AN EPISTEMIC PRINCIPLE WHICH SOLVES NEWCOMB'S PARADOX

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A murder has been committed. You are in charge of the investigation, and you suspect Jules. Let $O$ be the proposition that you dust the murder weapon for fingerprints, let $C_1$ be the proposition that you dust the weapon for fingerprints and find Jules' prints, let $C_2$ be the proposition that you dust the weapon for fingerprints without finding Jules' prints, and let $P$ be the proposition that Jules is the murderer. Now it is clear that, by dusting the weapon for fingerprints, you will change your subjective probability that Jules is the killer. If you discover Jules' prints on the weapon, your new probability that Jules is the killer, $Pr(P|C_1)$, will be close but not equal to one. (Jules might have innocently held the weapon on a different occasion.) If your examination of the weapon does not find Jules' prints, your new probability that Jules is the killer, $Pr(P|C_2)$, will be close but not equal to zero. (Jules might have worn gloves during the crime.) But, while the result of your observation can clearly alter your subjective likelihood that Jules is the killer, we would like to propose that the mere fact of making the observation should not affect your degree of belief that Jules is the malefactor. Instead, your current subjective probability that Jules is the killer ought to be a weighted average of the very high probability that Jules is the killer that you will have if you examine the weapon and find his fingerprints versus the very low probability of Jules' guilt that you will have if you examine the weapon without finding his prints. The weights for the averaging are given, respectively, by your current probability that, if you examine the weapon, you will find his prints versus your current probability that, if you examine the weapon, you will not find his prints. That is, your current subjective probability of $P$ should equal your current estimate of what the probability of $P$ will become after you have performed the observation $O$. We have
\[ Pr(P) = Pr(P|C_1) \cdot Pr(C_1|O) + Pr(P|C_2) \cdot Pr(C_2|O) \]

Since \( C_1 \) and \( C_2 \) are exclusive possibilities whose disjunction is equivalent to \( O \), this gives

\[ Pr(P) = Pr(P|O) \]

We want to propose that there is a general principle at work here:

**Good Observation Principle.** If an agent is certain that performing observation \( O \) in no way influences \( P \) whether \( P \) obtains, then the agent's subjective probability of \( P \) given \( O \) ought to equal her subjective probability of \( P \).

We call this a "good" observation principle because it's a principle governing observations which in no way influence the things being observed. For example, a policeman who wanders fully uniformed through a crowd observing how many people are getting their wallets lifted is doing a good job of protecting the citizenry from theft but a bad job of observing the incidence of pickpocketry, since the policeman's presence discourages pickpockets, so that

\[ Pr(\text{your pocket is picked}|\text{the policeman observes whether your pocket is picked}) \]

is much less than

\[ Pr(\text{your pocket is picked}). \]

For another example, suppose that, if you find Jules' fingerprints on the murder weapon, he is likely to be arrested, whereas, if you choose not to examine the weapon, it is unlikely that there will be

1. The notion of influence needs to be taken rather liberally here. Thus, if \( P \) has the form \( O \& O \), we shall want to count \( O \) as an influence that favors the truth of \( P \), even though \( O \) would provide a logical, rather than a causal, reason for the truth of \( P \).
2. We needed a gender for the agent, and the coin came up female.