

Problem Set 1

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Deviant aggressive behavior

Consider four well-known and widely believed theories of socially deviant aggressive behavior (e.g. criminal behavior, revolutionary behavior, rude behavior, etc.):

Answer the following question in 500-800 words:

1. What social policy might be appropriate to reduce deviant aggressive behavior if Theory I were correct? Theory II? Theory III? Theory IV?

- Theory I: Deviant aggressive behavior is learned from experience. Individuals in a society learn to do those things for which they receive rewards and to avoid those things for which they receive punishment.

Theory 1 assumes that individuals were taught to display aggressive behavior to receive rewards and avoid punishment. In other words, the benefits of *being aggressive* to other members of society have been passed down and intensified people's pre-existing characteristics through means of socialization. Therefore, the key is to transform cultural norms regarding deviant aggressive behavior. An education policy might be effective to re-socialize the younger generation to unlearn their aggressive behavior patterns with a public campaign to reform social norms in society at large. However, the case of criminal activities associated with aggression is a bit different from aggressive behaviors on a personal level; in this case, it might be optimal to adopt a stronger punishment policy in order to increase the drawbacks of aggressive behavior, as well as increasing police numbers and strengthening law enforcement. If people are aware that their aggressive behavior will be recognized by the police and result in a heavier sentence, the utility of aggressiveness decreases even when rewards are present.

- Theory II: Deviant aggressive behavior is a symbolic expression of hostility toward personal authority figures. When an individual is frustrated in his personal life, he becomes angry toward parents, bosses, or public officials. He will express this anger by deviant aggressive behavior.

This theory approaches aggressive behavior from the perspective that people project their anger and frustration onto the authority figure. If concerned with individuals's aggression on the interpersonal level, such as relationships with parents or teachers, a regional/local policy that provides therapy and treatment with professionals might be beneficial; as hostility or aggressiveness towards authority often suggests that an individual has no trust in the authority, it is crucial to address that the authority figures are not to harm them. Through counseling and other treatments, individuals with aggression might realize the authority is not always bad for them and clear up misunderstandings.

- Theory III: Deviant aggressive behavior is the rational action of oppressed individuals. Social rules systematically discriminate among people. People who are most hurt by the rules are least likely to profit from conforming to them and thus do conform less.

When the aggression is towards the society and government, it requires a different approach because it is inarguably true that the law enforcement is not always righteous, which contributes to justification for aggression towards the public authority. For example, the last few decades have observed a decline in political trust in the government and its leaders in black/African American communities. Personal struggles might

not always be solely personal; thus, in the case of criminal activities, it is important to take institutional misconducts and social injustice into account. Therefore, a no-mercy punishment policy should be preceded by non-punitive measures to restore social trust first, as well as systematic endeavors for a **truly just** criminal justice system. Racial minorities commit certain crimes at higher rates than whites, but the authority often overestimates these differences and attributes an exaggerated amount of crimes to people of color. Policymakers therefore should identify and correct ostensibly race-neutral policies that disproportionately punish certain racial groups. Therefore, if aggressive behavior is associated with personal experiences of social and political oppression, it might be more effective to eradicate the fundamental causes, such as sexism and racism, in the long run, rather than punishing individual actions.

- Theory IV: Deviant aggressive behavior is a social role. Individuals are socialized into the role through contact with a deviant subculture.

A subculture is formed based on a set of beliefs and values that differ from the dominant culture, and in this case, that support violence. Individuals are likely to understand aggressive behavior as a normal, valid, and expected response due to the socialization process within the subculture. In this case, education programs and institutional interventions that teach prevalent cultural values, discouraging aggressive behavior, might diminish negative subcultural influences. If the subculture is a hotbed of crime, it might be best to disintegrate the organization of subculture. For example, assume a subculture emerges in schools, where beating up other students and robbing their lunch money is “cool.” In this case, school officials might consider punishing those who practice the harmful subcultural values, from community services or counselling sessions to suspension or expulsion. Likewise, on a national level, the government should identify where the harmful subcultures exist and assess the danger in order to prevent consequences of the spread of aggressive behavior.

Waiting until the last minute

People often do things at the last minute (students turning in papers, professors grading exams, and so on).

a. Ask yourself why the observation might be true and write down your explanations.

People procrastinate because they overestimate the stress and difficulty of their tasks, which result in making them less motivated to do the job right away. I have observed this pattern in various groups, including students and working professionals; almost everyone is aware that the task should be done by the deadline and that they will have a better outcome when they work on it with a sufficient amount of time, but they do not start working on it until the last minute. I believe this is due to the lack of motivation that is derived from the overestimation of time and commitment required for the task. At a moment of decision, whether to play more video games or do the homework that is due in three days, people are more likely to value the immediate pleasure they can get out of playing video games over the homework that requires certain time and efforts that are not as fun as games. If compared to fun activities, the tasks come off as a huge amount of intense stress. Subsequently, they become less and less motivated to do the homework and justify their decision by overestimating the magnitude of the task, e.g., “this homework demands a great deal of concentration, so I am going to wait until my brain is more awake and until I am ready focus on this work for six hours straight.”

b. Generalize the explanatory model – that is, induce the most general, abstract model you can produce that still has the original observation as a consequence.

As explained in the answer for **a**, I believe the procrastination derives from the lack of motivation followed by the overestimation of the tasks. Therefore, the research questions for my model are: 1) Do people procrastinate because they are less motivated for the task? and 2) If so, are people less motivated because they overestimate the dedication needed for the task? My model of procrastination attempts to explain the

psychological foundation that fosters postponing their task. This model takes the rational choice approach:

$$U_i = B_i(X) - C_i(X)$$

$$i = 1, \dots, n$$

$$U_i : \text{Utility}, B_i(X) : \text{Benefits}, C_i(X) : \text{Costs}$$

Thus, people calculate the expected utility of benefits and costs they would get when they procrastinate. For example, if an individual thinks she would have bigger benefits of playing video games, such as relaxation and fun, and smaller costs of not doing the task immediately because they still have time until the deadline, her utility increases until she has almost no chance of successfully finishing the task if she doesn't start it immediately.

c. Induce an alternative model that also has the original observation as a consequence.

Alternative model assumes procrastination is due to the fear of failing the task. In other words, people are afraid of failure in their tasks and thus end up procrastinating.

d. For each of the two general models produced in (b) and (c), derive two interesting predictions (four predictions in total). Be sure the logical connection between your model and your predictions is explicitly stated and that any assumed facts concerning the world are made explicit.

1. Model 1

- 1) People would procrastinate when they are not motivated for the tasks regardless of their assessment of task commitment. The core assumption would be the task given to them is not fun in nature, and people never procrastinate on fun activities that immediately give them some degree of pleasure.
- 2) People would procrastinate when they believe the task is more work than it actually is even if their motivation to do well on the task is bigger than other activities they choose to do before the task. The assumption behind this prediction is that overestimating the workload makes people wait for the *perfect time* to do it.

2. Model 2 (Alternative)

- 1) People would procrastinate when they are afraid of possible failure in their job. This prediction needs an assumption that people have a fear of failure in all kinds of tasks, and that it will hinder them from starting the task early on. It also assumes that people value the outcome of the tasks over the feelings of fulfillment that come from the process.
- 2) People have different levels of fear for different kinds of tasks, and the procrastination frequency and tendency vary by individuals, unless they display some characteristics of perfectionists. That is, there is a correlation between fear and procrastination only among perfectionists. This prediction assumes variance among the general public and that perfectionists always show a pattern of procrastination when they are afraid of failure.

Selecting and fitting a model

1. For each part, indicate whether we would generally expect the performance of a flexible statistical learning method to be better or worse than an inflexible method. Justify your answer.

a. The sample size n is extremely large, and the number of predictors p is small.

When the sample size is extremely large, a flexible method performs better as the large sample size reduces the variance, thus fitting the training data better than inflexible methods. Thus, flexible methods are better in this case for estimating a large number of predictors, as well as for reducing the risk of overfitting.

b. The number of predictors p is extremely large, and the number of observations n is small.

In this case, a simple, inflexible model works better. At the first sight, a flexible method seems to be a better fit because it will represent the data better than inflexible models, as it has a big number of predictors. However, due to the small sample size, a flexible model might not be much helpful in predicting unknown data and also end up overfitting the data. Therefore, an inflexible method is a better choice when the sample size is small.

c. The relationship between the predictors and response is highly non-linear.

A flexible learning method is better to fit a non-linear relationship between predictor and response variables. Inflexible methods are often too simple to represent non-linear relationships, whereas flexible methods, such as high order polynomial models, can fit a more complicated relationships.

d. The variance of the error terms is extremely high.

An inflexible method is better because a flexible method would fit the patterns found in the irreducible error terms as well.

2. Bias-variance: Think about the graph including bias, variance, training error, test error, and irreducible error curves, moving from less flexible statistical learning methods towards more flexible approaches.

a. Explain why each of the five curves has the shape it has.

As flexibility increases, bias will gradually decrease, whereas variance will have an increasing pattern; both graphs therefore resemble exponential curves. This is because flexible models are optimal for fitting the data with low bias and high variance, and vice versa. The intersecting point of bias and variance graphs would then be the optimal balance, meaning the risk of overfitting or underfitting the data is the lowest, though this might not always be the case. The test error graph will look like a convex graph with the minimum point somewhere above the bias and variance graphs. The test error might be the least when the bias and variance are perfectly balanced, but there are different scenarios where bias-variance tradeoffs are necessary to fit the model. The test error initially decreases as the flexibility increases, but eventually shows an increasing pattern because the flexible model will fit to the patterns observed in the training data. On the other hand, the training error graph will display a decreasing pattern above.