Using CB5T Framework to Investigate the Mechanism of Social Dysfunction

Introduction

The study of social dysfunctions, such as Social Anxiety Disorder (SAD) and Avoidant Personality Disorder (AVPD), has historically been approached through the lens of diagnosis and reductionism in clinical psychology. However, these approaches often fall short of capturing the underlying mechanisms that drive such disorders and even form circular reasoning which is hazard for further research. Diagnostic literalism—treating diagnostic categories as the actual disorders—can lead to a narrow focus on symptoms rather than the complex mechanism underlying the disorder. Similarly, reductionism, the practice of studying isolated components of a disorder, often overlooks the systemic nature of mental health issues, where the characteristics of individual components change depending on their relationships within the system. This paper aims to address these issues by applying the Cybernetic Big Five Theory (CB5T) to explain the mechanisms underlying social dysfunctions. CB5T offers a framework that views personality as an adaptive system, focusing on how traits and characteristic adaptations interact across different contexts. By utilizing CB5T, this paper seeks to explore the mechanism of social dysfunctions, offering a more holistic understanding of these disorders.

1. Barriers of current clinical psychology research

Current clinical psychology research exists two phenomena: diagnostic literalism and reductionism, which may reveal some details of clinical psychological problems, but are insufficient in today's view (Fried, 2022)

1.1 Diagnostic literalism

In general, a diagnosis is an idealized classification of patients for clinical applications, such as treatment planning and facilitating communication. But is a patient's mental health problem really the same as a diagnosis? Idealization here refers to their misinterpretation of diagnostic symptoms as disease themselves. For example, patients with Alzheimer's disease will lead to brain Amyloid beta and Tau protein, and the symptom is regarded as diagnostic criteria, but the presence of these proteins is not the same as Alzheimer's disease. Mental disorder and diagnosis are different. The phenomenon of treating a patient's diagnosis as a mental disorder is called diagnostic literalism (also known as concretization or essentialism).

The following eight observations help clarify the discrepancy between mental health problems and diagnoses and illustrate the expected results of stacking clinical idealization on the complexity of mental disorders (Hyman, 2021):

1. Reasons for neglect: For most diagnoses, The DSM ignores causes and etiology (the DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS, the taxonomic and diagnostic tool published by the American Psychiatric Association).

2. Differences in classification systems: Classification systems (e.g., DSM and ICD) differ significantly in conceptualizing some mental disorder.

3. Low interrater reliability: Interrater reliability was low for some common diagnoses.

4. Diagnostic similarity: people with the same diagnosis often have some similarity in etiology and symptoms.

5. Diagnostic variability: Nonetheless, these individuals also showed significant variability.

6. Comorbidities and cross-diagnostic risk factors: Significant comorbidities were found across diagnoses and many risk factors were shared across diagnoses. Proving that they are likely to be the same disease of different dimensions which is worthy to investigate.

7. Dimensional description: Although diagnoses are categorical, most mental disorder are well described on a continuum from non-existent to very severe.

8. Diversity of disease pathways: Disease pathways are characterized by equivalence (different starting points may lead to the same diagnosis) and multiple endpoints (similar starting points may lead to different diagnoses).

Unfortunately, the phenomenon that concern diagnostic criteria as mental disorder entities occurs not only in clinical applications but also in scientific research. Clinical psychology and psychiatry have focused on the diagnostic features of mental disorders rather than their internal mechanisms (Insel, 2014). These studies examine factors associated with the mental disorder by comparing people who are diagnosed as patient with healthy people, however this approach is flawed as diagnostic labels do not equate to mental disorders. For example, Paris (2007) states that the diagnostic criteria for Borderline Personality Disorder (BPD) include a variety of symptoms such as mood lability, impulsivity, relationship instability, and self-image instability. The interaction between these symptoms can be very complex, and the pathological mechanisms may vary greatly from patient to patient, possibly even different disease entities exist among patients. Therefore, considering all BPD patients as a unified group for comparison with healthy controls may overlook the differences in symptoms and

different pathological mechanisms among patients.

On the other hand, the definition and classification of mental disorders often rely on operational definition, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the International Classification of Diseases (ICD). However, these criteria are not based on definitive biologic markers but rather on clinical observation and expert consensus. Therefore, different versions of the DSM or ICD is likely are given different definitions to the same mental disorder, even some disorder is removed from the classification or new. The change reflects the psychological barriers to define mental disorder as its subjectivity and empirical, rather than chemical elements which based on the objective natural facts (Zachar & Kendler, 2017).

Clinical psychology and psychiatry the lowest levels of the analysis of theory, which is observational term (Harkness et al, 2014). We examined psychological differences by looking at behavioral differences between the clinical and control groups. For example, we hypothesized that borderline personality is more aggressive than the average personality and observed the difference in behavior between the two. These hypotheses can indeed be tested by observation, and we cannot avoid studying the unobservable mind through observable behavior. But observational terms that appear to be falsifiable (i.e., can be observed to determine whether they are true) are also unfalsifiable. For example, we can define "intelligence" by a specific IQ test score. This is the operational definition because it ties an abstract concept (intelligence) directly to a measurable outcome (IQ score), but the definition can never be falsified. We can't tell whether IQ scores actually indicate intelligence or not by

doing an experiment that explores the relationship between intelligence and emotional stability using IQ scores. Therefore, these studies are limited to its operational definition of intelligence, and no new interpretation of intelligence can be obtained. The same situation arises in clinical psychological research, where mental disorders are defined by committees based on empirical observations and studied under this definition. But these studies cannot prove that the definition of mental disorder is wrong, so the research is no help on how to define mental disorder.

But unlike typical operational definition, the falsifiability of theory is higher. Although certain operational definition and regulations (consensus) about some things is essential to establish theory. But the important thing is that we need to balance theory in abstract rules (for example using IQ scores to define abstract intellectual) and empirical observation (as some biological entities), thus improve falsifiable. On the other hand, this involves holism, which means that some specific behavior of a system cannot be explained in a single part of the system and needs to be explained as a whole system. Therefore, composing each hypothesis into a theory can enhance its falsifiability. To this end, the National Institute of Mental Health (NIMH) has proposed a diagnostic category research, to develop a new diagnostic criterion (RDoc), comprise of the standard use of psychology, neuroscience, genetics and biochemistry, and other fields to check the behavior system, in the hope to understand the mechanism of the system level.

1.2 Reductionism

Another problem is isolated study of psychological barriers by each component. The idea that by studying each part of a machine in isolation so that one can understand how it works as a whole is known as reductionism. For here, when each part is studied separately, its characteristics are consistent with its presence in the whole. For example, in an automobile engine, each part (such as the cylinder, piston, fuel injector, spark plug, etc.) has a clear function, and the operation of these parts is relatively independent. If the engine does not start, the mechanic can check that the spark plug is working properly. If the spark plug is found to be damaged, the mechanic can directly replace the spark plug, thus solving the problem of starting the engine. However, this is not the case in many other areas, such as stocks, weather, and the Internet. The same is true of mental disorders, in which the characteristics of each component are inconsistent in isolation and in systems. The properties of each component depend on the relationship to the component. "For example, Barch (2005) discussed working memory deficits in schizophrenia." These deficits were studied in isolation in an attempt to find out the specific neurobiological basis. However, it has been found that working memory deficits alone do not explain the full spectrum of cognitive and clinical symptoms of schizophrenia. Rather, these cognitive deficits may be closely related to other cognitive functions, such as affective responses, and extensive changes in brain networks. Thus, merely examining working memory deficits in isolation may overlook the complexity of schizophrenia and its systemic features.

Further obstacle is the perception that low levels (such as biology) provide more explanatory power than high levels (psychology). A lot of investment in biological psychiatry, such as

neurotransmitter research, has identified certain relevant factors, but more efforts are needed to conduct to deeper mechanistic studies. A classic example is the application of "the norepinephrine hypothesis" in the study of depression. This hypothesis states that depression is primarily due to abnormal levels of norepinephrine. Hasler (2010), in a review, states that although the "norepinephrine hypothesis" may be useful in explaining some aspects of depression, it has been oversimplified. In adopting this hypothesis, researchers tend to overlook the complexity of depression, over-describe it to a single biological mechanism, and not fully consider the role of other neurotransmitter systems, gene-environment interactions, and cognitive and emotion regulation processes. It is also why biology has shifted from traditional reductionist approaches to systems biology. At the same time, neuroscience also continues to develop systematic exploration with network analysis as an example. For example, Bullmore and Sporns (2009) showed how network analysis methods such as graph theory can be used to reveal the topology of brain networks, and abnormal functional connectivity of these networks is closely related to mental disorders.

Specifically, there are several challenges to the explanatory power of reductionism:

a. Complex systems often require high-level rather than low-level explanations; It is absurd to try to study the cause of hypertension by quarks, but instead the interaction of various organs. Thus, interactions between personality components may explain more about the formation and maintenance of certain mental disorders than single biochemical changes.

b. Reductionism may find biomarkers rather than biological entities; We may find that biomarkers associated with psychological illness, such as elevated levels of certain

neurotransmitters may be associated with delusional symptoms. However, it is not just these biomarkers that really contribute to mental disorder, but rather the nature of the delusional content. For example, frightening delusional scenarios may lead to mental disorder, whereas beautiful fantasies may not have the same effect. This suggests that the study of mental disorder requires a deeper exploration of the psychological and contextual factors underlying symptoms beyond mere biomarker analysis.

c. Some phenotypes may have multiple pathways to achieve. When delusions occur in different individuals, their brains may act differently. Even if it appears to be a rise in a certain neurotransmitter, different mechanism should be considered behind it. So, explaining paranoia as a rise in some neurotransmitter misses a lot of detail, which is also the result of insisting on explaining reductionism. By exploring in a systematic way, we can more comprehensively examine the differences level between different individuals and avoid simplistic generalizations.

Finally, these two issues together constitute the limitations of current research in clinical psychology: People assume that the diagnosis is the mental disorder itself (diagnostic literalism), and by comparing the biological differences of the brains of patient and healthy people, they conclude that the two are different (reductionism). By this conclusion, the diagnosis is related to the biological entities of the brain, and the diagnosis is the mental disorder itself. This constitutes a circular argument. A typical example is the work on "schizophrenia" and the dopamine hypothesis. Researchers have usually found increased dopamine receptor activity in certain brain regions (such as the striatum) in patients with

schizophrenia by comparing the brain activity of patients with schizophrenia and healthy controls (Howes & Kapur, 2009). Based on these results, researchers have concluded that hyperactive dopamine function is biological evidence of schizophrenia. This approach treats the diagnostic label as an entity of mental disorder and, through a reductionist approach, reinforces the link between that diagnostic label and abnormalities in brain biology.

1.3 Learning from Systematic Review (ROS) in Internal Medicine

Why did clinical psychology and psychiatry choose Bacon-based empiricism (which emphasizes the accumulation of knowledge through observation and experimentation, and asserts that science should be based on experience and facts rather than relying on theoretical speculation) over generative theories in most other branches of science? Harkness (et al., 2014) speculated that it is because psychology and psychiatry are still trying to get rid of psychoanalytic theories, as these theories are often untestable, which makes psychology less scientific. However, this also brings limitations. Meehl (2004) further speculated that hypothesis testing methods based on statistical significance produce weak theories. Weber's (1949) concept of the "social sciences" distinguishes us from the natural sciences which can operate in a more subjective and explanatory framework, allowing psychology and psychiatry to be a certain extent without learning the scientific methods of other scientific fields.

In contrast to clinical psychology, internal medicine typically employs an approach called Review of System (ROS) to investigate clinical questions in physiology. ROS implies that the default human being is organized by major adaptive systems and validates this. The general

organization form of major adaptive systems is sensory input–integration-output. For example, the patellar (" knee hop ") reflex is a simple adaptive system whose sensory input is collected from stretch receptors in the thigh (quadriceps) muscle. Stretch can be detected when the ligament below the knee is tapped. Interneurons in the spinal cord integrate sensory input; The motor output causes the quadriceps to contract and relax the antagonistic muscle, protecting the length of the quadriceps. By reviewing these major adaptive systems, it is possible to generate theories that are falsifiable, combinatorial, dynamic, and comprehensive compared to operational definitions (Harkness et. al, 2014). This process not only mechanically disaggregates the patellar reflex, extracting each component mechanism and describing its function, but also explains how the individual components are linked to each other through feedback. But the system is not a complex system, so the characteristics of each part are not affected by the other parts.

2. Introduction of Cybernetics Big Five Theory (CB5T) (DeYoung, 2015)

Here, we introduce the cybernetic Big Five Personality theory (CB5T). CB5T uses adaptive systems to understand personality in a manner which is consistent with ROS. CB5T describes personality as individual variation of general evolutionary design, meaning that humans will follow some functional structures that evolved as mammals but differ from each other. This difference is personality. And this functional structure can be explained in a cybernetic way as a self-regulatory system based on the goal orientation.

2.1 Cybernetic systems

Such systems are characterized by one or more targets or reference values to guide the system. When the system accepts that the current state is not consistent with the goal, which is receiving feedback, it adjusts the system's behavior to approach the goal based on the feedback, thus forming a negative feedback mechanism. The most typical example is the thermostat, which continuously receives feedback on the temperature of the room and thus coals or heats to reach and maintain a target temperature. Of course, in addition to the negative feedback mechanism, the system also has a positive feedback mechanism, which refers to the reinforcement of the current behavior, if a certain behavior brings good feedback, then the next cycle will be reinforced. However, this can lead to a vicious circle. For example, the use of alcohol leads to feelings of pleasure, which in turn increases the frequency of use, but may ultimately lead to alcohol addiction. Alcohol is beneficial in the short term, but restraint is needed in the long term. So positive feedback is always constrained by negative feedback.

The execution of a cybernetic system can be represented by a cycle of five stages: (1) goal activation, (2) action selection, (3) action, (4) outcome interpretation, and (5) goal comparison. In the first session, individual goals are activated to guide subsequent sessions. In the second stage, the individual decides and chooses the appropriate action. The third stage is to execute action. The fourth stage, explaining the consequences after the action: Specifically, feedback on the state of the world after the action is analyzed and interpreted in conjunction with the knowledge in memory. Finally, this state is compared to the goal, if consistent, the next target is selected, and if not, the cycle is repeated. These stages can often exist in parallel. Because

people are constantly interpreting outside feedback and comparing it to their own goals, even when choosing and executing actions. But since only one action can be performed at a moment, and only after that action is performed can another action be selected, the loop remains largely serial (unless the action has been automated, such as talking while driving).

2.2 Personality traits and trait adaptation

In this cycle, there are two important concerns. The first is trait, which corresponds to the five traits of the Big Five personality in the CB5T: openness, conscientiousness, extraversion, agreeableness, and neuroticism. CB5T uses the five traits of the Big Five personality as parameters to affect the various stages of the cybernetic system, such as extraversion affecting the first and last stage. These trait parameters often influence personality performance across contexts, such as a person's tendency to actively communicate with others.

Characteristic adaptations, on the other hand, often corresponds to adaptation to particular situation by specific goals, explanations, and strategies. Such as the knowledge and skills each person has learned, as well as the innate needs and acquired interests. This part is stored in memory. For example, when dealing with colleagues in the company, one tends to adopt the strategy of helping others' work to satisfy one's own purpose of gaining the goodwill of others.

2. 3 Personality renewal

In addition to this, CBT5 considers how personality generate new goals and strategies, resulting in two higher-level meta-properties: stability and plasticity. The corresponding

mechanism of these two characteristics satisfies the two needs of human beings to deal with threats, one is to maintain the pursuit of goals in the face of threats, and the other is to combine the information brought by threats with existing knowledge to better adapt to the environment. The two seem to be opposites, but in fact they complement each other. Certain plasticity can improve stability by learning more skills, guarding against future risks. In this regard, a concept called chaotic edge is put forward in the study of complex adaptive system: in the case of constantly changing external environment, if the system is too ordered, it will be rigid and unable to adapt to the environment. If it is too chaotic, it will not work properly. And the end result of too much rigidity (too much order) is also chaos. Only by maintaining a certain disorder can the system operate flexibly and stably. This state is known as the chaotic edge (DeYoung & Krueger, 2018).

3. CB5T and psychopathology (DeYoung & Krueger, 2018)

In CB5T, the core of mental disorders is the failure of characteristic adaptation to achieve important goals, but it cannot be effectively replaced by other characteristic adaptations. This is consistent with DSM criteria based on social or occupational dysfunction. The DSM's classification of disorders may not be justified, but the definition of mental disorders as functional disorders is justified because, in contrast to other disorders, mental disorders affect people's quality of life more than their survival. This means that mental disorders are not organic disorders, such as disability, but functional deficits. The CB5T does more than the DSM by providing a framework for dealing with these disorders. At the same time, mental disorders are no longer classified into different categories but are understood as

abnormalities of different functions of general healthy personality, that is, functional dyfunction. It must be mentioned that: with regard to functional disorders, many naturalistic approaches to the definition of mental disorders assume that the function of psychological mechanisms is based on evolution, and therefore the purpose of their function is for survival and reproduction. But the goal of CB5T definition is not the survival and reproduction of the individual in naturalism. For many violations of reproduction (celibacy, for example) and survival (principled hunger strike) are not indeed pathological. In particular, human goals are highly flexible. Thus, whether a behavior follows evolutionary adaptation cannot be used as a criterion to define a psychiatric disorder.

On the other hand, when describing mental disorder, CB5T uses a concept of psychological entropy, which represents the uncertainty and unpredictability of cybernetic systems. On the other hand, it also indicates the ability of the system to organize the goal, that is, the degree of clarity of the individual's mind in trying to achieve the goal. And that depends on three cybernetic elements: objectives, representations of the world, and operation. These three elements correspond to: whether the goal is clear, achievable or not in conflict with each other; whether people are clear about the current situation; whether the person is sure that the action is effective. However, individual certainty about these three elements is inversely proportional to psychological entropy. In general, organisms will tend to lower or avoid psychological entropy to achieve their goals.

Thus, according to the definition of mental disorders, mental disorders are often associated

with high levels of psychological entropy. But increased psychological entropy doesn't always mean a threat. Entropy naturally increases because individuals constantly encounter new environments. At the same time, it can also be a reward as a modest increase in entropy can trigger exploration, so that the system can learn more new adaptations. Organisms have also evolved the ability to actively explore in order to learn more skills to avoid future risks. Therefore, increased entropy does not indicate a mental disorder, but a persistent failure to decrease entropy is the cause of a dysfunctional system, that is an individual's inability to learn and adapt to changes in the environment. In other words, dysfunction refers to the inability to learn effective ways to reduce psychological entropy after an increase in psychological entropy and to maintain the original Characteristic adaptations which cannot reduce psychological entropy. For example, when people going to work in a new company, the original social way is not suitable for here, while the original social way continues to be maintained as the inability to learn and adjust.

4. Using CB5T to explain the mechanisms of social dysfunction

Next, this paper will introduce the concept of social dysfunction and apply CB5T theory to explain the differences between social dysfunction personality and healthy personality in traits, trait adaptation, environment, and goal construction and correspond underlying mechanisms

4.1 Social dysfunction

In terms of dysfunction in the social domain, many studies suggest that social anxiety disorder (SAD) is a comorbidity of avoidant personality disorder (AVPD). It is believed that the

difference in impairment between the two conditions is due to different levels of social anxiety (Weinbrecht et al., 2016). Both psychiatric disorders showed clinical manifestations of social anxiety. The comorbidity rate of them is extremely high (40%-100% in different surveys). The difference is that AVPD is more impaired and more likely to fail on certain functional tests (AVPD scores lower on self-reflection than SAD). Although AVPD also showed characteristic lower self-esteem and passivity. However, this could be explained by additional symptoms resulting from higher feelings of social insecurity and fear compared to SAD. Therefore, this article will consider the mechanisms of these two psychiatric disorders across categories, collectively referred as social dysfunction.

Based on the symptoms described in DSM-5 for SAD and AVPD, the clinical symptom of social dysfunction are as follows:

1. Strong social or performance situational fear: Individuals show strong fear or anxiety in the face of one or more social situations. These situations often involve possible scrutiny or judgment by others, such as public speaking, talking to strangers, eating in front of others, or performing.

2. Avoidance behavior or extreme distress: Individuals often avoid social or performance situations that cause anxiety. Individuals experience significant distress or anxiety if they have to face these situations.

3. Fear of negative evaluation: Individuals are acutely afraid of appearing in an embarrassing or humiliating manner, and fear that others will judge them negatively, such as criticism, rejection, or humiliation.

4. Low self-esteem and self-depreciation: Individuals tend to perceive themselves as socially inferior or uninteresting or unattractive to others. This low self-esteem leads to an individual's extreme restlessness in social situations.

5. Excessive anxiety reaction: the individual's fear or anxiety reaction obviously exceeds the actual threat level of the situation, and it is difficult to control.

6. Persistence: The anxiety or fear is persistent, usually lasting six months or more.

4.2 Differences in CB5T trait parameters in social dysfunction

Abnormal trait parameters of CB5T can lead to dysfunction to a certain extent. There are two typical situations here. The first one is that the trait parameters of personality are too high or too low, causing the relevant cybernetic system to go haywire. For example, it has been shown that high extraversion is associated with impulsive behavior and high-stakes decision-making, which can lead to conflict in relationships or poor professional performance. (Whiteside & Lynam, 2001) The second is that the trait parameters remain within the normal range, but the specific interaction between multiple trait parameters leads to the abnormal operation of the cybernetic system. For example, studies have found that the combination of high agreeability and low conscientiousness may lead to difficulties in displaying confidence and self-discipline in the work environment, which may affect career success (Witt et al,2002). Does this mean that someone scores extreme on all parameters? My interpretation of this is that being high in one trait can either constrain or promote the other trait to be high, depending on the category. For example, high extraversion would promote high openness but also inhibit high conscientiousness. Therefore, the balance between each trait is important. Otherwise, it is

easy to have situations where several of these traits are scored too high or too low.

For the trait level, that is, the parameters of the various stages of the cybernetic system, people with social dysfunction often show differences from healthy personalities and are reflected in their performance on each stage of the cybernetic system. Based on the symptoms of social dysfunction in DSM-5, patients with this mental disorder may have the following specific combination of personality traits which is low extraversion, high neuroticism, high conscientiousness, low agreeableness, and high openness/low intelligence.

Extraversion in CB5T mainly affects sensitivity to reward. Such rewards include social rewards like being praised, liked, respected and so on. Studies have shown that people with high extraversion scores in the reinforcement learning paradigm learn faster in the reward condition (Robinson et.al, 2010). People with social dysfunction tend to show lower sensitivity to social rewards. For example, studies have shown that individuals with autism spectrum disorder (ASD) are less responsive to social rewards such as smiling or praise when interacting with others (Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012). At the same time, this low sensitivity to rewards can lead to a lack of self-confidence. Because self-confidence stems from the individual's motivation for each success, and people with low sensitivity find it difficult to feel motivated. For example, the individual is unable to feel the praise of others or the joy of success in his work, resulting in his lack of motivation to establish the concept of himself as capable. All of this can be attributed to lower extraversion. Extraversion tends to affect the first and last stages of the cybernetic system, which reflect in the probability of

target activation and the ultimate satisfaction with the behavioral outcome. Social dysfunction is characterized by a low rate of activation of social goals, such as less desire to be liked by others; At the same time, in the last stage, social reward sensitivity is low, such as the inability to detect the good feelings of others.

Neuroticism in CB5T mainly affects emotional responses to negative feedback such as uncertainty, threat, and punishment. This response can be divided into active defense and passive avoidance. The former corresponds to the behavior of avoiding and eliminating negative feedback, while the latter corresponds to the psychological process of inhibiting motivation to achieve goal, represent as anxiety and depression (DeYoung et al., 2007). For social interactions, this negative feedback often happens as contempt, criticism, and potential communication failure by others. People with social dysfunction tend to be highly sensitive to such information and therefore respond strongly to it, such as suppressing their social motivation and choosing to escape from situations where they may be criticized by others (Hirsch et al., 2006), which can therefore be explained by higher neuroticism scores. Neuroticism tends to affect the first, second, and last stages of cybernetic systems. Regarding social dysfunction, it will present as easy activation of avoidance goals, such as avoiding being demeaned by others, referring more to negative information when choosing actions like perceiving oneself as a bad image and choosing not to show it, and identifying more negative parts of the outcome after a social action is completed, such as amplifying others' criticism of oneself.

Conscientiousness reflects the personality's ability to keep long-term goals (indirect goals) undisturbed and preference for order. Patients with social dysfunction tend to exaggerate the negative social evaluation of social norms violation and therefore act carefully. Studies have shown that people with social phobia tend to believe that negative social events are highly possible to happen and that if such events occur, the consequences will be terrible or unbearable (Nelson et.al, 2010). At the same time, they may focus more on the impact of social interaction on long-term goals rather than the pure pleasure of social interaction, such as the impact of social interaction on job opportunities rather than the emotional release of chat. These can be explained by the performance of higher conscientiousness. This aspect tends to affect the first and second stages of cybernetic system. In the mind of social dysfunction people, social goals are often associated with other long-term goals. They also overly obeying social rules when choosing social strategies, such as thinking that they should keep serious in formal occasions, and overly concerned about whether their behavior conforms to etiquette.

Agreeableness reflects the ability to perceive the state of others in personality (mentalization), and the tendency to cooperate with others and be altruistic. People with high mentalization ability are more able to perceive the helplessness and pain felt by others, thus producing altruistic behavior. In the development of society, coordination and cooperation with others is a necessary means to achieve many personal goals, while I believe that altruism also becomes the goal to achieve one's own value. Crocker and Canevello (2008) showed that altruistic behavior can improve the self-esteem and happiness of individuals, which indicates

that altruistic behavior can also be used as personal goals in social interaction. People with social dysfunction often find it difficult to perceive the state of others because they actively avoid receiving information about the state of others, and therefore it is difficult to form cooperation with others. It has been shown that interactions (mentalizing) with human partners elicit less activation of the medial prefrontal cortex in GAD patients compared to healthy control participants (Sripada et.al, 2009). This could be explained by a lower performance of agreeableness. This parameter often affects every stage of the process, because the acceptance of information always occurs. It often showing that at any stage of cognition, there is a lack of acceptance of information from others.

Openness/intelligence is a composite parameter in CB5T, involving two parameters that cooperated with each other. Openness involves the ability to perceive sensory information, whereas intelligence corresponds to the ability to perceive abstract and semantic information. On the other hand, these two parameters are also involved in the ability of extensive association and logical reasoning, respectively. This parameter is very important for individuals to interpret the world (DeYoung et al., 2012). Social dysfunction is often due to low agreeability, which leads to minimal information about state of others, and the interpretation of this information often leads to illusion, that is, unfounded associations. Studies have shown that patients with generalized social phobia (GSP) exhibit an illusory correlation in social events, particularly between social cues and negative outcomes (Christiane Hermann, Julia Ofer & Herta Flor 2004). They also lack the ability to connect with other memories to suppress this illusion. For example, from a slight impatient expression of

the other, patient with social dysfunction will imagine that the other is disgusted with us. At the same time, we can't contact the information that the other told us before that he or she was uncomfortable. Therefore, we can't combine the two information to get the correct judgment: the other is impatient because he or she is uncomfortable, rather than disgusted with patient. This can be explained as part of the phenomenon of too high openness and too low intelligence (DeYoung et al., 2018). However, people with frontal amnesia. They often have difficulty distinguishing between imagination and memory, but they score highly on intelligence tests. This can be explained by the fact that the low intelligence here refers to the memory monitoring function of the frontal lobe, such as the inability to connect two different memories to make a factual judgment. However, the ability of other brain regions, such as those involved in logical reasoning, can still maintain high intelligence, resulting in high scores on intelligence tests. This parameter, like agreeability, affects every step of the process, because interpretation occurs all the time, which is represented as the formation of misunderstandings of other people's information at any stage.

The differences of various trait parameters can explain the psychological changes of some typical patients with social dysfunction in social situations. For example, Chris is socially dysfunction. When he must go to an interview for a job, he behaves differently than a healthy personality. Before the interview, Chris's low extroversion meant that he rarely set positive social goals. For example, actively prepare for how to present social skills in an interview. In contrast, due to his high neuroticism, Chris mainly focuses on avoiding possible negative consequences during this stage. He mulled over how to avoid being embarrassed or belittled

by the interviewer during the interview. At the same time, Chris's high conscientiousness drove him to tie interviews closely to his long-term career goals. He is overly worried about how his performance in the interview will affect his career opportunities. During the interview process, Chris' low agreeableness, high openness and low intelligence are presented by difficulty in perceiving the interviewer's emotions and misinterpreting the intention behind them. Because he has long avoided social situations, he lacks sensitivity to other people's emotions, and it is difficult to judge the interviewer's reaction by his expression or tone of voice. For example, when an interviewer shows slight impatience, Chris fails to recognize that it may be because the interviewer is tired or has other reason, but immediately interprets it as dissatisfaction with his performance. With low extroversion, Chris is less responsive to social rewards in interviews, such as a smile or approval from the interviewer, and is unable to gain confidence from such positive feedback. He is more inclined to ignore these positive signals or even dismiss them as perfunctory or untrue. At the same time, his neuroticism causes him to overreact to any negative signals (such as questions or challenges from the interviewer) and feel intense anxiety and restlessness. After the interview, Chris will reflect on the whole process. Since he is highly sensitive to negative feedback, he may amplify any possible negative signals during the interview. Because of low extroversion, Chris has difficulty getting satisfaction from positive experiences in interviews. For example, even if he gets a thumbs-up from an interviewer, he has a hard time feeling the boost in confidence that comes from the thumbs-up. As a result, his reflections tend to focus on his own shortcomings, rather than the successful parts of the interview. Chris, who is high in conscientiousness, may continue to think after the interview about how his performance in the interview affects his future career.

He would be anxious about any small mistakes he made in the interview and worried that they might cost him the job. The pressure of this long-term goal prevents him from relaxing during the reflection process and further exacerbates his social anxiety.

4.3 Characteristic adaptation of social dysfunction

Specifically, in terms of Characteristic adaptations, different social situations and social objects require different social skills, social knowledge and different goals, which need to be mastered through continuous learning and exploration. For example, to communicate with people of different personalities and different classes, it is often necessary to take different ways: for those with higher enthusiasm, we can give the initiative to other; For people who is introvert, it is necessary to try to find common ground and give each other appropriate space. But for people with social dysfunction, targeting avoidance itself loses the greatest motivation to learn new social skills, leading to reduced plasticity in social dysfunction. Spence and Rapee (2016) explored the learning of social skills in patients with social anxiety disorder in a study and found that these patients avoided social occasions and lacked opportunities to practice social skills, which resulted in delayed or insufficient development of social skills. This inability to update adaptation further reinforces the stability of false characteristic adaptation in social dysfunction.

The reason why such avoidance goals are continuously selected by individuals is that, on the one hand, individuals are afraid of the risks brought by contacting and exploring the new environment (which is also an opportunity for learning), and the avoidance goals can be

achieved without exploration. On the other hand, it is because the external environment and experience enhance the individual's ability to achieve such a goal, so that the avoidance goal is very easy to achieve, such as avoiding social situations very skillfully. Finally, some people have compensatory adaptations, such as trying to find comfort in social networks or solitary entertainment after avoiding social situations. In a simple word, they are used of the old way of life and no motivation to change. Although they do learn a lot of escape skills at the level of how to escape. However, this kind of escape skill is special, which makes the individual unable to contact other social situations and thus unable to learn other social skills. It can said that individuals can only avoid other social situations and can only learn in a limited range, but not in more social situations. Compared with normal people, their learning range is very limited, so their plasticity is reduced.

As a result, even if patients with social dysfunction can avoid harm in the short term and find their own way to compensate, they must face many social situations such as interviews to get a desired job. And avoiding social contact can lead to more serious potential problems in personal development, such as failing to get the job because of fear. Therefore, from another longer-term perspective, the net result is still increased entropy. Because this increases the uncertainty of achieving long-term goals, such as achieving ideals that are hindered by personal social fears. This reveals the complex and contradictory relationship between goals, and the wrong achievement of short-term goals may lead to the failure of long-term goals. The short-term success of escape from social interaction will lead to the limitation of personal growth and eventually lead to the failure of personal achievement. Therefore, only by setting

the right short-term goals can the long-term goals be achieved.

4.4 The role of environment in the formation of social dysfunction

In addition to considering internal parameters within the cybernetic system that contribute to the stability of social dysfunction, the counteraction of the environment on the system, such as inductive and reinforcing effects, should also be considered. The cybernetic system often needs to adapt to the environment to further achieve the goal, but the environment also shapes the cybernetic system in the process. There is no problem when the cybernetic system adapts to the adverse environment, because the adaptation is successful. However, after the adverse environment is changed, this characteristic adaptation to cope with the adverse environment is still retained, and it is prone to become dysfunction. For example, caregiver criticism, scolding, and neglect in early life can all lead to the development of a fearful attachment style (craving intimacy but fear of rejection), which individuals maintain in adulthood even in the face of friendly environments. It can cause avoidant personality disorder.

Part of the reason why these Characteristic adaptations to a given environment occurs in the form of cross-environment can be explained by the counteraction of Characteristic adaptations on trait parameters. For example, people who learn various strategies to act in a more conscientious manner, such as using structured to-do lists and dedicated workspaces, may be better able to prioritize goals and resist distractions more effectively, thereby

improving conscientiousness. The same can be applied to social functions. People who are unable to adapt to a certain social environment are unable to have fun in social interaction, thus reducing extraversion, that is, sensitivity to social fun in all social situations. Because traits have cross-scene properties, they can still affect performance when facing other scenarios. This explains the phenomenon of canalization found by some studies in mental disorder, which makes the individual retain the specific trait adaptation formed from the environment after leaving the environment and have difficulty adjusting in the new environment as their brain function have changed during former environment. (Carhart-Harris et al., 2023).

The influence of the environment on personality depends on its extremes and time. Extreme and long-term environments often have a great influence, which makes the personality still maintain the characteristic adaptation of the original environment after being separated from the original environment and cannot adjust and change in time when encountering other environments. Family and cultural influences are often profound. Bonanno, Westphal, and Mancini (2011) pointed out that individuals who have experienced extreme environmental stress tend to maintain their original coping strategies after environmental changes, such as continuing to show high vigilance and defensively in a safer or supportive environment. This trait fixation may make it difficult for individuals to adjust and adapt in a timely manner when facing a new environment.

The reason why the long-term environment can have such a large impact on personality can be explained by the framework of CB5T. The long-term constant environment will

continuously strengthen the characteristic adaptations through each successful achievement of the goal. On the one hand, in the fixed environment, it is easier to make the corresponding characteristic adaptations become proficient, thereby improving the accessibility of the characteristic adaptations in memory. Further, this proficiency also makes individuals more willing to choose to use this trait adaptation. Because proficiency and previous successful experience make the psychological entropy of using the characteristic adaptations decrease, that is, the expected uncertainty of using the feature to adapt and achieve the desired goal decreases. Ultimately, this choice preference may form canalization, which in turn affects trait parameters and thus the performance of personality across contexts

It also explains the processes that are affected in the long-term context of social dysfunction. Studies have shown that parents' long-term overprotection will make children lack opportunities to develop social skills. On the other hand, if parents teach children that others' evaluation is important for a long time, children will pay attention to others' evaluation. There are also peer influences on children as they grow up, such as peer isolation, ridicule, bullying and rejection, which can make children lose motivation to communicate with others. In addition, culture is also an important factor. For example, collective culture requires individuals to pay attention to the feelings of others, which will make individuals have more altruistic goals (Rapee & Spence, 2004). For example, the parents of an individual emphasize the importance of how others perceive him. Individuals thus develop trait adaptations that try to avoid provoking criticism from others. Since the individual lives in a collectivist society, the individual uses this characteristic to adapt to obtain the appreciation and encouragement of

the people around him in this environment. Gradually, the individual is more and more used to this way and has a biased expectation that this practice will always get stable results. However, with the change of the environment, when the negative evaluation of others gradually increases and even hurts the individual, the individual keeps the mentality of paying attention to the evaluation of others, which will make the individual feel social anxiety or even fear of social interaction, and eventually form social dysfunction.

On the other hand, individuals will experience huge psychological entropy when facing extreme environments. Because unlike the predictability of everyday environments, extreme environments are often difficult to predict. On the one hand, current characteristic adaptations frequently fail due to the inability to adapt to extreme environments, resulting in strong emotions such as fear, sadness, surprise, etc. Then individuals begin to question the validity of the original characteristic adaptations, resulting in a decrease in the stability of the original characteristic adaptations. On the other hand, in order to cope with such a very different environment, individuals will take the initiative to improve their learning rate and continue to make exploration behavior to seek new characteristics to adapt the environment, which also makes the personality into a state of high plasticity. This allows the formation of new characteristic adaptations in extreme environments more quickly than in long-term environments, allowing the same degree of proficiency and preference for Characteristic adaptations to be formed in a short period of time.

This could explain the social dysfunction that develops in some individuals following extreme

events. For example, in adulthood, major events such as unemployment and loss of loved ones and their subsequent effects can lead to lower self-evaluation or loss of social motivation (Rapee & Spence, 2004). For example, sudden unemployment brings unstable economic circumstances and frustration to individuals. The loss of financial resources and undignified status make the individual no longer able to communicate with others in a confident way and no financial ability to participate in social activities. Extreme frustration and confusion make individuals begin to give up the original stable way of life and communication style, and in order to get rid of this incongruity, individual will start to explore a new way of life. However, the process of re-employment did not go well, individuals chose to play video games at home to escape reality and stopped accepting invitations from friends to avoid continuing to talk about unemployment. Eventually form a kind of social avoidance, and fear to communicate with the characteristics of adaptation.

However, on the other hand, the extreme environment also brings the perfect opportunity to change the original characteristic adaptation, because the personality will enter the emergency state of low stability and high plasticity. If individuals can successfully overcome the challenges posed by their environment, they may develop new and more effective trait adaptations. One of the examples is Exposure Therapy, which reduces anxiety responses and increases resilience by gradually exposing patients to social situations that trigger anxiety, helping them to face and get used to those situations. These environments may be common to the ordinary person, but for patients, they are extreme environments that they want to avoid. Studies have shown that the combination of exposure therapy and sertraline is

particularly beneficial for the treatment of social phobia (Haug et al. 2000). Meanwhile, a diversified environment will also provide rich learning opportunities, promote individuals to learn coping styles in different scenarios, reserve more skill to improve the means to cope with the future, and thus reduce psychological entropy in the face of new environments. However, when individuals are unable to successfully adapt or respond to the challenges posed by extreme environments, the situation can become very complex and dangerous. When individuals fail to explore or are unable to find effective coping strategies from the extreme environment, the psychological stress brought about by the extreme environment may lead to severe psychological trauma, such as post-traumatic stress disorder (PTSD). Therefore, these methods must be carried out under the supervision of professionals.

4.5 Dynamic process of social dysfunction formation (time dimension)

However, the environment is often difficult to change based on realistic factors, such as family environment, income, and culture. However, people are not completely passive to the influence of the environment. From the perspective of time, at any given moment, people will face the environment with a specific personality. With the change of time, the personality is constantly updated, and this renewal depends on the interaction between the personality and the environment at the previous moment. For example, the personality at time t+1 depends on the interaction between the personality at time t and the environment. If an individual's personality shows higher plasticity and lower stability at time point t, it is easier for him or her to learn more information from the psychological entropy of the environment and use this

information to update his original characteristic adaptation. Conversely, if the personality at time t has low plasticity and high stability, it is not easy to learn the psychological entropy of the environment, and then maintain their original characteristic adaptation.

This reflects that the interaction between personality and environment is a dynamic system (Olthof et al., 2023). At birth, people are born with innate temperament, genes and family environment interaction, thus constantly renewing personality. The personality at the latter time point is often influenced by the interaction between the personality at the previous time point and the environment. Therefore, the process of personality development is hard to follow. On the one hand, this dynamic system has Enhanced Contrast: as the system undergoes multiple changes and becomes more sensitive to specific factors such as psychological stress. This can be interpreted as positive feedback reinforcement of the cybernetic system. On the other hand, the dynamic system has Hysteresis, a phenomenon that the system is not easy to return to the original state after changes. Even if the environment is changed, such as removing the work environment that causes stress, the system may still stay in the state before the change such as depression and will not immediately return to the initial health state. This can be explained by the stability or rigidity of the personality against the influence of environmental changes. The two factors together contribute to the initial value sensitivity of this dynamic system. That is the stability and plasticity of personality at birth and trait parameters have a large weight in predicting the later personality development path. Different initial personalities develop dramatically different personalities after experiencing the same environment.

The starting point, t0, is an individual's genes and temperament at birth. Several studies have shown that temperament at birth influences how individuals respond to environmental influences in early childhood. For example, children with a behavioral inhibition temperament (a restrained attitude and an avoidance attitude toward novel and unfamiliar things and people) are more likely to develop social phobia. Because they are less willing to accept the interaction with the environment. There is also a genetic component, and some genetic phenotypes are more susceptible to social dysfunction (Rapee & Spence, 2004). This can be explained by trait parameters of the initial cybernetic system, such as lower openness and extraversion of personality at birth. On the contrary, an individual with a high initial personality of development and extroversion will have more possibilities and motivation to try to explore different social ways and social environments even if he grows up in a family environment that emphasizes social etiquette and others' evaluation. Thus, they resist the influence of the environment and form different personality development pathways under the same environment.

4.6 Social dysfunction and goal construction

Human goals often differ from those of other organisms because they involve subjective experiences. Rudrauf and Debbane base the subjective experience model on "imagination and social perspective as key mechanisms of anticipation and exploration". These two abilities just correspond to openness and agreeableness in cb5t (DeYoung& Krueger, 2018) Openness

enables an individual to imagine things that do not currently exist, whereas agreeableness enables an individual to understand the ideas and perspectives of others. It is this imaginative and social nature that frees people from the evolutionary goals of survival and reproduction, creating dazzling goals such as the pursuit of art, love, ideals, etc.

On the one hand, as psychodynamic theory says, these goals are different from evolutionary goals, and sometimes these goals are unconscious, and it is difficult for people to fully understand their true needs. Because this goal of detachment from evolution is not explicitly specified in the organism, it is difficult to realize it. Many dysfunctions arise from the conflict between the individual's conscious and unconscious goals, such as the inability of some AVPD patients to recognize their desire for love, but this desire conflicts with his conscious desire to escape the people. However, as mentioned earlier, short-term wrong goals often affect the achievement of long-term goals. Therefore, it is necessary to identify the subconscious goals to compare and weigh them with other goals.

On the other hand, these goals take a lifetime to construct, so that when multiple goals conflict, many people still don't build up their goal enough. Because these goals are constantly changing, there is no single answer, different values are involved (DeYoung & Krueger, 2018), and different social requirements are involved. As individuals, in addition to learning more skills through exploration to cope with possible challenges and risks in the future, they also need to explore and construct their own real needs and goals. Because of this, personality plasticity is very important. It involves the ability of individuals to go out of

their comfort zone and seek broader and diverse goals instead of maintaining the current single goal. Such as finding more hobbies and pursuits. On the other hand, it is also a means of reducing future psychological entropy. Unlike learning skills, enriching the diversity of one's goals increases the likelihood that one will achieve one of them, just as balancing risk by investing in different products rather than one. It is necessary for patients with social dysfunction to explore more personal interests in order to avoid set up social anxiety as the center of their life. By reducing the weight of social interaction in their life, they can reduce the expected impact of social interaction and therefore reduce the pressure facing social situation. For example, individuals who have their own interests as a source of life satisfaction may be less anxious about whether social outcomes are good or bad. At the same time, try to communicate with different types of people in the hope of finding a more suitable social partner, and use this as a way to practice social skills, so as to ease the transition to more difficult social situations. For example, meet people with common interests and personalities. Because long term goals are achieved by achieving small goals at each stage, it is also necessary to build more detailed goals through exploration.

Conclusion

Through the lens of CB5T, this paper has demonstrated that social dysfunctions such as SAD and AVPD are not merely a collection of symptoms but complex interactions between personality traits and characteristic adaptations. The mutual influence of trait and characteristic adaptation constitutes the interrelationship between personality performance in cross-context and specific context. These dysfunctions are shaped by both the individual's

traits and their environmental contexts, highlighting the dynamic nature of personality. The analysis reveals that while certain environment may predispose individuals to social dysfunctions, the personality of person at that moment also plays a crucial role in reinforcing or mitigating these traits. Furthermore, the concept of psychological entropy in CB5T underscores the importance of adaptability and learning in managing social dysfunctions. Enhancing personality plasticity through targeted interventions could therefore be key in helping individuals overcome these challenges. In addition, the exploration and construction of new personal goals and the construction of multiple alternative goals are also necessary processes for personality to maintain stability and plasticity. By moving beyond diagnostic literalism and reductionism, and adopting a more systemic approach, future research and clinical practice can better address the complexities of social dysfunctions and improve treatment outcomes.

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