HW1 Responses

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Building Models

Deviant Aggressive Behavior

Theory I states that deviant aggressive behaviors are resulted from experience. Consequently, the most direct social policy implication would be to forbid deviant aggressive behaviors by law and enforce punishment on those who engage in those behaviors. Since only a relatively small number of members of the society would engage in deviant aggressive behaviors and gain experience, it's even more important to make sure the general public can learn this experience indirectly. Therefore, apart from law enforcement, it's also necessary to inform the general public of the inevitable consequences of those behaviors to prevent potential offenders from doing them. Broadcasting criminals getting their deserved penalty is an example. Having ex-offenders tell their stories and regrets would be another ideal way of sharing experience. In addition to providing negative feedbacks to unwanted deviant aggressive behaviors, the theory also suggests rewarding desired behaviors with positive feedbacks, such as awarding a prize for exemplar workers, praising lawful citizens, etc. In short, theory I suggests punishing those behaviors, rewarding the opposite and sharing those experience to public.

Theory II attributes deviant aggressive behaviors to people venting their frustration to their authority figures. An evident way to cut such behaviors would then be keeping society members satisfied via steady economic growth, less unemployment and closer income cap. Happier people will in turn be less likely to be mad at their authority figures. In the meanwhile, more focused policies can be done at target groups. In companies, promote a more relaxing working environment for employees and their bosses. At school, adjust school rules to create a student-oriented campus for students and their teachers. Though they may be considered individual decisions rather than a social policy, a social policy aimed to promote a forbearance and tolerance culture would result in such decisions. In addition, trainings or lessons about emotion management in schools and companies would be helpful. Once the frustrated people learned how to let out their anger elsewhere, less likely are they to express it through those undesired behaviors.

Theory III regards deviant aggressive behaviors as results of discrimination. Accordingly, a social policy that promotes diversity and stops discrimination is the straightforward answer to deviant aggressive behaviors. Legislators should abolish unjust social rules and work on laws and regulations that promote and/or enforce equity among races and genders. Once the rules no longer hurt a certain group of minorities, their rational choice would be obeying the rules instead of breaking them. On the other hand, if a systematical reform for equity is impossible or slow to perform, an expedient policy is to closely monitor those oppressed society members and react in time once they take deviant aggressive actions. In specific, more police force and other public security resources should be assigned to neighborhoods with most oppressed (and potentially dangerous) group of people. The ethics of that policy is of course debatable and may undermine the reforms on unfair social rules.

Theory IV suggests that deviant aggressive behaviors are efforts required to be recognized as a member of a certain subculture. Therefore, in order to reduce those unwanted behaviors, an effective solution would be to officially ban or criticize that subculture to limit its influence, though rapid actions on subculture may cause its members to backlash and result in the opposite. On the other hand, promoting the mainstream culture through more education funds and NGO supports is a gentler approach and will yield better results in the

long term.

It's also worthwhile to point out that all the four theories make sense to some extent, and a good policy maker will usually choose a bundle of social policies to address the problem, rather than choose only the 'best' one.

Waiting till the last minute

1. To be short, waiting till the last minute to work takes less efforts compared to starting early. To start early requires planning ahead, self-discipline and motivations, while the individual is just driven by urgency and desperation at the last minute. To start late also gives the individual an excuse to work in haste instead of improving the quality of their work through careful consideration.
2. I generalize it into a 'minimum cost theory': when there're multiple ways to complete a certain task, an individual will choose the method that takes the minimum effort. Cost here is general and relative: it can be anything among time, manual labor, concentration, money, etc. The cost is relative as people value their different kinds of efforts/costs differently. Some are willing to take more concentration to get the task done in a short time, while others prefer to work longer but keep relaxed.
3. An alternative model is 'uncertain cost underestimation theory': when estimating the uncertain part of the cost to achieve a goal, people or groups would always underestimate them. In our case, people do not wait till the last minute because they want to, but because they believe that moment is a good time to start and is early enough to leave room for double-checks. Only when they are only halfway done and the deadline approaches will they realize that they actually underestimated the time required for that job. Therefore, it looks like they started until last minute, and they usually turn in their work at last minute when underestimation happens.
4. Minimum cost theory: Steak cooked by the same chef with same requirement of rawness will vary greatly, as long as they are ordered at different time or by different customer. As long as it looks medium rare, it is medium rare. Extra attention adds to the cost of preparing the food, and average customer cannot tell the difference. When deciding the location of a factory, the entrepreneur will never take pollution into consideration as long as no penalty (whether financial or on company fame) is given.
5. Uncertain cost underestimation theory: People will call back to unanswered calls from unknown numbers more often than they should because they underestimate the risk of it being a scam and the probability of them falling into any phone call scam. Many students will fall or withdraw from courses because they underestimate the cost of succeeding in them when looking at the syllabus description, as long as no other sources of information (course evaluations, try-outs, etc.is available.

Selecting and Fitting a Model

1. Flexible and Inflexible methods

- The flexible method is better. In general (and all answers below refer to the general case), when sample size is large, a flexible method would make a better use of them than inflexible methods. Though fitting more towards the test data creates risks of overfitting, such risk is usually smaller when the number of observation is large.
- The inflexible method is better. This is the opposite case to the previous question. The risks of overfitting when sample size is small is rather high. It's also worthwhile to point out that it's better to find more observations or reduce predictors in this case, rather than choosing a better statistical method.
- The flexible method is better. When the relationship is non-linear, it becomes risky to force a model onto the data.

- The inflexible method is better. A flexible method would be heavily affected by high error terms while overlooking the general pattern. A carefully-chosen, theory-based inflexible method would deal with large error terms better.

2. Bias-Variance

- The Irreducible error curve is flat because of the randomness nature of our world does not vary upon the flexibility of the statistical method we use.
- The bias curve always goes down as flexibility increases, as a more flexible method will always capture more information from the dataset and follow it more closely.
- The variance curve, on the other hand, will always increase as flexibility increases, as the bias-variance trade-off suggests. At higher flexibility levels the model becomes less applicable to outside cases and will result in higher variance.
- The training error goes down with flexibility level as the model represents the training set better.
- The test error starts decreasing as the model better represents training set and therefore testset due to increased flexibility. Then the test error increases as the model becomes more and more affected by the noises from training set while overlooking its general patterns.