**Theoretical Basis for the Interactive Self Inventory**

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## Abstract

In an attempt to bridge the gap between cortical electrophysiological patterns and behavior, an instrument was developed to explore the possibility of predicting general behavior based on electrophysiological patterns. An interdisciplinary theoretical model of social psychological behavior was proposed based on the met- dimensions of approach and avoidance and their correlation with EEG asymmetry. In order to define valid measures of approach and avoidance in more detail a group of seven sub-dimensions and associated scales was developed. An important step in this process is validating the dimensional structure of these measures. Responses from three thousand clinical subjects were factor analyzed to confirm the proposed factors contributing to approach and avoidance and establish the discriminant validity of the scales. The results of this analysis confirmed the internal consistency, temporal stability and construct validity of the proposed scales and subscales.

The Interactive Self Inventory (ISI) proposes domains of measurement of human behavior based on constructs grounded in social psychology and electrophysiology. The primary purpose of the ISI is to cross correlate patterns of social behavior with the neurophysiological domain of electrical activity in the brain. The secondary purpose of the ISI is to develop an instrument that is more clinically relevant than existing instruments for the assessment of clinical problems in terms of social interaction and defining avenues of behavioral change. Many of the existing instruments, such as the MMPI, utilize very abstract dimensions of measurement that are primarily and exclusively psychological in nature and that neurofedback clinicians find difficult to specifically operationalize clinically to implement change in clients.

Previous efforts to define and measure human dimensions of behavior have been isolated within disciplinary boundaries and these boundaries have also defined their limits of analysis. These efforts have generated valuable but incomplete theories and measurement techniques, such as behaviorism, that often lead to puzzling conclusions. By engaging in a more interdisciplinary approach that includes biological, psychological and social dimensions of analysis, the ISI attempts to bring more of the various pieces of the behavioral puzzle together.

The scientific analysis of human behavior evolved over time into two fundamental domains of analysis, the sociological and the psychological. In the 1930s several theorists began to identify problems with confining analysis to either domain and began a synthesis of these domains in the form of social psychology. This synthesis has resulted in a more satisfying hybrid of theories.

In psychology Watson and Skinner defined the powerful research tradition of behaviorism. Behaviorism proposed that rewards and punishments in an environment predicted behavior. This paradigm focused on the reinforcing properties of the environment and discounted subjective states as unimportant. Personality theorists on the other hand looked for consistency of behavior over time across situations. One group, including Allport and Cattell, sought to identify traits that could be measured to define and predict personality. The operational source of these traits was never acknowledged, although some discussion acknowledged that they may emerge from some unidentified

internal process that was also discounted. Consequently these personality theorists tended to discount eternal rewards and punishments. Personality theorists, such as Freud, Adler, Horney, and Maslow in contrast attempted to devise theories to explain how personality emerged from internal drives as well. These theories, although useful clinically were difficult to verify empirically because of the nature of their theoretical constructs.

In Sociology, structural theorists such as Durkheim defined behavior as a result of social environmental forces that were external and coercive. The Symbolic Interactionists in contrast, initially defined by Mead, proposed an alternative social-psychological tradition that identified the personality or "Self" as a process that emerged from the interaction of the biological and the environmental forces resulting in a self-society dialectic. Objects were always, by definition, social and the self emerged from social interaction, whether imagined or real. Parsons later attempted to synthesize these perspectives into an integrated systems theory perspective. Festinger, one of the first social psychologist, was dissatisfied by both psychological behaviorism and sociological structuralism and developed theories such as Social Comparison theory that moved beyond behaviorism and structuralism as well.

Drawing on Gestalt theory in psychology, another of the first social psychologists Kurt Lewin, looked at the impact of processing on behavior in his formulation of social-psychological analysis. This study of the perception of social objects, rather than just physical objects, reflected the work of Mead and others in sociology. Gestalt contained

the concept of self as process, like Mead's theories, and this self process was derived from interaction. From this perspective, how social environments are "construed" defines the identity of rewards and punishments studied in behaviorism. Therefore, how social environments are construed (perceived, interpreted, and distorted) is critical to the formulation of human response.

People form construals (Ross & Neisbett, 1991) of their social environment as a basis for behavior. Construals are based in two fundamental motives: "the desire to maintain self-esteem and the desire to form an accurate picture of oneself and the social world" (Aronson, 1998). Social Cognition theory proposes that social behavior is driven by "Expectations" involving "Self-Fulfilling Prophecy" (Rosenthal & Jacobson,1968) based on construals. Social Cognition is defined as how people select, interpret, remember and use social information to make judgments and decisions and then act. There are many basic components to the process of Social Cognition. For instance, individuals use schemas as theories on how things work as a basis for evaluation and action. Schemas can distort what we see perceptually and what we remember. Schemas persist when discredited in the form of "Perseverance Effect." "Self-fulfilling Prophecy" occurs when our schemas result in (influence) behavior that reinforces them by eliciting behavior in others that reinforces our expectations. " Judgemental Heuristics" are processing patterns, mental short cuts, that we use to process vast amounts of information. All of these can be greatly distorted by network dysfunctions. Neurologists have noted for over a century that damage to temporal lobe networks can lead to confabulations that distort the employment of schemas and judgemental heuristics (Demasio, 1994). Yet, this source of

behavior is a missing dimension of influence not included in the analysis of social-psychologists.

Cognitive Dissonance is a social psychological theory that Leon Festinger proposed that is also associated deeply with self-esteem. This theory reflected a trend in thinking about the sources of human behavior. In psychology Albert Bandura's Social Cognitive Theory connects learning to behavioristic theory and personality theory through the medium of self-efficacy and provides a parallel theoretical picture. Self–efficacy is similar to self-esteem theory. Julian Rotter's theories of expectancies mirror Expectation Theory in Social Psychology.

These theories emphasize the importance of emotion and self-evaluation in the determination of human behavior. This theoretical approach also more specifically reflects the anatomical development and physiological dynamics of the human brain. Human behavior is profoundly influenced by emotional processes (Goleman, 1995). There is a human need to maintain a positive view of ourselves according to the Self-Esteem Approach (Aronson, 1992). From the social-psychological perspective the psychological dimension of denial stems from the desire to maintain one's self-esteem (although it may emerge from confabulation). The perspective behind the ISI proposes that self-esteem is dependent on social accuracy, which can derive from either socialization or from the processing efficiency of neural networks. Negative emotional valencing (as well as positive) (Demasio, 1999) provides individuals with important feedback regarding the success of their behavior. Another key mediating variable,

proposed by this author, in the process of achieving Social Accuracy is "effective cognitive processing." When we are not accurate we engage in denial and rationalizations to sustain self-esteem. Accuracy tends to be a more cognitive process, while self-esteem tends to be a more emotional process that is valencing our accuracy. Individuals engaging in approach behaviors are more likely over time to refine their interaction techniques and gain access to social resources such as attention, status, power, and money. Their ability to maintain a dominant "approach" style of behavior is a measure of their success at interaction and indirectly a measure of the social resources they have accessed. Individuals engaging in avoidance behaviors are more likely over time to fail at practicing and refining behaviors and poorly access social resources.

Approach and avoidance have a typical EEG signature. The amygdala and the nucleus acumbens, subcortical affective related structures, play key roles in providing emotional valencing to networks guiding attention and cognitive processing as well as primary bottom up sensory processing (LeDoux, 1996; Chow and Cummings, 1998). Negative interactions, both internal and external, tend to increase right hemisphere activation and anxiety (Davidson, 2000). Continued negative interaction results in withdrawal behaviors and depression (Davidson, 2000). This provides a starting point for correlating behavior with neurophsyiological activity. Individuals with a dominant approach behavior pattern will consistently demonstrate a stereotypical EEG pattern in which the left hemisphere is more activated than the right hemisphere (Davidson, 2000). Other patterns that correlate behavior with neurophysiology are likely to emerge as well.

The researchers in neurophysiology (Sacks, 1985; Ramachandran, 1998; LeDoux, 2002; Demasio, 1999; Davidson, 2000; Cozolino, 2002) have provided a new window into human behavior exposing a dimension previously ignored or discounted in the behavioral sciences- the physiological. Based on their findings, there are distinct correlates between human behavior and electrophysiological events. These findings suggest that processing and the resulting construals can be profoundly altered and that the resulting behavior will be novel and socially inaccurate. A consequence of this finding is the implication that an additional causational link, among several mentioned above, exists between behavior and physiology that can provide cause and effect consequences in either direction between the correlating factors. The further implication of this hypothesis is that any event which disrupts, disturbs or profoundly alters physiology can also alter human behavior. This includes drugs, trauma, intense emotional states, viral infection, and toxins. The enduring consequence of trauma can result in unanticipated social consequences with respect to human behavior that are both subtle and socially destructive, particularly if they occur in individuals who reside in key hubs of power; in which case they are likely to have extensive negative consequences for the social order.

The ISI is based on a theory of personality that is social and psychological as well as grounded in the biological or physiological. This bio-social-psychological theory draws from the concept of social accuracy derived from Social Cognition Theory (Fiske & Taylor, 1991) and links it to approach-avoidance theory emerging from the investigations of Richard Davidson regarding affect regulation and EEG asymmetry. The approach avoidance theories emerging from Labs are grounded in neurophysiological measures of

affect regulation, specifically EEG. The ISI seeks to correlate approach and avoidance behavior with EEG distribution and cortical activation patterns. The approach avoidance sub-dimensions are expected to be influenced at the very least by EEG asymmetry as well but more extensive correlations are also expected. Below is a chart of some observed general clinical correlations between EEG and behavior.

| **Delta** | **Theta** | **Alpha 8-9hz** | **Alpha 9-11hz** | **Beta 1** | **Beta 2** |
|---|---|---|---|---|---|
| Hypercouple1 AD/HD | | Hypercoupled 2 Depression | Optimal Coupling | Hypocoupled 1 Insomnia | Hypocoupled 2 Hypervigilence |
| Impulsive | | Dependence | Flexible | Anxious | Independence |
| Independence | | Inhibited | Co-Operative | Inhibited | Controlling |
| Interactive | | Perfectionistic | Interactive | Perfectionistic | Competitive |
| | | Passive | Regulated | Competitive | Pasive |
| | | Avoidant | Relaxed | Assertive | Avoidant |
| | | | Approach | | |
| Lo Dopamine | | Lo Serotonin | | Hi Norep | Lo Gaba |

Research questions begin to naturally emerge from the foregoing. Where does the problem with social accuracy emerge from in terms of social interaction? What is interfering with the processing and interaction of individuals who are depressed and causing them to retreat? What are the key dimensions of interaction that lead to retreat? Inhibition, passivity, perfectionism, excess competitiveness, and over-dependence are proposed negative dimensions associated with social retreat trajectories. In terms of established social-psychological concepts it could be said that these dimensions are related to low self-esteem. They can emerge from processing errors due to network dysfunctions. They feedback into network processing and enhance negative self-evaluations that further destabilizes networks. The positive dimensions of assertion, co-

operation, independence, relaxed, and self-regulated tend to lead to approach trajectories with positive outcomes with respect to social accuracy and acquisition of social resources.

To ensure Convergent Validity as well as item face validity the ISI dimensions and items were selected based upon a meta-analysis of existing scales in peer reviewed psychological instruments ( Corcoran & Fischer, 2000) and based upon their usefulness in defining clear alternative lines of interaction that would result in enhanced social accuracy. Individuals scoring high in the negative dimensions tend to engage in withdrawal behaviors and attribute errors to others. They lack self-efficacy. They select, interpret and remember in negative terms. Their schemas tend to be negative. "Perseverence Effect" emerges when their schemas fail to be effective. They blame others and see themselves as victims. They have a negative Self-fulfilling prophecy because negative expectations result in behaviors in others that reinforces those expectations. Judgemental heuristics dominate processing in a negative form.

Some predictions regarding behavior can initially be made based on these dimensions. If individuals are impulsive they will violate norms and erode trust in others and consequently themselves. If they are regulated they will build trust.

If inhibited they will not self-disclose and engage others to build relationships. If relaxed, they invite interaction.

If they are passive and go along with others all of the time, they will violate themselves by not getting the resources they need. If they are assertive they will act to secure resources.

If they are perfectionistic, they will frustrate themselves and others in attempting to get things done to secure resources. If they are flexible, they can adjust to change and adapt to circumstance to overcome adversity and challenge.

If they are overly competitive, they will discourage others from participating and diminish their self-esteem. If they are co-operative, they will encourage others to participate and improve outcomes through sharing resources.

If they are overly dependent, they will not take initiative and generate conflict by attempting to have others secure their resources for them. If they are independent, they demonstrate confidence, feel self-empowered and actively define clear boundaries .

The New Mind Database system is designed to investigate the relationship between electrophysiological patterns in the brain and human behavior. It provides social-psychological measures in the form of the ISI, cognitive and emotional measures in the form of the Cognitive Emotional Report, and physiological measures in the form of the Physiological Report. These measures are cross-correlated with each other and with a qEEG report showing the distribution of electrical activity in the brain. This activity is a proxy measure of activation of brain networks showing effective and functional

connectivity (Freeman et al, 2009) between Hubs and Nodes in the brain network system (Hagmann et al, 2008). The "at rest" measures of the EEG record the "Default Mode" (Buckner et al, 2008) of brain processing and the functional connectivity of brain networks. Through the correlation of these bio-psycho-social dimensions emerges the ability to measure and identify specific features of disorders, which may transcend diagnostic categories, and generate interventions as well as track the results of their implementation.

**Subjects**

Questionnaires were taken from N= 3000 subjects. Subjects were drawn from over 300 clinics around the country and constitute a volunteer sample of high quality. Since the clinics are located in a variety of geographical locations across the country and represent a variety of socioeconomic groups they are likely as close to being a random sample as possible without engaging in formal targeting procedures using stratified sampling methods. Subjects include both males and females and range in age from 16 to 92 years of age. All subjects presented themselves to clinics as having a disorder of some form and eventually received neurofeedback training after testing.

**Methods**

Data was collected anonymously from the New Mind Database containing responses to the ISI questionnaires. There were a total of 136 items that defined two meta-dimensions of approach and avoidance and 14 subdimensions measured using five point Likert like. Dimensions were each composed of 5-16 questions on average with anxiety and

depression measures containing 15 and 16 items respectively. Anxiety and depression scales showed an average correlation of 86% with the Beck Inventories when comparisons were run for cross-validation. These scales were included in the measures to validate approach and avoidance validity and to enhance cross validation with other psychometrics. By correlating factor loadings of approach and avoidance with depression and anxiety Discriminant Validity of meta-scales and subscales would be confirmed. They could then later be cross-correlated with EEG asymmetry measures. Scale items are listed by scale in the appendix.

Items were initially evaluated for substantive validity through initial inspection of the descriptives run on a group of 30 peak performers in business and athletics. Results indicated all items represented valuable measures of the constructs of interest, none of the items appeared skewed or unbalanced, no response sets emerged and all items were retained for further analysis.

Each scale was statistically analyzed using factor analysis. Initially oblique rotations were employed for each dimension to determine orthagonality of constructs. Results indicated that there was significant overlap between constructs with values typically exceeding .32 in the correlation matrix (Tabachnick and Fiddell, 2007). This was considered desirable since we sought overlap for these dimensional subscales that would later be factor analyzed as subdimensions of approach and avoidance where orthagonality would be considered a critical issue from a theoretical standpoint. Data was subjected to Bartlett's Test of Sphericity to confirm the matrix was an identity matrix and Kaiser-

Meyer-Olkin Principal to confirm sampling adequacy. Next a set of reliability analyses were conducted on all scales utilizing Chronbach's alpha to applied to confirm scale structure characteristics. This provides an opportunity to inspect how subscales intercorrelate, how broad each construct remains and to determine which scale items should be removed in order to improve the internal consistency and reliability of measures. Following this a new set of reliability and factor analyses was then applied using orthogonal Varimax rotation to each scale. Eigenvalues were extracted for each dimension and Scree plots were evaluated for key factors ranking above 1.0 in eigenvalue. These results found that additional modification was necessary with regard to six scales, with additional items being removed and the reliability analysis then being rerun for these scales along with a new factor analysis. Finally, the correlations of the subdimensions with the meta-dimensions of Interactive and Avoidant, which were the focus of these analyses, were conducted, along with a final set of reliability analyses for all finalized scales.

**Results**

First, the following table summarizes the final set of scales included in these analyses. The total number of items associated with these finalized scales are presented, along with measures of Cronbach's alpha and a listing of the specific items not included in each of these scales, where applicable.

A Cronbach's alpha of 0.70 or higher would indicate an acceptable level of internal consistency reliability. As shown in the following table, all scales were found to have a Cronbach's alpha equal to this threshold or above with the exception of Independence and Assertiveness, with both of these scales only being marginally below

this threshold of 0.70. Therefore, based on these results, this set of scales were deemed to have an acceptable level of internal consistency reliability.

Additionally, as illustrated in this table, the majority of these scales did not need to be modified based on the results of the factor analyses as well as the reliability analyses conducted. These unmodified scales consisted of the following: Avoidant, Interactive, Dependence, Competitive, Cooperative, Passivity, Inhibited, Relaxed, Depression, and Anxiety. Specifically, the only scales that were modified consisted of the Independence, Perfectionistic, Flexible, Assertiveness, and Impulsivity scales.

Table 1: Summary of Final Scales

| *Scale* | *N of Items* | *Alpha* | *Items NOT Included* |
|---|---|---|---|
| Avoidant | 6 | .915 | NA |
| Interactive | 6 | .894 | NA |
| Dependence | 5 | .716 | NA |
| Independence | 5 | .660 | 6 |
| Competitive | 8 | .880 | NA |
| Cooperative | 6 | .809 | NA |
| Perfectionistic | 7 | .828 | 4, 5, 6, 7 |
| Flexible | 7 | .879 | 7 |
| Assertiveness | 5 | .677 | 4 |
| Passivity | 6 | .712 | NA |
| Impulsivity | 9 | .829 | 8 |
| Regulated | 6 | .741 | 1, 2 |
| Inhibited | 10 | .912 | NA |
| Relaxed | 8 | .765 | NA |
| Depression | 16 | .921 | NA |
| Anxiety | 15 | .891 | NA |

With regard to the Independence scale, only the sixth item was removed, which asked respondents “What other people say doesn’t bother me”. In reviewing this question alongside the remaining question, it appears conceptually different than the remaining

five, which focused on the factors of the respondent enjoying being by themselves, not relying/depending on other people, and not caring what others think about them. What other people say about the respondent would appear to be substantially different from these other measures, making the removal of this item both statistically as well as theoretically or conceptually justified.

The Perfectionistic scale was also modified by removing items 4 through 7. The retained items associated with this scale focused generally on mistakes and failures made by the respondent or in other people's projects. However, items four through seven focus upon making mistakes and paying attention to details in a much more abstract way as well as whether others take advantage of the respondents' mistakes. These specific items appear to be very conceptually different from the retained items, so it was felt that the removal was again justified statistically based on the results of the factor analyses and reliability analyses as well as theoretically or conceptually.

The next scale which had been modified consisted of the Flexible scale, in which only a single item, question 7, was removed. This question posed to respondents, "At times a sudden change of plans is necessary". This concept of a sudden change of plans appears conceptually different from the remaining items, which focused upon learning new things, new points of view, trying new things, etc. Therefore, it was felt that the removal of this item was both theoretically and conceptually justified.

The Assertiveness scale was modified by removing item 4. This item asked respondents, "When I'm asked to do something I always want to know why". This question also appears distinct from the remaining items, which focused upon issues such as being honest about their feelings, meeting new people, and complaining and

confronting others. Due to this reason as well as the results of the factor and reliability analyses, this variable was removed from this scale.

Following this, the Impulsivity scale was also modified by removing question 8. This question asked respondents, "I say things without thinking". This question also appears distinct from the remaining items, which asked about factors such as planning, solving problems, sitting still/being restless, and so forth. Again based on this fact along with the results of the analyses conducted, this measure was removed from the scale.

The final modified scale consisted of the Regulated scale, in which questions 1 and 2 were removed. Question 1 asked respondents, "I plan things carefully", while question two asked "When I get angry I wait for a while before I respond". While there is a question similar to question one included in this scale ("I plan each day with a written list"), question 2 appears conceptually distinct from the remaining items, which asked about factors such as keeping things organized, setting aside time for themselves, avoiding excess, and so forth. It was not felt necessary to keep both questions 1 and the similar question, question 4, as components of this scale, and also based on the statistical results, questions 1 and 2 were removed.

The following table summarizes the results of the correlations conducted between the scale items and the Avoidant as well as the Approach factors. As shown, both Pearson's as well as Spearman's correlations were conducted, as while Pearson's correlation is excellent at estimating a linear association, Spearman's correlation is superior at modeling non-linear correlations. As indicated in the following table, these two sets of correlations produced nearly identical results in all cases. Additionally, for the purposes of interpreting these coefficients, correlations of +/- 0.10 are considered weak

correlations, with correlations of +/- 0.30 considered moderate correlations. Correlations that are found to be +/- 0.50 or larger in magnitude would be considered strong correlations. For the purposes of interpreting these correlation coefficients, while found to be very similar as stated earlier, the Pearson's correlations will be focused upon.

First, with regard to the Avoidant scale, the following scales were found to have positive and significant correlations: Dependence, Competitive, Perfectionistic, Passivity, Impulsivity, Inhibited, Depression, and Anxiety. The correlations with Dependence, Competitive, Passivity, and Impulsivity were found to be weak, while the correlations with Perfectionistic, Depression, and Anxiety were found to be moderate in strength. Additionally, the correlations conducted with Inhibited was found to be strong. Next, significant, negative correlations were found between the Avoidant scale and the Independence, Cooperative, Flexible, Assertiveness, Regulated, and Relaxed scales. All of these correlations were found to be weak with the exception of the correlation conducted with Assertiveness, which was found to be moderate in strength.

The following set of correlations were conducted with the Approach scale. Here, significant, positive correlations were found with the following scales: Independence, Cooperative, Flexible, Assertiveness, Regulated, and Relaxed. The correlations conducted with Independence, Flexible, and Regulated were found to be weak, while those conducted with Cooperative, Assertiveness, and Relaxed were found to be moderate in strength. None of these correlations were found to be strong. Next, significant, negative correlations were found between the Approach scale and Perfectionistic, Passivity, Impulsivity, Inhibited, Depression, and Anxiety. The correlation conducted with Impulsivity was found to be negligible, while the correlations

conducted with Perfectionistic, Passivity, and Anxiety were found to be weak. Finally, the correlations conducted with Inhibited and Depression were found to be moderate in strength.

Table 2: Correlations with Avoidant and Approach/Interactive

| *Measure* | *Avoidant* | | *Approach* | |
|---|---|---|---|---|
| | *Pearson* | *Spearman* | *Pearson* | *Spearman* |
| Dependence | .248*** | .244*** | .033 | .024 |
| Independence | -.059** | -.072*** | .113*** | .118*** |
| Competitive | .179*** | .190*** | .009 | .016 |
| Cooperative | -.229*** | -.256*** | .375*** | .367*** |
| Perfectionistic | .381*** | .377*** | -.159*** | -.154*** |
| Flexible | -.205*** | -.233*** | .286*** | .288*** |
| Assertiveness | -.325*** | -.318*** | .400*** | .387*** |
| Passivity | .226*** | .222*** | -.101*** | -.105*** |
| Impulsivity | .234*** | .239*** | -.050* | -.053** |
| Regulated | -.063** | -.065** | .103*** | .094*** |
| Inhibited | .578*** | .570*** | -.339*** | -.336*** |
| Relaxed | -.264*** | -.277*** | .342*** | .334*** |
| Depression | .453*** | .440*** | -.303*** | -.301*** |
| Anxiety | .420*** | .409*** | -.259*** | -.265*** |

Notes: *$p$<.05, **$p$<.01, ***$p$<.001; $N$ = 2721, $df$ = 2719.

**Discussion**

The results of this analysis provides a new instrument that begins to bridge the EEG defined dimensions of approach and avoidance with other socio-behavioral patterns. It also begins to establish the primacy of these dimensions with respect to social and psychological behavior based on empirical measures grounded in physiological patterns of individuals. Previous work done by Davidson, Heller and others has paved the way

for this effort and already established the importance of this direction of investigation. Other such patterns of EEG are beginning to emerge that indicate dysregulation in areas of the brain that clearly influence behavior, such as EEG patterns related to filtering abilities, facial decoding, and impulse control. These other dimensions of activities may result in future modifications of the present ISI model or spawn affiliated instruments that can work in conjunction with the ISI.

At minimal EEG asymmetry predicts likelihood of behaviors defined within the dimensions of approach and avoidance and this effort further defines what those dimensions of behavior might be as well as begin building a theoretical perspective based upon them that integrates diverse theoretical perspectives presently prominent within the fields of psychology, social psychology and sociology.

The instrument further provides built in measures of anxiety and depression that can help further define the social-psychological contributors to these measures and further clarify the impact of social distress in the development of psychological disorders. In addition, further correlations between EEG distributions and these patterns of behavior can be further explored in detail.

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