According to the paper written by Franz Huber, he talks about how an individual should revise their beliefs when they receive new information on that belief. The example they give in the paper is: “Sophia believes many things, among others that it will rain on Tuesday, that it will be sunny on Wednesday, and that weather forecasts are always reliable. Belief revision theory tells Sophia how to revise her beliefs when she learns that the weather forecast for Tuesday and Wednesday predicts rain.” (Huber, 2013, p. 3). This information tells us that with her original belief that it will be rainy on Tuesday, and sunny on Wednesday isn’t correct anymore, so with her belief that the forecast is always reliable, she keeps her belief that Tuesday is rainy, and gives up her belief that it is sunny on Wednesday. As we can see, even though she had her original belief, the fact that she had the belief that the forecast was 100% reliable made it so she wouldn't doubt her decision to give up her belief that it was sunny on Wednesday.

According to another paper written by Fabio Paglieri, he writes that individuals also store information that they do not currently believe, since in the future that information could then become believed if new evidence is gathered (Paglieri, 2004). Along with this, beliefs that are accepted currently may be refused later on, either because they were shown to be incorrect, or because more plausible information was provided from a different source (Paglieri, 2004). This ties into our forecast problem, since someone could observe sunny skies and a warm day, but after an hour they watch the news, and the forecast states that there is a storm about to roll into the area. Now this person uses this new evidence to refuse their original belief that it would be sunny, and then believe that it will rain in the future instead. An individual also stores information from two contradictory sources (say 2 different news sources like BBC and CNN), one claiming that there will be a perfectly sunny day tomorrow, and the other stating that there will be showers throughout the day tomorrow. The individual is more inclined to believe the one

that they have more trust in (or whichever has the better reputation) (Paglieri, 2004). If a third independent source came in and also stated that tomorrow will be a perfectly sunny day, the individual will use this information to update their original beliefs, choosing to believe that it will be sunny since two sources (assuming the third independent source is reliable), said that it would be sunny in their forecast.

For our problem that we have proposed, which is "is today a good day to go have a picnic?", we have developed a process of belief revision that we will be modeling in this project represented in Figure 1. The way that we will represent the original beliefs in our problem will mainly be based on present observations, which was set to ideal conditions in this project. A forecast is then randomly generated, and it is further determined, using a weighted point system, how ideal the forecast is for a picnic. If the forecast is expected to be ideal, the modeled person will continue with their plans for a picnic, while they will cancel their plans if the forecast is not ideal. Drawing off some points presented earlier, they will not expect this decision to change or go back and check the forecast again before they leave for their picnic. While the current scope of the forecast in the project does not have much constraint in realism, adding this in later would even better help the belief revision model real-world scenarios. This could even possibly be accomplished by allowing the program to ingest real current weather observations and forecasts to more so eliminate randomness and inconsistencies in the forecast outputs. For example, it would not be expected that the temperature would drop from 70 °F to 40 °F, but the scope of the program does currently allow this scenario without much restriction.

It is also important to note how each forecast variable is weighted in the model's eyes. This was done using a form sent out to the class, which asked them to rank in terms of importance temperature, dewpoint, wind, and the current weather conditions, and these results

were reported in Figure 2 and translated into the weight values in Figure 3. Based on the forecast, the weights determined by the average importance of the class, and what's displayed in the forecast, the model will make their original prediction as to whether or not it is a good day to have a picnic.

Once it is time for the picnic, the model will once again check the current observational conditions. This is not intended as an intention check of the conditions, since their belief has already been set, but designed as a response to a person walking outside to leave and subconsciously re-observing the weather. If the model determines that the conditions are now questionable for a picnic, they will check the forecast only for the variables in question, since their belief has only changed for those. If the model determines that one of the variables is too bad for a picnic, they will cancel it without checking the forecast. If the model determines that the new conditions are still within a set comfort level, then it will proceed with the picnic as planned. However, if the new conditions do not fall within this comfort level, the model will call off the picnic. In the scope of the model, there is a 1 in 8 chance that any individual variable will change from the forecast, leading to about a 1 in 2 chance of any part of the conditions deviating from the forecast. The conditions for what is considered good, questionable, or bad were set by Elijah and Kaitlyn using their meteorology background and their knowledge on what is reasonable in the meteorology realm, and reported in Figure 4.

References

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