The GH-Method

Quantitative Measurements of Stressors and Symptoms of People with Borderline Personality Disorder Before and During the COVID-19 Quarantine Period Using GH-Method: Math-Physical Medicine (No. 296)

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Abstract

This article focuses on the stressors and symptoms of people with borderline personality disorder (BPD) before and during this COVID-19 quarantine period. The example cited is based on the author's observations of patients with BPD behaviors from 2006 to 2010. He accumulated knowledge of abnormal psychology beginning in 2002, then he started five psychotherapy centers to care for approximately 200 abused women and abandoned children from 2006 to 2010. Due to ethics and patient confidentiality, their identities and their stories are combined into this hypothetical BPD patient. However, he provides a detailed explanation of the usage of his developed mental index (MI) model based on this semi-fabricated input data in this case study. The combined MI (Mental Index) model scores have the following indications: MI score = 0.25 is the best score, MI score = 1.0 is the mean score, MI score = 2.25 is the worst score. Figures 3 and 4 reveal the patient's MI scores before and during the COVID-19 period. Here are the summary findings: Before the COVID-19 period: Stressors MI score = 1.3563; Symptoms MI score = 1.0750. During the COVID-19 period: Stressors MI score = 1.6875; Symptoms MI score = 1.3750. Changes between Before & During: Stressors MI score = 24% (worsening from 2 changed items); Symptoms MI score = 28% (worsening from 3 changed items). Psychology is an empirical science and, at times, it is easier to describe in words about stressors (causes), symptoms, behaviors, reactions, or treatments; however, it is more difficult to describe them in numbers in a quantitative manner. The author self-studied and practiced abnormal psychology therapy for 9 years, from 2002 to 2010. During that period, based on his idea, he developed a formula based on a quantitation and precision approach to study and research abnormal psychology using physical phenomena observations, mathematical equation derivation, engineering modeling, and computer science, not just statistics alone. Due to the difficulty of collecting and utilizing patients' data without breaching ethics and patient confidentiality, he gave up his idea of using the math-physical medicine (MPM) research approach for psychological applications. In the summer of 2010, when his health conditions became life-threatening because of his severe diabetes complications, he then launched his MPM research approach on metabolism and endocrinology to save his own life. To date, he has written and published around 300 medical papers using this method. This particular paper is his first attempt to apply his developed MPM methodology on the abnormal psychology topic of BPD. He has adopted the same short abbreviation of MI but changed it from the Metabolism Index into the Mental Index, which is a personal milestone for the author. He hopes to continue his psychological research by using more of his developed GH-Method: math-physical medicine approach. He appreciates the invaluable inputs, comments, criticisms, and suggestions from his colleagues regarding the area of abnormal psychology.

Keywords: Borderline personality disorder; COVID-19; Quarantine; Diabetes

Abbreviations: BPD: borderline personality disorder; MPM: math-physical medicine; MI: mental index

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1. INTRODUCTION

This article focuses on the stressors and symptoms of people with borderline personality disorder (BPD) before and during this COVID-19 quarantine period. The example cited is based on the author's observations of patients with BPD behaviors from 2006 to 2010. He accumulated knowledge of abnormal psychology beginning in 2002, then he started five psychotherapy centers to care for approximately 200 abused women and abandoned children from 2006 to 2010. Due to ethics and patient confidentiality, their identities and their stories are combined into this hypothetical BPD patient. However, he provides a detailed explanation of the usage of his developed mental index (MI) model based on this semi-fabricated input data in this case study.

2. METHODS

2.1 COVID-19 epidemic

The author will discuss the COVID-19 epidemic first and then focus on specific characteristics that could have significant impacts on the behaviors of BPD patients.

The most significant observations regarding the COVID-19 virus are its spread rate, coverage area, fatality rate, and multiple impacts on certain internal organs. This type of negative news would disturb the general public by creating additional pressure on people with psychological problems or personality disorders.

This vicious virus is an infectious disease that is directly linked to population density, human contact, and social behaviors. Therefore, the author collected the population data of each nation or area and then use them as the denominator for calculating his confirmed case percentage, not just on confirmed case numbers. Next, the degree of the confirmed case percentage is dependent upon the availability of the testing kits and the willingness and approach of each nation how provides sufficient tests to its general population. The government's attitude, policy, and approach would influence the outcome of this epidemic control. As a result, the author only selected a few representative nations for this comparison study. Lastly, he calculated the death case percentage as the number of deaths divided by the confirmed cases. This death case percentage reveals the actual level of advancement regarding medical facilities and the knowledge and skills of healthcare professionals in terms of rescuing the lives of infected patients.

2.2 Borderline personality disorder

Now, the author will discuss BPD stressors such as original causes and stimulators along with the behavior symptoms which include outputs, diagnosis, and treatment.

Personality disorder (PD) is defined as an enduring pattern of thinking, feeling, and behavior that is relatively stable over time. There are 10 specific personality disorders, which include borderline personality disorder (BPD). BPD is a pervasive pattern of instability within interpersonal relationships, self-image and affects, and marked impulsiveness that could begin in early adulthood and presents itself in a variety of contexts. The definitions from above along with the following section come from Reference 1 and the author's 9 years of self-study and clinical research on this subject.

Here are the ten stressors for BPD, including the original causes and follow-on stimulators:

(1) Parents: including both parental separation or parental loss during young adult or adolescent years. This stressor relates to the "abandonment" experiences and parental abuse.

(2) Abuse: including physical, verbal, emotional, and sexual abuse during young adult or adolescent years. Emotional abuse can include neglect, abandonment, or verbal cruelty. At times verbal abuse is even worse than physical abuse because verbal abuse can destroy a person's self-identity, self-image, and self-confidence. "Love can hurt" means some parents abuse their children under the pretense of "love".

(3) Family situation: specifically, first-degree biological relatives who also suffer from psychological stress. The individual may have a 5x higher chance to develop some form of PD. Usually, it is easy to identify some

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other forms of PD among siblings. Children who grow up in a dysfunctional family together would suffer similar bad experiences which lead to a variety of PD. For example, we can find that a sister is borderline PD while her brother is antisocial PD. Family members who experienced abuse, neglect, and/or hostile conflicts are more likely to turn into a BPD or other type of PD patient.

(4) Gender: usually, females account for about 75% of BPD cases while males account for only 25%; BPD cases are ~2% of the general population; BPD cases are ~30% to 60% of all PD patients, which means that BPD is the largest group.

(5) Flashback: this stressor and behavior symptom result from bad experiences in early life and serves as a stimulator or stressor for BPD patients' later recurrence of behaviors. When a patient has flashbacks of a memory or scene, his or her following acts and behaviors will suddenly become "abnormal". It is like a "bad dream" that will not go away.

(6) Polarized view: BPD patients tend to see the world in a polarized way, in one extreme or another. Everything and everyone become either black or white and this view can be switched quickly. A BPD patient cannot view the things in this world as a shade of gray like most normal people. This root cause will relate to other behaviors affecting interpersonal relationships, such as anger, panic, depression, despair, and mood swings.

(7) Relationships: these mean unstable and intense interpersonal relationships. BPD patients will either see other people as an angel, caregivers, or best friends, and then can suddenly see the same people as evil, destroyers, or worst enemies. Having a relationship, their emotional expressions are usually very rich and intense, and vice versa, when BPD patients change their views, their hate will be equally strong and bitter. This type of behavior would cause deeper damage to themselves which results in unstable emotions.

(8) Difficulties in life: many BPD patients have trouble dealing with difficulties in their lives, including education, career, and social life. Many of them have had difficulties finishing their education, creating a stable work life, being long-term friends, or keeping a marriage.

(9) Abandonment experiences: this abandonment experience in young adults or adolescence will likely stay with the BPD patient as a lifelong stressor. Many BPD patients' behavior symptoms are centered around this "abandonment" issue. Their resulting action is more violent resulting from these flashbacks of the "fear of abandonment" in their early life.

(10) Special stimuli: Everyone will face or experience some special stimuli in their life, but BPD patients do not have sufficient abilities to cope with these surprises or difficulties. They will react differently when facing this type of stimuli, such as the COVID-19 period. Sometimes they have combined complex reactive behaviors, almost like a "chain reaction" resulting from these stimuli. For example, the quarantine period caused decreased social interaction, limiting school children's outdoor activities, creating BPD's self-image of poor parenting, increasing the patient's depression or even anger, and affecting other family members, where this whole process is a "chain effect" or a "nuclear reaction" process.

Next, the author will cover ten major behavioral symptoms of BPD patients. The information is from the knowledge he has obtained from reading many textbooks over the past 19 years, including Reference 1, and combined with his 5 years of clinical experience. Note that some of those described behavior symptoms may change with time and age. Patients in their 30s and 40s may have greater stability in their relationships and vocational functioning. After about 10 years, approximately 50% of BPD patients may no longer exhibit a pattern of behavior that meets the full criteria for BPD. For example, the hypothetical BPD patient only exhibited five severe behavior symptoms before the Covid-19 period but increased to seven severe behavior symptoms during the quarantine because of this virus stimuli (see both Figures 3 and 4).

(1) Fear of abandonment: as described previously, this is one of the major causes and behavioral symptoms of BPD. It also connects with many other behaviors, such as interpersonal relationships, poor self-image, emptiness, loneliness, and fear of separation or rejection. They will make frantic efforts to avoid real or imagined "abandonment".

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(2) Unstable or intense interpersonal relationships: BPD patients treat their interpersonal relationships with a much stronger, more intense, or sometimes with an intimated approach. They have strong positive emotions with their friends, lovers, or life partners, and with equally strong hate and negative emotions when separated. Sometimes, a separation may even trigger a suicidal attempt. This behavior also relates to other impulsive and "black and white" polarized views toward the world. Some BPD patients even behave similarly toward their sex life and become promiscuous. This relationship instability will cause more and deeper harm to themselves.

(3) Identify and self-image disturbance: sometimes, the perception of impending separation or rejection, or the loss of external structure, can lead to profound changes in self-image, affect, cognition, and behavior. Even an environmental change due to unique stimuli, such as Covid-19, can alter their self-image. Due to the abuse or emotional damage when younger, they might lose some of their judgment ability between objective external environment versus their internal self-image, value, and identity. This identity disturbance can cause them to shift goals and values associated with careers, education, change opinions and life plans, and even drop friends.

(4) Impulsiveness: a BPD patient may possess at least two types of self-damaging impulsive areas, including over-spending, shopping sprees, gambling, promiscuity, substance abuse, reckless driving, or binge eating. Not every BPD patient would have this impulsiveness. However, if someone has two or more of these behaviors, there is a high probability this person would be a severe BPD patient.

(5) Suicidal behavior or self-mutilating: usually, some BPD patients would have recurrent suicidal attempts or self-mutilating behaviors. The main message they are trying to send to others is seeking help. Their recurring suicidal attempts are indeed their inner cry for help. Through self-mutilation, they feel some degree of satisfaction or relief and strangely prove their life existence. Nevertheless, these two acts are horrifying and very dangerous. About 8% to 10% of suicidal attempts are successful in killing themselves. The risk of suicide and self-mutilation occur most in young adults but may stretch into their early 30s, and then gradually decrease as they get older; unfortunately, many other BPD behaviors may be lifelong.

(6) Mood swings: mood swings of ups and downs usually last a few hours and rarely more than a few days. For most BPD patients, their mood swings will continue throughout their lifetime. This kind of rapid emotional change hurt the person who cares about the patient the most. Their loved ones usually live a kind of life similar to "walking on eggshells". Sometimes, BPD patients' loved ones may take their frustration out on a third party in the family, for example, the children. This is how and why the "dysfunctional family" was created or formed. The mood swings can be combined with impulsiveness and polarized black-and-white views. They may switch quickly from idealizing others, feeling that the other person is the best lover, friend, or caretaker, to devaluing them, feeling that the other person does not care enough. In other words, they are prone to sudden and dramatic shifts in their views of others, from "caring" to "rejection". The typical mood swings are often combined with anger, panic, or despair which can eventually damage the patient's physical health.

(7) Emptiness and Loneliness: this chronic feeling of emptiness inside exists in many BPD patients. In some cases, this emptiness and loneliness could lead to dangerous suicide attempts. They are easily bored and constantly seeking something to do but this act should be distinguished from obsessive-compulsive personality disorder.

(8) Uncontrollable anger, panic, or despair: they frequently express inappropriate and intense anger, or have difficulty controlling their anger. Some patients may display extreme sarcasm, enduring bitterness, or verbal outburst. However, their expression of anger is often followed by shame and guilt. This kind of cycle is associated with unstable and intense relationships, polarized black-and-white views, poor self-image, and fear of abandonment or rejection. Combining this anger and mood swings, they often end up with poor performance in school, work, and/or marriage which can lead to dropping out of school, job loss, and/or divorce.

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(9) Paranoid Ideation or Severe Dissociative: during periods of extreme stress, transient paranoid ideation or dissociative symptoms (e.g. depersonalization) may occur to protect their inner self. This type of “abnormal self-protection mechanism” usually lasts several minutes, or several hours in extreme cases.

(10) Fear of separation or rejection: a small incident could trigger a BPD patient’s internal fear of separation, rejection, and followed by fear of abandonment. They would frantically try to salvage the situation they created in the first place. Meanwhile, all kinds of inner fears such as rejection, separation, or abandonment will also hit the patient. The combined feelings of anger, panic, and despair will be mixed. You can imagine how hard for a BPD patient to deal with this situation even though the patient may be the person who creates this situation in the first place. Sometimes, the separation or rejection is not even real, because they are in the patient’s imagination. However, the emotional confusion and hurt feel real to the patient.

2.3 Mental index (MI) model

The following third part of this section of Methods addresses the author’s way of quantitative measurements for BPD patients’ situations. After his 9-years of self-studying abnormal psychology (traumatized psychology), he launched his research of internal medicine due to his life-threatening diabetes complications. Along the way, he had to define and develop a mathematical model to describe the “metabolism”. He spent the entire year of 2014 searching and defining 10 categories of metabolism (containing 500 elements), including 4 “physiological symptoms”, obesity, diabetes, hypertension, and hyperlipidemia, with 6 “lifestyle stressors”, food quantity control and nutritional balance, water intake, persistent exercise, sufficient sleep, stress reduction, and daily life routines. These ten categories are interwound together and have a kind of “n by n” (actually 6 by 4) nonlinear mathematical relationships. This physiological metabolism model is quite similar to the psychological mental model for a BPD patient’s 10 stressors by 10 symptoms as described above. The relationships among these 10 categories of stressors and 10 categories of symptoms are not the simple “one by one” (i.e., one input causes one output) linear relationship like many other problems. Instead, it is a 10 by 10 nonlinear and dynamic relationship model.

The author applied the concept of the topology of mathematics and the modeling technique of the finite element method of structural and mechanical engineering to develop a mathematical model of the metabolism index (MI) in 2014. Today, he will attempt to use the psychological input of both ten stressors and the output of ten symptoms to obtain a snapshot of the overall “mental profile” of one hypothetical BPD patient via a newly defined term, the Mental Index (MI). The presented input data in Figures 3 and 4 are synthesized scores of a hypothetical patient without any real identity connection, even though all of its background stories are related to true cases.

3. RESULTS

The author selected four nations to study their COVID-19 situations by population density (people per square km): Japan (336), the UK (275), Germany (234), and the USA (34). As mentioned previously, this virus is an infectious disease that is related to population density, at least in theory. The second key factor is “human contact” which is related to mask-wearing, social distancing, and hand hygiene habits. However, the degree of these three basic protection rules are reinforced by all people at different degrees according to their perception of this epidemic, the definition of freedom, willingness to follow law and order, government attitude, and scale of policy enforcement. All of these factors are associated with this particular nation’s population's attitude toward “freedom and discipline” regarding virus protection. The author has traveled and lived in these four nations extensively and is quite familiar with the national citizen's behavior characteristics and social disciplines in these countries. Based on his own opinion and their exercise of “freedom and disciplines”, he ranks these nations from high to low in this order: Japan, Germany, UK, and USA. This ranking matches the virus confirmation case percentage, as defined by the number of confirmed cases divided by the total population (Figure 1). The confirmation case percentage is ranked by the USA (1.14%) at the top, followed by the UK (0.47%), Germany

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(0.24%), and Japan (0.02%) at the bottom. This means that the USA has the widest coverage of testing and America has the highest degree of perceived personal freedom but with the lowest degree of discipline concerning and protecting others. Japan is the best nation, with Germany following right behind it. Both countries are highly "disciplined nations". If we look at the actual numbers of confirmed cases, the USA number is disturbing due to massive testing, which is good, but with too much personal freedom without regard to other people's basic right of survival, which is bad. The author is a US citizen and has no intention to denounce his own fellow Americans, but he deserves the right to criticize his nation through freedom of speech.

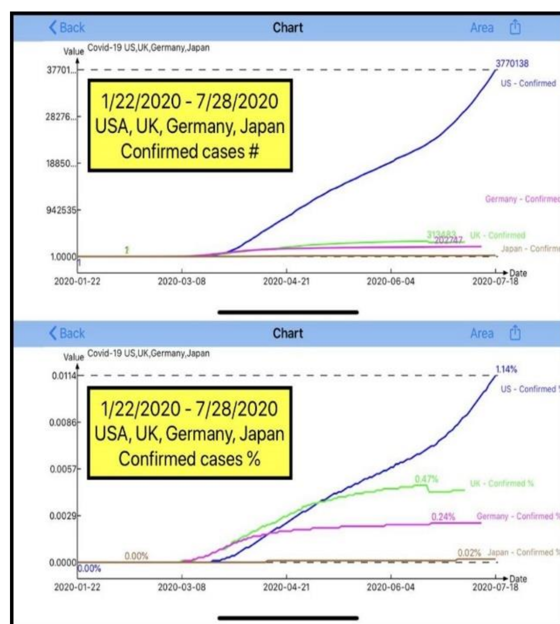

Figure 1: Confirmed case numbers and percentages (4 nations).

On the other hand, the death case percentage, as defined by the number of deaths divided by the confirmed number of cases, actually reflects the general excellence level of quality and capabilities of the medical facilities, and the knowledge and skills of the medical professionals. The death case percentage ranking shows that the USA is at the top (3.77%), followed by Japan (4.06%), Germany (4.56%), and the UK (15.43%) in Figure 2. In this category, the USA has the best performance score. It is not a surprise to the author since he has attended 65 medical conferences, including World Health Organization, in the past 2.5 years, where he presented 120+ oral medical presentations and met with ~1,000 medical research scientists; therefore, he is aware of the overall medical excellence of the USA. However, he could not figure out why the UK has the highest death case percentage. He feels bad for his fellow British friends due to the high death case percentage findings using his simple arithmetical calculations.

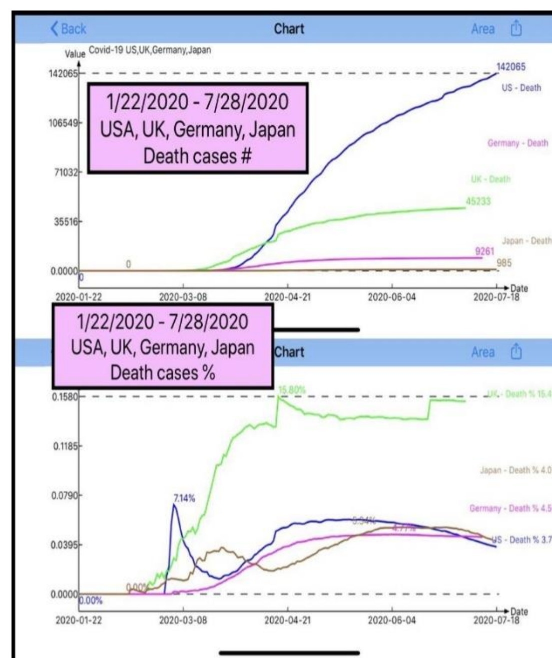

Figure 2: Death case numbers and percentages (4 nations).

COVID-19 is a horrific and deadly infectious disease. The associated quarantine life not only hurt the global economy but also created a tremendous amount of stress on individual life, in particular for those people with psychological problems or personality disorders. In this article, the author will address his concerns about a special group of people, BPD patients. Their life in a normal situation is already hard for them to cope with, let alone during this tough period. This article will establish one hypothetical BPD patient who is synthesized from other BPD individuals combined with the author's other patients from his previous work.

The author applied his developed MI (Metabolism Index) model for calculating this hypothetical BPD patient's stressors and behavioral symptoms both "before" and "during" this COVID-19 quarantine period. The results are shown in both Figure 3 and Figure 4. It should be re-mentioned here that the final score of combining 10 categories is the result of these 10 by 10 nonlinear and dynamic mathematical models, for stressors and symptoms, respectively. Within each category, he provides an input scale by

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"levels" with the following matching numerical values.

Level 1 = 0.5
Level 2 = 0.75
Level 3 = 1.0
Level 4 = 1.25
Level 5 = 1.5

Where level 1 (0.5 value) is the best performance level, while level 5 (1.5 value) is the worst performance level. The combined MI (Mental Index) model scores have the following indications:

MI score = 0.25 is the best score
MI score = 1.0 is the mean score
MI score = 2.25 is the worst score

Figure 3 depicts this hypothetical patient's snapshots (i.e. a static view of a dynamic situation) before Covid-19, while Figure 4 shows this hypothetical patient's snapshots during this period. Here are the summary findings:

Before COVID-19 period:

Stressors MI score = 1.3563
Symptoms MI score = 1.0750

During COVID-19 period:

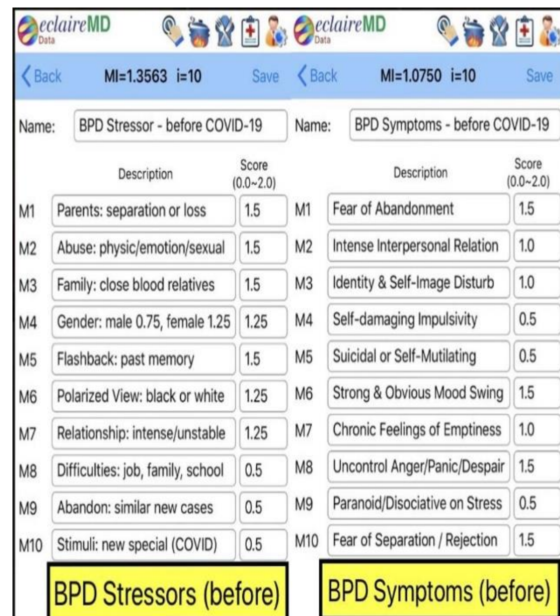
Stressors MI score = 1.6875
Symptoms MI score = 1.3750

Changes between Before & During:

Stressors MI score = 24% (getting worse from 2 changed items)
Symptoms MI score = 28% (getting worse from 3 changed items)

A more detailed examination of these results reveals some discoveries from both stressors and symptoms. First, this patient's stressors are getting worse due to these 2 items: difficulties associated with quarantine; and unique stimuli from the virus (fatality, social constraints, and family members' frustrations). Second, this patient's symptoms are worsening due to these 3 items: intense interpersonal relationships from quarantine; self-image doubts due to internal frictions; and feelings of emptiness and loneliness due to lack of social contact and daily routine disturbance.

Other than the 2 items mentioned above in stressors and 3 items in symptoms, additional unmentioned items are pretty much the same for both "before" and "during" the virus periods.



MI=1.3563 i=10 — Name: BPD Stressor - before COVID-19

	Description	Score (0.0~2.0)
M1	Parents: separation or loss	1.5
M2	Abuse: physic/emotion/sexual	1.5
M3	Family: close blood relatives	1.5
M4	Gender: male 0.75, female 1.25	1.25
M5	Flashback: past memory	1.5
M6	Polarized View: black or white	1.25
M7	Relationship: intense/unstable	1.25
M8	Difficulties: job, family, school	0.5
M9	Abandon: similar new cases	0.5
M10	Stimuli: new special (COVID)	0.5

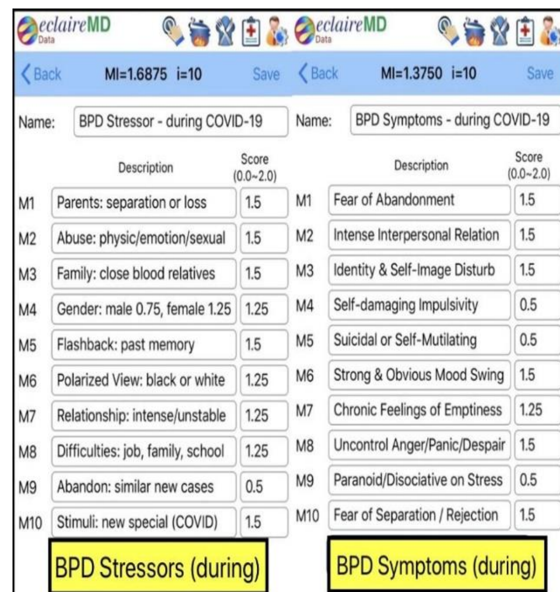
BPD Stressors (before)

MI=1.0750 i=10 — Name: BPD Symptoms - before COVID-19

	Description	Score (0.0~2.0)
M1	Fear of Abandonment	1.5
M2	Intense Interpersonal Relation	1.0
M3	Identity & Self-Image Disturb	1.0
M4	Self-damaging Impulsivity	0.5
M5	Suicidal or Self-Mutilating	0.5
M6	Strong & Obvious Mood Swing	1.5
M7	Chronic Feelings of Emptiness	1.0
M8	Uncontrol Anger/Panic/Despair	1.5
M9	Paranoid/Disociative on Stress	0.5
M10	Fear of Separation / Rejection	1.5

BPD Symptoms (before)

Figure 3: BPD stressors and behavior symptoms before the COVID-19 period.



MI=1.6875 i=10 — Name: BPD Stressor - during COVID-19

	Description	Score (0.0~2.0)
M1	Parents: separation or loss	1.5
M2	Abuse: physic/emotion/sexual	1.5
M3	Family: close blood relatives	1.5
M4	Gender: male 0.75, female 1.25	1.25
M5	Flashback: past memory	1.5
M6	Polarized View: black or white	1.25
M7	Relationship: intense/unstable	1.25
M8	Difficulties: job, family, school	1.25
M9	Abandon: similar new cases	0.5
M10	Stimuli: new special (COVID)	1.5

BPD Stressors (during)

MI=1.3750 i=10 — Name: BPD Symptoms - during COVID-19

	Description	Score (0.0~2.0)
M1	Fear of Abandonment	1.5
M2	Intense Interpersonal Relation	1.5
M3	Identity & Self-Image Disturb	1.5
M4	Self-damaging Impulsivity	0.5
M5	Suicidal or Self-Mutilating	0.5
M6	Strong & Obvious Mood Swing	1.5
M7	Chronic Feelings of Emptiness	1.25
M8	Uncontrol Anger/Panic/Despair	1.5
M9	Paranoid/Disociative on Stress	0.5
M10	Fear of Separation / Rejection	1.5

BPD Symptoms (during)

Figure 4: BPD stressors and behavior symptoms during the COVID-19 period.

4. SUMMARY

Psychology is an empirical science and, at times, it is easier to describe in words about stressors (causes), symptoms, behaviors, reactions, or treatments; however, it is more difficult to describe them in numbers in a quantitative manner. The author self-studied and practiced abnormal psychology therapy

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for 9 years, from 2002 to 2010. During that period, based on his idea, he developed a formula based on a quantitation and precision approach to study and research abnormal psychology using physical phenomena observations, mathematical equation derivation, engineering modeling, and computer science, not just statistics alone. Due to the difficulty of collecting and utilizing patients' data without breaching ethics and patient confidentiality, he gave up his idea of using the math-physical medicine (MPM) research approach for psychological applications. In the summer of 2010, when his health conditions became life-threatening because of his severe diabetes complications, he then launched his MPM research approach on metabolism and endocrinology to save his own life. To date, he has written and published around 300 medical papers using this method. This particular paper is his first attempt to apply his developed MPM methodology on the abnormal psychology topic of BPD. He has adopted the same short abbreviation of MI but changed it from the Metabolism Index into the Mental Index, which is a personal milestone for the author.

He hopes to continue his psychological research by using more of his developed GH-Method: math-physical medicine approach. He appreciates the invaluable inputs, comments, criticisms, and suggestions from his colleagues regarding the area of abnormal psychology.

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