

# Homework 1

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## Building models

### Deviant aggressive behavior

According to the four popular theories about deviant aggressive behavior, different highlights should be attached to the social policies to inhibit the occurrence of such actions. I would like to basically express the general ideas of these policies individually and make some explanations with examples in the following paragraphs.

For theory one, it suggests that deviant aggressive behavior is driven by an individual's learned experience. Specifically, such experience makes people think of deviant aggressive behavior somewhat beneficial and/or not risky enough to incur unacceptable punishments. Therefore, the direct key to reducing deviant aggressive behavior in this type seems to be limiting the benefits yielded by such behaviors while increasing the punishments. However, limiting the benefits in many cases is hard to be achieved straightly. For example, the "benefit" for stealing somebody's credit card is often related to obtaining the monetary resource bound to this card. In this case, straightly reducing the benefit means reducing the monetary resource contained in this credit card, which would also do harm to the owner of this card. To avoid the impact on innocent people, we need to make a strong distinction between deviant aggressive behavior and normal behavior. Following the above case, if we want to identify whether the card is used illegally, we could limit the amount for a one-time transaction if correct password is not provided, or ask for a second verification through binding electronic devices. Reducing the benefits indiscriminately is infeasible in real life, so strengthening the identification serves as an indirect approach to limit the acquirement of illegal benefits. Meanwhile, the increase of punishments is always effective for preventing deviant aggressive behaviors. In China, the rate of running a red light is largely reduced when new traffic regulations claim a greater loss in traffic credits if such an action is recorded. With better detection of deviant aggressive behavior, the increased punishments could be even more deterrent, so the combination of both approaches should be ideal for reducing this type of deviant aggressive behavior.

Theory two views deviant aggressive behavior as a consequence of unsatisfactory life and an expression of actors' anger. If we need to reduce deviant aggressive behavior in this type, we have to first figure out the reasons that make people feel unsatisfied. Different actors might feel unsatisfied in dissimilar aspects of their lives, so blindly using single social policies is unlikely to handle all the issues. It is important for those personal authority figures to open the floor for effective communications with people. For parents, they are supposed to have more company and regular conversations with their children; for teachers, they need to seriously take feedback from their students; for employers, they should care about the feelings of their employees instead of just focusing on their work performance; for governments, they ought to broadly listen to voices from citizens in various social groups. Having communications is just the first step, then they should respond to what they've heard. Otherwise, communications become ineffective. For things that they think reasonable, authority figures need to take measures to make people see improvements or adjustments, and for things that they feel are not so reasonable, explanations for why they feel in this way and further negotiations are also important. In general, the key in this process is to make those potential deviant aggressive behavior actors feel less unsatisfied and respected.

Theory three ascribes deviant aggressive behaviors to social discriminations. It seems to have some similarity to theory two because discrimination can also result in people's unsatisfied feelings. But one different thing in theory three is that it defines deviant aggressive behavior as a sort of rational behavior instead of emotional expression, which tends to be irrational. For me, rational behavior means actors understand well the cost and profits of their behaviors, thus for people who are hurt by unequal social rules, they generally suffer from a higher cost or lower profit if they conform to the rules. If these rules possess explicit discriminative expressions towards certain groups of people, then the direct way is to abolish these rules. For example, previous constraints in the U.S have blocked black citizens to purchase properties in communities dominated by white people, which are always associated with better living conditions. This rule clearly built up discrimination between blacks and whites and was finally terminated. But for some other rules, the relationship between discrimination and deviant aggressive behavior could more complicated. Once I have heard a news that a younger passenger was slapped by a senior passenger on a bus because she did not offer her seat to the senior, and actually she was getting a fever at that time. In such situations, old people are usually the beneficiaries of this kind of discriminative social norm, but they can also become the individuals who launch deviant aggressive behaviors because they feel their extra privileges are invaded. Therefore, for different types of discrimination (even those with good intentions), we are better trying to decrease their degree, and not make them as official rules for our life. Otherwise, such deviant aggressive behavior might happen more frequently both from beneficiaries and victims.

Theory four recognizes deviant aggressive behavior as a role from subculture. One of such subculture might be the gang/underworld culture in many countries. In my opinion, this kind of deviant aggressive behavior is the most hazardous to the whole society since it is always launched in a systematic and collective level. Once people are enrolled in such subcultures, they might even rationalize their deviant behaviors, which would make these behaviors become more often or even a routine in their lives. To be honest, trying to clear out a dangerous subculture is always difficult, but it is also necessary. A milder solution might be an intervention of these subcultures by removing at least the illegal part in them and restricting their aggressive activities within their groups, to protect normal people from potential harms. At the same time, it is also important to separate these risky subcultures from the mainstream to reduce their expansion to more people, especially young people who are easily attracted by new and special things.

### **Waiting until the last minute**

In my opinion, the phenomenon of Waiting until the last minute could be relevant to the following five reasons:

1. Aversion of work: For some people that I know about, it is usually an unpleasant thing for them to work or study spontaneously, compared to traveling or playing computer games. So at the very beginning, they prefer to do other things that are more enjoyable to them.
2. Heavy workload: For some people, their workflows are overly intensive, which makes them struggle between the deadlines. Once they just finished the last work, the next has come into their worklist, and they can only manage to finish it slightly ahead of due time.
3. Time pressure: When the homework is just assigned, individuals students seem to have abundant time to finish it, so the time pressure level is low. When the deadline is approaching, the pressure level tends to increase, and finally push them to do the assignment.
4. No extra profits: For most of the work, finishing or handing it earlier than the due time can not provide actors with more profits or better results. Thus, some people choose to do it until the last minute.
5. No redo chance: Some work like applications do not have a second chance for the same person, thus many people choose to submit only slightly before the due time in case they need to make modifications in the process.

According to these possible reasons, two general explanatory models are built and their corresponding predictions are mentioned:

The first model is built under the assumption that all these measured objects (works) would have no extra profits if just being finished early and these works either can be redone for as many times as people want

before deadlines or can not be redone. Also, the types of work involved in observations are supposed to be general works that require no special skills for the people in the observed group, so that their original capability should allow them to take approximately the same amount of time to finish the work if no delays are made in the way.

Factors considered in this model include people's aversion for certain work(s) (it is impossible to know people's aversion for all kinds of works), the time left before the due date and whether the works can be redone. The observation would include individuals' beginning and finishing time stamps and the following predictions are:

- People who have a higher aversion degree for the same work tend to start their work at a later point, and this point is around the point where their time pressure level is the highest. Because people who have a higher aversion degree would have less interest in starting the work, but everyone's ability to stand the time pressure is always limited, so they finally started working at the point where they can hold no more stress. After this point, the pressure decrease as the work is gradually done.
- For the observations where the works can not be redone after submission, the finishing time points tend to be later because people are afraid of the need to make further adjustments. On the contrary, the works that allow people to redo(resubmit) would have earlier (first) finishing time points.

The second model is also built with the assumption that all these measured objects (works) would have no extra profits if just being finished early and these works either can be redone for as many times as people want before deadlines or can not be redone. But the main factor considered here is the workload for individuals. Specifically, the workload for individuals is decomposed as the number of previous works as well as the type of these works, and observations would also include individuals' beginning and finishing time stamps. Based on these two aspects, I make the following two predictions:

- When the types of previous works are the same, if the number of prior works is bigger, then people are more likely to start the observed work later because part of their time would be devoted to finish previous works.
- When the number of previous works is the same, people's starting time points might vary according to the types of the previous works. For those more time-consuming previous works, they might pose more delay effects on the start of current work, increasing the possibility of the happening of "wait until the last minute".

## Selecting and fitting a model

Question 1:

- a. Flexible methods are better. A flexible method will fit the data closer and with the large sample size while inflexible methods might contain unsuitable assumptions like linearity or parametric settings.
- b. Inflexible methods are better. A flexible method tends to overfit the data when the observation number is small.
- c. Flexible methods are better. Non-linearity indicates multiple possible relationships between the predictors and the response, so flexible methods are better to measure relationships in uncertain format.
- d. Inflexible methods are better. Flexible methods might capture too much noise in the errors, making the prediction less precise.

Question 2: Moving from less flexible methods to more flexible methods:

- a. Bias curve: This curve declines monotonically because as the methods become more and more flexible, the model would become better fitting to the data from real-life observations.
- b. Variance curve: This curve increases monotonically because as the model fits the observed data better, they can capture more detailed differences between data points, thus increasing the overall variance.
- c. Training error curve: This curve decreases monotonically as the methods become more and more flexible because the model would become better fitting to the observations in the training data set.
- d. Test error curve: This curve firstly reduces to the lowest point but rises up afterward because fits the observed data better, the error in the test data set would also decrease at first since they are from the

same DGP, but at a certain point the model starts to overfit the data, being too close to the training set but not general enough to be applied to the test dataset.

- e. Irreducible error curve: This curve is a horizontal line because the irreducible error would not be affected by the flexibility of models. Its estimation is a constant.