

***CogEpiCrim* – The M-Theory of Suicidology**

Ajay Agarwal

verslinfiniaudela@gmail.com Department of  
Computer Science & Engineering  
DIT University Mussoorie,  
Diversion Road,  
Makka Wala, Dehradun 248009  
Uttarakhand

**Abstract**

For the past century, suicide has been associated with negative connotations to the liberalistic connotations, however, the fabric of logic and reason behind suicidal ideation continues to exist with countless wrinkles and folds. In my manuscript, a new approach to address the age-old question is provided – *CogEpiCrim*, which extends the boundaries of our understanding by using the suicidal ideation, not the action, as an infectious disease that can spread across closed communities. The paper describes how *CogEpiCrim* is used to classify the “existing wrinkles in our understanding as flaws in our approaches, not the fabric”.

**Keywords**

suicide theory, disease, suicidal ideation, *CogEpiCrim*, cognitive science, epidemiology, criminology

**Introduction**

CogEpiCrim stands for Cognitive Science, Epidemiology, and Criminology. Derived from the first few letter initials from the fields that my model is based on, CogEpiCrim acts as a M- theory (M-theory, Master-Theory or Universal Theory) for Suicidology. The CogEpiCrim approach helps us to understand any unexplained human behavior which is observed to be deviant from normalcy, and whose continued existence can hamper the proper functioning of

a social community (Sausdal et al., 2019; Mark, 2013; Katz, 1988). To completely understand the impact of a CogEpiCrim approach towards formalizing unexplained human behaviors, I will take the case of increased suicides in South Korea and Japan (Iga et al., 1978; Takahashi, 2002; Heisel & Fusé, 1999).

### **Introduction to Basics of CogEpiCrim for Suicide cases in South Korea and Japan**

First, I will take into consideration the basic criminology of the cases of suicide in South Korea and Japan. In contrast to Polizzi's views of considering crime to be a symptom and ideation of crime to be a disease (Polizzi, 2011; Polizzi & Lanier, 2012); I shall consider ideation of crime to be a symptom and the act of crime to be a disease. This shall provide us the basic parameters for defining the variables for a disease epidemiological model.

We take into consideration a SIR-model, Susceptibility-Infected-Recovered model (Mandal et al., 2011; Heathcote, 1989). Considering the "act of suicide" to be an epidemic spreading increasingly fast in the country like South Korea and Japan, I shall define the parameters of S - Susceptibility, I - Infected and R - Recovered accordingly. The true task comes into play when one is invited to define the exact features that describe these parameters.

1. What is the "susceptibility" of a person committing "an act of suicide"?
2. What is the meaning of "infection" in the context of "suicide" as an epidemic?
3. What is "recovery" in the context of "suicide" as an epidemic?

To completely understand how "suicide" correlates with an "infectious disease" of an epidemic nature. I shall draw correlations between different stages of the disease and different stages of crime in action. This shall help us answer each of these questions and define possible points that introduce us to the cognitive science perspective of the CogEpiCrim approach.

## **Foundations of CogEpiCrim for Suicidal Ideation**

Before I begin claiming epidemiological models for suicide events in South Korea and Japan, we first begin in understanding how suicide itself is a disease? The CogEpiCrim approach involves dissecting any act of unexplained human behavior or any crime into the stages ranging from – “Ideation to Action”. Some might argue the concepts of free will in defining such events and might also be inclined to consider to take a philosophical view on the matters, however, CogEpiCrim takes strictly a Cognitive and a Psychological standpoint to define these incidents. Keeping in mind the length of this paper, instead, of defining a new psychological theory for the same, I use an already existing theory that defines suicide into the “Ideation-to-Action” framework – 3ST (3 Step Theory) Theory by Klonsky and May (2018). I use the 3ST theory to display to the readers how such existing psychological models be used to qualify incidents of such nature to have all features of being qualified as an actual disease. First, I shall describe the 3ST Theory and the Stages of Disease, and then shall discuss the correlation between the two.

### **3ST Theory and Stages of Disease**

Theory, in brief, suggests that suicidal ideation results from the combination of two broad factors - pain (usually psychological pain) and hopelessness. Among the people who experience the above two, “connectedness” acts as a key protective factor from the escalating ideation. Finally, the journey from ideation to action is facilitated by dispositional, practical, and acquired factors which ultimately determine the capacity to commit suicide.

According to the *Centers for Disease Control and Prevention*, the progression of a disease process in an individual over time has mainly four stages.

1. Stage of Susceptibility
2. Stage of Subclinical Disease
3. Stage of Clinical Disease
4. Stage of Recovery, Disability, and Health

The exposure occurs to a susceptible person after the end of the first stage. Pathological changes in the body are observed in the second stage. The onset of symptoms begins at the start of the third stage. Usually, the diagnosis of the disease is done in the early-third stage. Later, either the treatment can work leading to a recovery in the fourth stage otherwise, unfortunately, disability (or death) in the final stage.

### **Classifying Suicidal Ideation as Disease**

Any unexplained human behaviour of irrational nature or a crime can be considered as a disease. On a broader perspective, one can identify that such behaviours are deviance from the normal expected behaviour of a person in societal structure. A case of suicide by the student, despite being explained via a suicide note left by him, or being unexplained, brings in doubt questions to the community of students in that place. It is deviance against the normal functioning of the student body. Then, the question arises is whether this deviance is claimed as a disease?

There exist many theories that tend to define the actual definition for “disease”, like the BST Theory (Biostatistical Theory) given by Boorse (1975, 1977, 1997, 2002, 2009, 2011a, 2011b, 2012, 2014, 2016) and the Action-Theoretic Holistic Theory given by Nordenfelt (1995). Instead of diving in philosophy, I can cleverly generalize from these theories is that a disease is –

*“An abnormal, pathological, and harmful societal state that hinders the functions of an individual (or his/her components) in his/her daily life.”*

Hence, suicide, *ita ratio*, is a disease. It hinders the proper functioning of an individual and his/her attempts in achieving his goal in life (Sausdal et al., 2019; Mark, 2013; Katz, 1988).

### **Disease Characteristics of Suicidal Ideation**

With suicide being defined as a disease, it is now crucial to note how does 3ST Theory of Suicide provides correlations to stages of the disease. First, I consider that Suicide is caused by infectious agents of *Pain* and *Hopelessness*. For the first stage of susceptibility, I define individual susceptible to suicide depending on the case in consideration. The 3ST Theory defines “pain” and “hopelessness” to be contributing factors to suicidal ideation, however, its clearly doesn’t define the nature of pain or the source of pain.\*. Hence, the susceptibility to being exposed to “pain” and “hopelessness” is dependent of the individual’s day-to-day experience. There are many ways in which I can define the stage of susceptibility or susceptible groups. Some of the most accurate approaches would define the people susceptible to suicide as -

1. Distraught or Painful day-to-day experiences
2. Part of statistical-likelihood subgroups of being infected of “suicide” like students and young professionals
3. Increased levels of Heidegger’s “*thrownness*” in daily life (Dahlstrom, 2013, pp. 212-5).

The main idea to capture is –

- *What are the reasons for pain in an individual’s life?*
- *What are the reasons for hopelessness in an individual’s life?*

To answer these questions, one can take a statistical viewpoint to find people most likely in pain, or people who are more exposed to events (of political, natural, or sociological nature) that can induce signs of any type of pain, and hopelessness. A simple example can be of a

farmer living in a drought-prone land, and being statistically likely to fall in a debt trap. Such a farmer, in the absence of adequate economic measures to insure his family's economic and personal safety during times of crisis, is more likely to suffer from feelings of hopelessness and pain. These feelings would be an unfortunate result, of his lack of control over the situations troubling him (falling in line with the Heidegger's *thrownness* concept), and hence is likely to commit suicide. This is similar to case of farmers in India (Basu et al., 2016; Mohanty, 2013; Mohanty, 2005). With constant exposure to "pain" and "hopelessness" in day-to-day life, the stage of susceptibility ends with the accumulation of factors sufficient to begin the disease process.

#### *Incubation Stage of Suicide*

The second stage is marked with the onset of pathological changes in the body of the person, without the person being aware of it. Also known as the *incubation phase*, many factors affect the period of incubation, like rate of replication, host susceptibility and immune response. This phase basically, involves the period until when the infectious agents has replicated in enough quantity in the host body to induce symptoms of the disease.

For my study, I will involve three factors that can help dissect the same characteristics for suicide.

1. Host Susceptibility
2. Rate of Replication of Infectious Agent
3. Immune Response

We have already discussed the features that can help us identify the host susceptibility in the previous sections. The rate of replication of "pain" and "hopelessness" correlates with the increased frequency of events that can induce feelings of pain and hopelessness within a short time. Immune Response for the incubation period of suicide is the concept of "connectedness"

as per the 3ST Theory and how, just like the immune system, it lowers down the intensity of suicidal ideation, and thereby prevents a person from being fully infected with the disease of “suicide”. Connectedness, in the context of 3ST Theory, is defined as an individual’s attachment to a job, project role, interest, or any sense of perceived purpose or meaning that keeps one invested in living. It acts as an immune response to “pain” and “hopelessness” because the symptom of “suicidal ideation” will remain moderated and in control as long as the individual’s connectedness is greater than his pain and hopelessness.

### *Stage of Clinical Disease*

As the second stage comes to an end, the symptoms of the disease start to appear. This is the time, most likely, the symptoms are diagnosed, severity in the deviance of vital body stats are taken, and the person is diagnosed with suffering from the said disease. In the case of suicide as a disease, the incubation period ends with the onset of displaying symptoms. These symptoms are the constant recurring thoughts of self-harm and suicide. Just like in diagnosis, the body’s vital stats are measured to estimate the likelihood of an infectious agent fully infecting the body, in the same way, the individual’s vital stats are taken to understand whether the likelihood of suicidal ideation to convert into an attempt of suicide is dominant or not.

In consideration of the 3ST Theory, an individual’s vital stats that determine whether is person is most likely to be diagnosed of suicide as a disease are –

- *Dispositional Factors*
- *Acquired Factors*
- *Practical Factors*

*Dispositional Factors* involves mainly the relevant variables that are genetic-based. These include pain sensitivity, blood phobia etc. Someone with above-than-average sensitivity is most likely to be a suitable host for “pain” and “hopelessness” to replicate and develop into symptoms of the disease- suicide.

*Acquired Factors* refers to the phenomenological experience of the person with the events of pain, injury, fear and death over time, and whether or not he/she has had more-than-average encounter with such incidents in his/her life. Increased levels of acquired factors in a person's life is more likely to lessen his “connectedness” response to “pain” and “hopelessness”.

*Practical Factors* refers to presence or absence of relevant knowledge about means of suicide in a general manner. There can exist several practical factors like – knowledge about firearms, knowledge of poisons, or knowledge about knives etc. A person with an above-than-average knowledge about firearms is more likely to commit to actions of suicide when faced with ideation of it due to infection of “pain” and “hopelessness”. The study of these vital stats shows the individuals' body state as being deviant from the normal body state of the individuals in the same social group. Understanding the cognitive aspects of recurrent thought of suicide can also help us in defining exact definitions and list points for “symptoms of being infected by suicide”.

#### *Stage of Recovery, Disability or Death*

The final stage post treatment is either of recovery, disability or death. In case of treating suicide as a disease, post treatment, one can either be recovered i.e. one can survive a suicide attempt, and can successfully increase his/her connectedness more than his/her pain and hopelessness. In the case of disability, it relates to the attempt of suicide that led a disability

with a scope of recovery. Finally, death in both the cases (disease and “suicide” as disease) means the same thing – a successful attempt of suicide.

By following all the stages of a disease, “suicide”, hence, qualifies as a disease.

The comparisons that are drawn between “suicide” and the stages of a general disease, help us identify parameters like S (Susceptible), I (Infected), R(Recovered), E (Exposed). Here, I used the 3ST Theory of Suicide to understand how suicidal ideation correlates exactly with a disease. There exist many other theories that define the concept of suicidal ideation, a key research question shall be identifying other major acceptable theories that can be used to identify suicidal ideation as a disease.

### **Classifying Suicidal Ideation an Infectious Disease**

In closed communities, suicidal ideation is an infectious disease. Isolated cases of suicide also raise suspicion until the real cause behind the action and ideation of the same can't be identified. When I investigated communities of certain people, I can identify pattern in the possible triggers that escalate the ideation of committing a suicide. These triggers itself can be of varied nature. Investigating these triggers from a cognitive science aspect allows us to observe possible reasons that could have escalated to the idea formation of committing suicide. As per my analogies, suicidal ideation acts as an infectious disease in closed communities. This can be understood by taking an example. Let us assume, a student committed suicide. As per Klonsky's 3ST Theory, there must exist “pain” and “hopelessness” in his life that might have pushed him off the edge. These emotions would've been well distinct and superior to the existing “connectedness” that the student might have.

As per the theory of CogEpiCrim, suicidal ideation is a result of pathogens namely – “pain” and “hopelessness”. These pathogens travel via communication channels, which are equivalent

to various events and phenomenon that occur in our everyday life. In the case of student, one can say that the events that rendered him “pain” and “hopelessness” are likely to exist for other students as well. These events, in varying nature, are similar occurring simultaneously for some or the other student. Hence, it is likely that any other student belonging to the same schools as the student who committed suicide, must be experiencing some or the other level of “pain” and “hopelessness”. The act of suicide done by his classmate/schoolmate is likely to instigate him to ideate such thoughts for himself. In simpler words, *Werther Effect* plays the role to fulfil in defining suicidal ideation to be of infectious (Kim et al., 2013).

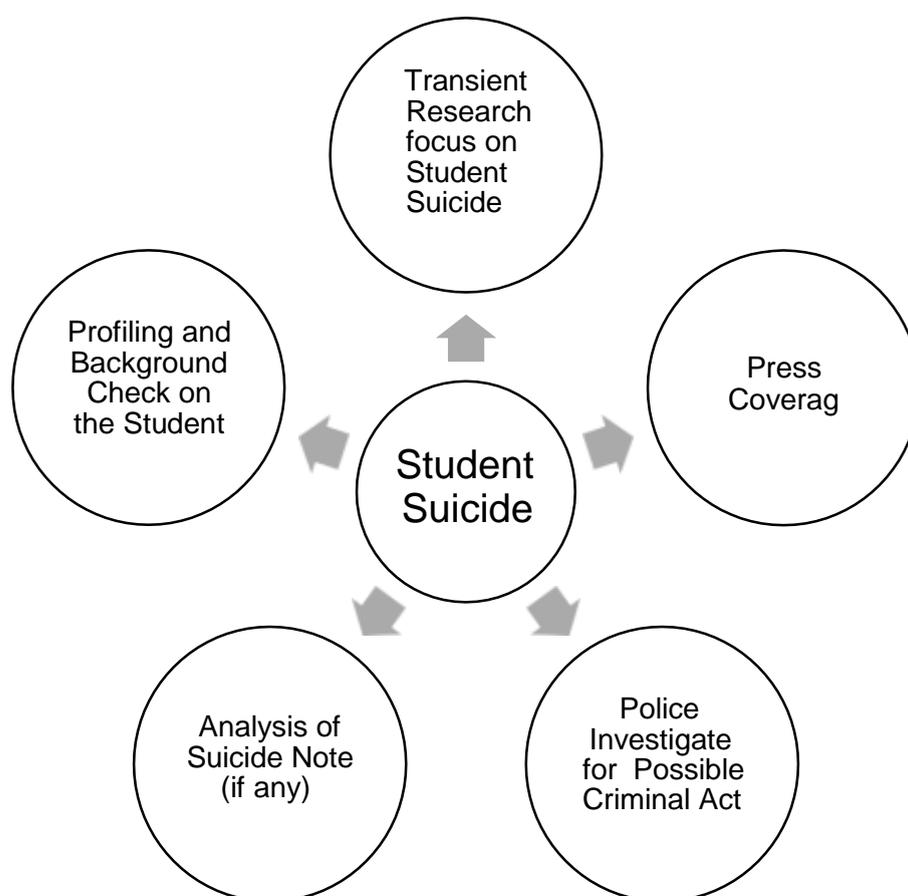
Some might likely argue that *Werther Effect* would only occur if the news of suicide is broadcasted in the manner it should not be, i.e. defining the act in details, defining the method used, glorying the act for personal gain of increased viewership etc. However, it is to be noted that currently, no media broadcasting channel is sensitive enough to follow the guidelines mentioned out by various agencies to cover news regarding suicide. Hence, the hypothesis for the application of *Werther Effect* is acceptable in practical domain. As stated earlier, the parameters of CogEpiCrim were defined taking in context the existing situations and trends prevalent in the society.

### **Susceptibility: Ideation of Crime as Symptomatic of Disease**

Susceptibility is defined as the number of people who are most likely to get infected as a result of transfer of virus through an infected person in a closed population. In the case of crime being treated as disease, define “susceptibility” to be the chances or likelihood of ideating the process of committing a crime. This means the likelihood of a person to “think about committing a crime”. Possible drawbacks to current method would involve the lack of practical methodology to keep in track what a person is thinking. However, this drawback can be re-routed by studying the sociological features of individuals that have committed a certain crime. This is where

criminology comes in picture. Criminology, allows in profiling the person who has committed the crime and identify the various features regarding the same.

Let us take the case of Japan. Student suicide has been a huge issue in Japan. The cases of student suicides have been so worse that a term was appointed to them – *shidoshi*. Though, since 2019, the cases have hit an all-time low, it is to be noted how these cases follow up post-pandemic. In either case, let us assume a case where a Japanese student commits suicide. Figure 1 depicts what usually follows.



**Figure 1. The above figure depicts the processes that follow as a result of “student suicide” in almost any country of the world.**

While the policing and criminal justice systems often get engaged in finding traces of any criminal activity, the academic researches and psychologist end up analysing the statistics of student suicide in the Japan. A large focus is diverted towards identifying why the student X committed suicide. Unfortunately, no one asks *whether his action is representative of others in his community who are likely at some other stage of “ideation-to-action” towards an act of self-harm? When did his “pain and hopelessness” (agents of suicide) overpower his connectedness (immune system) towards the world? What the sources of origin of “pain and hopelessness” for people belonging to his community?”*

The first and foremost problem that one needs to deal is to identify group, if such an unfortunate event occurs. What group a student is a part of? If a student can commit suicide, it means students belonging to his age range studying at his institute are more likely at higher risk of being infected by thoughts of suicide. It is also important to note that a student is more than just a student. A student might likely be engaged in other psychological groups, groups of specific internet usage pattern and choices (commonly seen in victims of suicide due to *cyberbullying*), groups of specific eating preferences and physical features (commonly seen in victims of suicide due to *peer discrimination*) etc.

### **Infected Stage of Suicidal Ideation**

In the context of the SIR model, the second compartment of the infected can be defined as –

*“... class of individuals, in which the level of the parasite is sufficiently large within the host and there is potential of transmitting the infection to other susceptible individuals.”*

In context of the example taken of student suicide, the question that are required to be studied are – what is the incubation period of suicidal ideation and what is the prodromal period of suicidal ideation. These questions also call for a greater in-depth analysis of identification of the psychological factors that come in play when the individual under study has finally decided to commit suicide, or when “suicidal ideation” has been accomplished either consciously or subconsciously. Incubation period in such a case would be defined as the period from the first possible encounter of the student with the suicidal thought, to the period when the student subconsciously (or consciously) starts initially displaying signs of “negative thoughts inclined towards self-harm”. The period following the incubation period would be the prodromal period where the signs of potential disconnect of the student are apparent enough to be spotted on careful investigation. While a lot of academic research has been done in defining the notable reasons of suicide and even, suicidal thoughts, a trivial question has still not been addressed. The reasons mentioned as causes don’t have a metric to be measured against. As a result, accurately defining the symptoms of suicidal ideation as an infection is yet to be done. Hence, while the concepts of incubation and prodromal period can be defined in an abstract, the estimation of the period is yet to be done. Often, the stages accompanied post suicide of a student don’t indulge in testing of all the susceptible individuals of the group the student belonged to. As a result, it only remains a matter of time until another cases emerges as a headline.

### **Recovered Stage of Suicidal Ideation**

The last compartment of the SIR model is the Recovery stage, which in the context of epidemiology can be defined as –

*“All individuals who have been infected and have recovered by developing immunity against the infection”*

A common misconception that is likely to arise at this stage in context of suicidal ideation, or crime in general is the recovered individuals would be the suicide survivors (or in context of crime people who have been convicted and evicted at least once). Unlike common belief, the recovered individuals are the ones which have been recovered from the pathogen of *suicidal ideation, not suicide*. When one considers suicidal survivors as recovered individuals, one fails to take in consideration that the act of suicide didn't attempt to kill the person, it was the idea behind that attempt. As a result, in contrast of Polizzi's approach of treating crime as a disease (Polizzi, 2011; Polizzi & Lanier, 2012); the treatment of crime ideation as a disease helps us truly grasp the ideology behind defining individuals free from committing the crime.

Not all suicidal survivors are recovered post attempts of suicide. Only those survivors which were able to identify the pathogenesis of their suicidal ideation pathogen, understand the possible measures of treating the pathogen if faced by circumstances where the pathogen can attack again, and train their immune system (in simple case, the emotional intelligence) to be strong enough to defend the person from any further attacks of suicidal thoughts, only then an individual can be claimed to be recovered truly from the disease of suicidal ideation.

### **Societal Applications of CogEpiCrim**

Today, the world is affected by many cases of human behavior that lack the support of any possible logic, be in psychological in nature or criminological in nature. Certain notable examples include the rise of student gun violence across USA (Scott, 2020); fanatic spread of misinformation and rampant extremism on the lines of self-made beliefs and groups with highly illogical group membership criteria. An increased focus of researchers studying these

behaviours is on identifying the root causes and establishing the cause-and –effect scenario for these behaviours. CogEpiCrim, on the other hands, begs to differ from the existing approach.

CogEpiCrim, lies at the culmination of three most impact and powerful, research fields – Cognitive Science, Epidemiology and Criminology. CogEpiCrim approach of dealing the problem involves in viewing the behaviour as an anomaly from the social defined human behaviour. Students are supposed to study. In context of changing times, students are also likely to protest for social causes. However, in no manner possible, student is remotely expected to wield guns. Wielding guns and claiming lives are characteristic of individuals of other social groups – *terrorist*. This conflict of personalities acts as deviance from expected and cordial social behavior, which in its core definition is the existence of a disease.

Whenever, any unknown disease infects a larger section of population, the first response of the authorities is to “*control its spread*”. This involves preventing all forms of interaction between individuals already infected by the unknown disease from the healthier section of the population. So, CogEpiCrim in case of student gun violence, would call for identification of the healthier individuals – *full-scale psychological testing to identify individuals who are under any form of psychological stress or distress, which may lead to greater manifestations of extreme nature, identifying teachers for any signs of psychological distress (any major or minor mental health disease, or any current event) which might be reflected in their teaching actions intentionally/unintentionally etc. which is most likely to have effected any student in their class to misunderstand the statement or action negatively*. There exist many other policies that CogEpiCrim can suggest for student gun violence, misinformation etc. given they are studied separately and extensively as described in the manuscript. These polices itself offer objective approaches of treating deviant human behaviour as a disease than as a choice, which is reflected in the existing policies of treating the same.

### **Future Work and Conclusion**

While CogEpiCrim is a budding field that requires way more work, it is important to realize its importance. The notions of CogEpiCrim can be extended in various domains of unexplained human behaviour – understanding student gun violence (Silver et al., 2018); understanding the prevalence of sexual assault in South-Asian countries etc. (Niaz, 2003). It is to realize that the first step towards developing our understanding as researchers of fields in unexplained human psyche starts with organizing the literature and treating it as a disorder, not as an action.

### **Declaration, Data Usage and Funding**

The author declares no potential conflict of interest. No data was used, as the paper is a theoretical discourse. No funding was obtained from any institute for the conducted work.

### **References**

- Basu, D., Das, D., & Misra, K. (2016). Farmer suicides in India. *Economic & Political Weekly*, 51(21), 61.
- Boorse, C. (1975). On the distinction between disease and illness. *Philosophy & public affairs*, 49-68.
- Boorse, C. (1977). Health as a theoretical concept. *Philosophy of science*, 44(4), 542-573.
- Boorse, C. (1997). A rebuttal on health. In *What is disease?* (pp. 1-134). Humana Press, Totowa, NJ.

Boorse, C. (2002). A rebuttal on functions. *Functions: New essays in the philosophy of psychology and biology*, 63-112.

Boorse, C. (2009). Disability and medical theory. In *Philosophical reflections on disability* (pp. 55-88). Springer, Dordrecht.

Boorse, C. (2011). Concepts of health and disease. In *Philosophy of medicine* (pp. 13-64). North-Holland.

Boorse, C. (2012, September). Clinical normality. In Conference paper, Christopher Boorse and the Philosophy of Medicine symposium, University of Hamburg, September (Vol. 12).

Boorse, C. (2014). A second rebuttal on health. *Journal of Medicine and Philosophy*, 39(6), 683-724.

Boorse, C. (2016). Goals of medicine. In *Naturalism in the Philosophy of Health* (pp. 145-177). Springer, Cham.

Boorse, Christopher. "Concepts of health and disease." In *Philosophy of medicine*, pp. 13-64. North-Holland, 2011.

Dahlstrom, Daniel O. (February 7, 2013). "Thrownness (Geworfenheit) (pp. 212-5)

Heisel, M. J., & Fusé, T. (1999). College student suicide ideation in Canada and Japan. *Psychologia: An International Journal of Psychology in the Orient*.

Hethcote, H. W. (1989). Three basic epidemiological models. In *Applied mathematical ecology* (pp. 119-144). Springer, Berlin, Heidelberg.

Iga, M., Yamamoto, J., Noguchi, T., & Koshinaga, J. (1978). Suicide in Japan. *Social Science & Medicine. Part A: Medical Psychology & Medical Sociology*, 12, 507-516.

Katz, J. (1988). *Seductions of crime: Moral and sensual attractions in doing evil*.

- Kim, J. H., Park, E. C., Nam, J. M., Park, S., Cho, J., Kim, S. J., ... & Cho, E. (2013). The Werther effect of two celebrity suicides: An entertainer and a politician. *PloS one*, 8(12), e84876.
- Klonsky, E. D., & May, A. M. (2015). The three-step theory (3ST): A new theory of suicide rooted in the “ideation-to-action” framework. *International Journal of Cognitive Therapy*, 8(2), 114-129.
- Mandal, S., Sarkar, R. R., & Sinha, S. (2011). Mathematical models of malaria-a review. *Malaria journal*, 10(1), 1-19.
- Mark, M. L. (2013). *Epidemiological criminology (EpiCrim): Definition and application*.
- Mohanty, B. B. (2005). ‘We are like the living dead’: farmer suicides in Maharashtra, western India. *Journal of Peasant Studies*, 32(2), 243-276.
- Mohanty, B. B. (2013). Farmer suicides in India: Durkheim's types. *Economic and Political Weekly*, 45-54.
- Niaz, U. (2003). Violence against women in South Asian countries. *Archives of women’s mental health*, 6(3), 173-184.
- Nordenfelt, L. (1995). Towards a holistic theory of health. In *On the Nature of Health* (pp. 35-104). Springer, Dordrecht.
- Polizzi, D. (2011). Phenomenological theory. *The Routledge handbook of deviant behavior*, 129-134.
- Polizzi, D., & Lanier, M. M. (2012). Crime as dis-ease: towards an Epidemiological Criminology of the social body. *Acta Criminologica: African Journal of Criminology & Victimology*, 25(2), 37-49.

Sausdal, D., & Vigh, H. (2019). Introduction: Anthropological criminology 2.0. *Focaal*, 2019(85), 1-14.

Scott, S. (2020). A Report from the NIMBioS/DySoC Investigative Workshop on the Mathematics of Gun Violence.

Silver, J., Simons, A., & Craun, S. (2018). A study of the pre-attack behaviors of active shooters in the United States between 2000 and 2013.

Takahashi, Y. (2002). Suicide in Japan. In *Suicide prevention* (pp. 121-130). Springer, Boston, MA.