notable cognitive frameworks, especially the one suggested by Aaron T. Beck (Beck, 1964), and finally Seligman's learned helplessness theory (Seligman & Maier, 1967). These sources together established a strong theoretical and clinical basis for identifying SAD's essential elements.

The DSM-5 criteria for SAD highlight an intense fear or anxiety in one or more social contexts where the person is subject to potential judgment by others (5th ed., text rev.; American Psychiatric Association, 2022). Individuals with SAD often fear displaying behaviors that will result in them being negatively evaluated, resulting in humiliation, embarrassment, or rejection. In line with these criteria, attributes such as intense fear of social situations (A1), fear of negative evaluation (A2), and avoidance of social interactions (A3) were included. The chosen attributes comprise

physiological, behavioral, and emotional facets of SAD. Physical symptoms, including sweating, trembling, and blushing (A4), are commonly reported and thus were included. Certain contexts, such as public speaking or performance situations, tend to elicit intense anxiety in SAD individuals, and hence the emphasis on highlighting the significance of performance-related fear (A7) as a trait of the condition. Since people with SAD perceive social interactions as more threatening than they actually are, they overestimate potential social threats, fitting the feature of overestimating social threat (A9), which serves to instigate anxiety and avoidance.

In addition to DSM-based criteria, these traits integrate insights from Beck's cognitive behavioral model, which highlights how negative self-schemas affect the onset and persistence of psychological disorders (Beck, 1964). Even though Beck's cognitive triad was initially proposed in the context of depression, its components conceptually overlap with the cognitive patterns observed in SAD. Recent cognitive-behavioral models of SAD, particularly those proposed by Clark and Wells (1995) and Rapee and Heimberg (1997), describe distorted beliefs about the self, world, and the future that conceptually resemble the negative views found in Beck's triad. Clark and Wells describe how early life experiences shape excessively high social standards, conditional assumptions, and deeply rooted negative self-perceptions, all of which contribute to a negative view of the self (e.g., "I'm unlikeable") and future expectations of social failure or humiliation (e.g., "I'll make a fool of myself"). Although their model does not explicitly define a negative worldview, Rapee and Heimberg (1997), drawing on the work of Leary et al. (1988), include the assumption that others are inherently critical as an initial assumption in their model. Together, these models offer a conceptual pathway for mapping Beck's views of the self, world, and future onto the cognitive patterns typical of SAD.

A negative view of the self promotes feelings of inferiority or self-doubt (A10) and often results in self-blame and shame. A negative view of the world (A16) involves perceiving others as judgmental, unsupportive, or hostile, and the environment as unfair or overly demanding. A negative view of the future (A17) reflects hopelessness and the belief that current problems will persist or worsen over time. These cognitive tendencies contribute to the interpretation of social situations as threatening, the self as inadequate, and outcomes as inevitably negative. Moreover, catastrophic thinking

(A6)—a type of cognitive distortion—increases anticipatory anxiety by promoting worst-case scenario expectations and reinforcing avoidance behaviors in social contexts (Beck et al., 2024).

In a similar vein, Seligman’s theory of learned helplessness (Seligman & Maier, 1967), although initially developed in the context of depression, has since been conceptually extended by later theorists to explain perceived lack of control in social environments (e.g., Moscovitch, 2009; Peterson & Seligman, 1984). Moscovitch (2009) highlights how individuals with SAD may perceive their core personal flaws as unchangeable, leading to the belief that rejection is inevitable regardless of effort—a pattern that reflects the core logic of learned helplessness. As such, the framework includes this mechanism as a distinct attribute (A18), representing a sense of helplessness and resignation in social settings. This inclusion was thoughtfully considered due to its potential significance to SAD.

Social avoidance can be in the form of subtle nonverbal behaviors, like avoiding eye contact (A8), which indicates discomfort (Clark, 2001). Excessive self-consciousness (A5), marked by an increased awareness of oneself in social contexts, is often observed in individuals with SAD and contributes to their anxiety since they monitor their behavior closely and anticipate negative evaluation. People with SAD often encounter persistent physical tension (A15) in social settings, which can present as general discomfort. Additionally, individuals with SAD indicate struggles in starting conversations (A13), demonstrating behavioral inhibition. Similarly, reduced confidence (A14) in one’s capacity to interact successfully in social interactions is another frequent characteristic that leads to functional restrictions in social settings.

Considering that individuals with SAD often face disruptions in their academic, occupational, and personal lives due to ongoing anxiety and avoidance, attributes such as social withdrawal (A19) and functional impairment (A20) were included, in line with the diagnostic focus on clinically significant impact highlighted in the DSM-5-TR (APA, 2022).

In this research, attributes for SAD were selected based on a comprehensive understanding of the condition. The attributes of social anxiety were thoughtfully

selected to include cognitive, emotional, physiological, and behavioral aspects, integrating both recognized diagnostic standards and theoretical viewpoints. Table 1 offers a comprehensive analysis of the chosen attributes along with their descriptions.

*Table 1: List of Attributes*

<b>Attribute</b>	<b>Explanation</b>
A1	Intense fear of social situations
A2	Fear of negative evaluation or embarrassment
A3	Avoidance of social interactions
A4	Physical symptoms (e.g., sweating, trembling, blushing)
A5	Excessive self-consciousness
A6	Catastrophic thinking about social situations
A7	Fear of public speaking or performance situations
A8	Avoidance of eye contact
A9	Overestimation of social threat
A10	Feelings of inferiority or self-doubt (Beck's negative view of self)
A11	Persistent worry about past social interactions
A12	Rumination about embarrassing moments
A13	Difficulty initiating conversations
A14	Diminished social confidence
A15	Physical tension in social settings
A16	Beck's negative view of the world
A17	Beck's negative expectation of the future
A18	Seligman's learned helplessness
A19	Social withdrawal
A20	Impairment in academic, work, or personal life due to social fears

### *3.1.3 Establishing the Clinical Context*

At the beginning of the analysis, each item from the previously chosen psychometric tools was examined individually. A matrix was created where the rows represented the items, and columns a1 to a20 indicated 20 attributes of Social Anxiety Disorder (as outlined in Table 1). A total of 137 items were evaluated: 17 from the SPIN, 20 from the SIAS, 20 from the SPS, 30 from the SAQ-A30, 12 from the BFNE, 10 from the FPES, and 28 from the SADS. For each item, a binary code was utilized: a '1' indicated a strong connection between the item and a specific attribute, whereas a '0' represented the lack of that relationship. This matrix-based method allowed the researcher to methodically chart each item's relevance across a wide range of validated tools.

According to the Formal Psychological Assessment framework (FPA; Serra et al., 2015; Serra et al., 2017; Spoto, 2011; Spoto et al., 2013), after the whole clinical context has been established, each item can be categorized based on how it relates to the attributes of the investigated disorder, in our case SAD. Some items might not align with any of the attributes, suggesting that they do not aid in evaluating SAD and are therefore eliminated from the clinical domain. This scenario is typical for items initially created to evaluate symptoms beyond SAD. Other items may cluster into equivalence classes, indicating that they assess the identical set of attributes. It is crucial to recognize that items with only a few, but not all, shared attributes are not deemed equivalent. When equivalence classes are established, one representative item is chosen to symbolize the whole class in the clinical setting. Additionally, when any existing item does not cover specific attributes, new ad hoc items are developed to fill these gaps. Finally, items that show problems related to their phrasing, construction, or validity are excluded from the assessment, as they cannot reliably contribute to the clinical context.

Taking these steps into account, the relationships between each attribute and its related items are methodically analyzed to create a thorough clinical context domain for social anxiety disorder. This domain combines theoretical models of SAD and includes elements that reflect their fundamental aspects. The clinical context obtained is shown as a Boolean matrix in Table 2, with comprehensive item-level details found in Appendix A.

*Table 2: Final Domain of the Clinical Context*

ITEMS	ATTRIBUTES																			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
SPIN3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN5	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SPIN6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN7	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN10	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SPIN11	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN13	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN15	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SIAS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SIAS8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

SIAS10	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
SIAS12	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIAS13	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS15	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS16	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
SIAS18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SPS8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SPS14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS18	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SAQ-A30/13	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SAQ-A30/23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
SAQ-A30/26	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
SAQ-A30/30	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
BFNE1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE3	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
BFNE6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
BFNE9	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
AD-HOC1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
AD-HOC2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
AD-HOC3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
AD-HOC4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AD-HOC5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
AD-HOC6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

### 3.2 Results

The initial set of items used to evaluate SAD, drawn from seven psychometric tools, consisted of a total of 137 items. To construct a more refined item set, the FPA principles were applied (Serra et al., 2015; Serra et al., 2017; Spoto, 2011; Spoto et al., 2013). In the analysis, every item corresponded to at least one attribute. Only one item (SADS5, “I often find social occasions upsetting”) was excluded due to phrasing issues, rather than lack of relevance. Since four attributes were not represented by any existing items, and two attributes were measured only in combination with others, six ad hoc items were created to ensure at least one prototypical item for each independent attribute. Two items investigated different combinations of core attributes; therefore, the two of them together could not form an equivalence class, nor could they be included in any of the

existing ones. Additionally, five attributes were investigated by only one item among the existing items.

As a result, twenty-nine equivalence classes were identified. The clearest and most representative item from each equivalence class was then selected. For example, SADS20 ('I often feel on edge when I am with a group of people') and SIAS19 ('I am tense mixing in a group') investigate overlapping attributes (A1, A15) using different items. SADS20 was selected as the most prototypical item over SIAS19 because it captures both the emotional experience (feeling on edge) and the social context (being with a group) in a clearer and more natural way. Additionally, its phrasing may be more easily understood by respondents, enhancing interpretability in clinical settings. This procedure removed 94 out of 136 items, leading to a final set of 29 representative items. When these three groups—the two items with unique combinations, the five single-investigated attributes, and the six ad hoc items—are added, the total number of items reaches 42, describing each of the 20 attributes. The assessment process also took into account the relationships between items. In some situations, answering positively to one item may require the respondent to answer positively to another item as well. These types of “prerequisite relations” help enhance the efficiency of the assessment process and minimize redundancies for respondents.

*Table 3: Clinical Context: Final Item Set Comprising 42 Items and 20 Attributes*

<b>Item</b>	<b>Text</b>	<b>Attributes</b>
<b>SPIN3</b>	Parties and social events scare me	A1
<b>SPIN4</b>	I avoid talking to people I don't know	A1,A3
<b>SPIN5</b>	Being criticized scares me a lot	A2,A6,A10
<b>SPIN6</b>	I avoid doing things or speaking to people for fear of embarrassment	A2,A3
<b>SPIN7</b>	Sweating in front of people causes me distress	A2,A4,A5
<b>SPIN10</b>	Talking to strangers scares me	A1,A13,A14
<b>SPIN11</b>	I avoid having to give speeches	A2,A3,A7
<b>SPIN12</b>	I would do anything to avoid being criticized	A2,A6
<b>SPIN13</b>	Heart palpitations bother me when I am around people	A4
<b>SPIN15</b>	Being embarrassed or looking stupid are among my worst fears	A2,A10
<b>SIAS2</b>	I have difficulty making eye contact with others	A8
<b>SIAS8</b>	I feel tense if I am alone with just one person	A2,A15
<b>SIAS10</b>	I have difficulty talking with other people	A13,A14
<b>SIAS12</b>	I worry about expressing myself in case I appear awkward	A2,A5,A6
<b>SIAS13</b>	I find it difficult to disagree with another's point of view	A2,A14
<b>SIAS15</b>	I find myself worrying that I won't know what to say in social situations	A6,A14
<b>SIAS16</b>	I am nervous mixing with people I don't know well	A1,A14

<b>SIAS17</b>	I feel I'll say something embarrassing when talking	A17
<b>SIAS18</b>	When mixing in a group, I find myself worrying I will be ignored	A10
<b>SPS8</b>	I would get tense if I had to sit facing other people on a bus or a train	A15
<b>SPS14</b>	I worry I'll lose control of myself in front of other people	A6
<b>SPS18</b>	I get tense when I speak in front of other people	A2,A7,A15
<b>SPS20</b>	I feel awkward and tense if I know people are watching me	A2,A5,A15
<b>SAQ-A30/3</b>	Speaking in public	A7
<b>SAQ-A30/13</b>	Maintaining a conversation with someone I've just met	A14
<b>SAQ-A30/23</b>	Starting a conversation with someone of the opposite sex that I like	A13
<b>SAQ-A30/26</b>	Telling someone that their behavior bothers me and asking them to stop	A2, A13
<b>SAQ-A30/30</b>	Telling someone I am attracted to that I would like to get to know them better	A2,A13,A14
<b>BFNE1</b>	I worry about what other people will think of me even when I know it doesn't make any difference	A2
<b>BFNE3</b>	I am frequently afraid of other people noticing my shortcomings	A2,A9
<b>BFNE6</b>	I am afraid that people will find fault with me	A2,A16
<b>BFNE9</b>	I am usually worried about what kind of impression I make	A2,A5
<b>FPES9</b>	I don't like to be noticed when I am in public places, even if I feel as though I am being admired	A5
<b>SADS2</b>	I try to avoid situations, which force me to be very sociable	A3
<b>SADS20</b>	I often feel on edge when I am with a group of people	A1,A15
<b>SADS21</b>	I tend to withdraw from people	A19
<b>AD-HOC1</b>	I assume people notice and criticize every little mistake I make in social situations	A9
<b>AD-HOC2</b>	I often find myself going over past conversations, worrying if I said something wrong	A11
<b>AD-HOC3</b>	Embarrassing memories come back to me, and I can't stop dwelling on them	A12
<b>AD-HOC4</b>	I assume most people are quick to judge or criticize others, even for small things	A16
<b>AD-HOC5</b>	I feel like no matter what I do, I will always fail in social situations	A18
<b>AD-HOC6</b>	I feel like I miss out on opportunities in school, work, or social life due to my social fears	A20

Among the attributes assessed across the various psychometric instruments, fear of negative evaluation (A2) and excessive self-consciousness (A5) emerged as the most frequently investigated dimensions. In contrast, several other attributes—such as physical symptoms (A4), catastrophic thinking about social situations (A6), feelings of inferiority or self-doubt (A10), difficulty initiating conversations (A13), and Beck's negative expectation of the future (A17)—were each directly assessed by only a single item. Notably, SIAS15 and SPIN11 featured unique combinations of attributes that did not overlap with other items, making them distinct within the item pool. Meanwhile, overestimation of social threat (A9) and Beck's negative view of the world (A16) were only addressed in conjunction with other attributes and thus required the development of ad hoc items to ensure that these attributes could be independently evaluated.

Additionally, no existing item directly assessed persistent worry about past social interactions (A11), rumination about embarrassing moments (A12), learned helplessness in social contexts (A18), or functional impairment due to social fears (A20). To address this gap, new items were specifically crafted to represent these underexplored dimensions. All the ad hoc items are listed in Table 3. As a result, the final set of items comprehensively captured all 20 core attributes identified for this study, ensuring a balanced and inclusive representation of the theoretical model.

## **4. Discussion**

This study shows the application of Formal Psychological Assessment (FPA) on Social Anxiety Disorder (SAD), by identifying twenty core clinical attributes and analyzing their presence across seven commonly used psychometric SAD instruments. It became possible to determine which clinical attributes were absent, overrepresented, and sufficiently covered by using a Boolean matrix, thus forming a more streamlined and focused item set. Earlier studies employing FPA for other disorders such as depression (Serra et al., 2015, 2017) and obsessive-compulsive disorder (Donadello et al., 2017) displayed how mapping elements to specific attributes reduces redundancy and enhances precision. As Serra et al. (2015) pointed out, instead of offering a total score, this method allows for tailored evaluation by determining which psychological aspects the respondent endorses. The construction of clinical context, a time-consuming process, relies on literature and researcher judgment, which poses a certain level of subjectivity and bias. Despite this, FPA remains adaptable to new research (Serra et al., 2015). More cross-disorder research could help create systems that detect comorbidities for more precise differential diagnoses. Ultimately, this study intends to contribute to the development of a broader clinical framework for SAD, potentially informing future diagnostic and assessment strategies.

## **5. Conclusion**

Through the application of FPA to SAD, this research aimed to establish a comprehensive set of defining characteristics for the disorder. By analyzing seven widely used assessment tools for SAD, it became clear that none fully addressed all important features of social anxiety. To address this shortfall, the clinical context was refined, enabling the assessment of all 20 attributes using a total of 42 items—36 drawn from the clinical context and 6 additional items included as needed. Following validation, this clinical framework could serve as an independent tool to support clinicians in diagnosing SAD. Having an adaptable nature also allows for integrating with other FPA-based clinical models, which enhances the integrative approach to psychological assessment. Other research might investigate broadening this framework to cover other relevant disorders like avoidant personality disorder, which has substantial overlap with SAD (Hudson & Rapee, 2000). Applying FPA to these areas may improve the assessment of comorbidities and enhance the structure of differential diagnosis, thereby supporting the development of tailored clinical intervention.

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## Appendix A: Preliminary Domain of the Clinical Context

ITEMS	ATTRIBUTES																			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
SPIN1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN2	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN5	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SPIN6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN7	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN9	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN10	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SPIN11	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN12	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN13	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN14	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN15	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SPIN16	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPIN17	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIAS1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SIAS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SIAS3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SIAS4	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS5	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SIAS6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SIAS7	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SIAS9	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS10	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SIAS11	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SIAS12	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIAS13	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS14	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS15	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS16	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SIAS17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
SIAS18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SIAS19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SIAS20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SPS1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS5	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SPS6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS7	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPS8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SPS9	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPS10	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SPS11	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPS12	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	
SPS13	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SPS14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPS15	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPS16	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SPS17	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPS18	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	
SPS19	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SPS20	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/2	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
SAQ-A30/3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
SAQ-A30/4	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	
SAQ-A30/5	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
SAQ-A30/6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SAQ-A30/7	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/8	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/10	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/11	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
SAQ-A30/12	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
SAQ-A30/13	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/14	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
SAQ-A30/15	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	
SAQ-A30/16	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
SAQ-A30/17	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	

SAQ-A30/18	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/19	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SAQ-A30/20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAQ-A30/21	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAQ-A30/22	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SAQ-A30/23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
SAQ-A30/24	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/25	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/26	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
SAQ-A30/27	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SAQ-A30/28	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/29	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SAQ-A30/30	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
BFNE1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE3	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
BFNE4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE5	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
BFNE7	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE8	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE9	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE10	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE11	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFNE12	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES4	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES5	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
FPES6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES7	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
FPES8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FPES10	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
SADS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

SADS2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SADS8	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS11	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SADS12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS13	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
SADS14	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SADS15	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SADS16	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS17	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS18	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS19	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
SADS21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
SADS22	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
SADS23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS24	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS25	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SADS26	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS27	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SADS28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0