HW1
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Question 1: deviant aggressive behavior
Theory 1
If deviant aggressive behavior is originated from experience, the government should implement social policy that establish a mature system to reward those who obey the rules and punish those who inclined to obey the rules. Firstly, the government should amend restrict civil law regarding the punishment of anti-social behavior. When individuals perform anti-social behavior, they could get punishment from the society, which discourage them from re-committing such behavior. Secondly, the government should limit the entitlement to welfare support according to people's criminal records. For example, people with criminal records will receive less government subsidy even when they fulfil other requirements. On the contrary, people without uncivilized behavior are more likely to receive government financial support. Thirdly, the government should set up funding and scholarships to reward the civil behavior. From children to adults, those who perform civil behavior, such as helping others and reporting criminal behaviors, should be rewarded.

Theory 2
If deviant aggressive behavior is a result of anger towards personal authority figures, it is important to establish mutual trust and respect among individuals and the living environment. Family is the smallest social institution and the most intimate unit of personal life. The government should adopt policy that help developing healthy family. For example, the government could provide subsidy for the underprivileged family with more than one child. The paid maternity leave should be guaranteed for a good early child development. In school, children should be entitled with the opportunity to receive elementary education in formal institutes, where they learn how to interact with peers and authorities like teachers with a positive attitude. In society, the government should protect the lawful rights and interests of labors.

Theory 3
If deviant aggressive behavior is originated from systematic discrimination, the government should adopt social policy that promote equality and welfare for underprivileged groups. The social policy should ensure by law that all people are equal regardless of race, gender, age, cultural and economic and other circumstances. Moreover, the social policy should help discriminated groups in the terms of health, education, employment and living. For example, college students from poor families should be given subsidies and government loans. Social policy should be more tolerant with those socially disadvantaged people when they behave deviant aggressive behavior. For example, the government could alleviate the punishment of food stealing committed by those in hunger.

Theory 4
If the deviant aggressive behavior is a social role, the social policy should help individuals to establish positive social roles. The first way to construct social belongingness is through education. By implementing a mature education system, children from an early age should be aware of social responsibility, citizenship, ownership, and establish a correct attitude towards deviant aggressive behaviors. After graduation, vocation becomes another

opportunity to socialize. The government should try every effort to decrease unemployment, by expending production and enlarging labor market. The family and community should also take the responsibility to monitor anti-social behavior through support and parenting programmes and cut off the contact with the anti-social subculture. Finally, the policy should include moral incentives for socializing with the major culture by propagandizing major values.

Waiting until the last minute
a. why the observation might be true
The reason why people wait until the last minute to do things is related to the benefit brought by the time proximity of their tasks. Firstly, people are more concerned with things close to them temporally. They might be occupied with other stuff or do not feel it necessary to begin the task until the last minute of task. On the contrary, given a short amount of time, they are more motivated to do the task. Secondly, it is a strategy to finish the task more quickly. Finishing a task within a short time is challenging and therefore inspires one's potential. As the amount of time left for the task is shorter, people's efficacy to finish the task is higher.

b. generalize the explanatory model
The main independent factor that contributes to this observation is the time proximity to the deadline. There are two groups of dependent variables: task relativity and efficacy. The task relativity is an internal psychological factor and could be measured with some questionnaires, while the efficacy is measured by the external quality and quantity of the outcome. As the deadline is approaching, people feel the task more relevant and more willing to begin with, and their efficacy significantly improves. In short, time proximity is a positive strategy that people actively use to finish the task more productively.

c. induce an alternative model
Alternatively, waiting until the last minute is a negative consequence of avoiding the challenging tasks. Psychologically, people might hold irrational believes that the difficulty of the tasks is beyond their abilities. They exaggerate the level of the difficulty and escape from the tasks until they have to submit something. The irrational believes are influenced by the true difficulty of the tasks, and the level of the self-esteem.

d. predictions
Model 1:
(1) as delay is a positive strategy adopted to inspire motivation and potential by giving additional timing constraint, it is negatively related with the difficulty of the task. The more difficult the task is, the less likely one would have to add time constraint to make more challenging.
(2) people with low self-esteem are less likely to wait until the last minute. People with low self-esteem would expect themselves to take longer to finish the tasks. When people with low self-esteem are adopting this strategy, they might feel the task itself is difficult enough to trigger their potentials and motivations.
Model2

(1) the lower one's self-esteem is, the more likely one would hold the irrational belief that he could not finish the task. As a result, he would be more likely to wait until the last minute to do the task.

(2) the more difficult the task is, the more likely this task would trigger one's irrational belief, resulting in delay behavior.

selecting and fitting a model
1.
a. the flexible method is better. When the sample size is large and predictor is small, the flexible method is less likely to overfit the trainset and there is less bias as well.
b. the inflexible method is better. When the sample size is small and predictor is large, using flexible method tends to cause overfitting.
c. the flexible method is better. The flexible method is necessary to find the non-linear relationship
d. the inflexible method is better. When variance is high, the flexible method is more likely to be influenced by the noise than the inflexible method.

2. bias-variance
Bias: as the model flexibility increases, the bias gradually decreases. The bias is introduced by the difference between the estimates and the true function. When the model is increasingly flexible, the model fits in the train set better and the bias decreases.
Variance: as the model flexibility increases, the variance gradually increases. As the model is becoming more flexible, the model is more sensitive to noises in the train set and therefore the model will change a lot when modeling another dataset.
Training error: as the model flexibility increases, the training error decreases. The training error is the difference between estimates and observations. As the flexibility increases, the model fits better to the training set and the training error decreases.
Test error: as the model flexibility increases, the test error initially decreases. At approximately the intersection of bias and variance curve, the test error begins to increase. The test error is related to both bias and variance. The test error is minimum when the bias and variance reach a balance. When the model is too flexible, it overfits the train set. When the model is too inflexible, it might not fit the train set very well.
Irreducible error: the irreducible error remains the same when the model flexibility changes. The irreducible error is influenced by the flexibility of the model.