## Background

Selected Papers:

Podlesny, J. A., & Raskin, D. C. (1977). Physiological measures and the detection of deception. *Psychological Bulletin*, *84*(4), 782–799. https://doi.org/10.1037/0033-2909.84.4.782

Dalgleish, T., Williams, J. M. G. ., Golden, A.-M. J., Perkins, N., Barrett, L. F., Barnard, P. J., … Watkins, E. (2007). *Detecting Concealed Information and Deception*. *Journal of Experimental Psychology: General* (Vol. 136).

Podlesny & Raskin was used as a general overview of common polygraph measures and in ranking the importance of

Dalgleish et. al. was selected because of its inclusion of the timing of physiological responses after question events.

## Approach

Of the questions asked, only the questions directly asking if values of cash or check were removed from either the mailbox or the bag were analyzed. The “baseline” questions, e.g. “Have you met Dr. Lewis?”) were excluded because they were not relevant to the crime. The questions leading up to the crime (“Did you open envelope X”) were excluded because they could be easily confused with the several other similar envelopes or actions and are only indirectly related to the crime committed.

Constructing a matrix of the selected questions below based on each question’s relevance to the parameters, we create 6 question sets:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Cash | | | | Check | | | |
|  | Any | $20.00 | $41.00 | $470.16 | Any | $20.00 | $41.00 | $470.16 |
| Mailbox | 4B | 5B | 6B | 7B | 8B | 9B | 1C | 2C |
| Bag | 8C | 9C | 1D | 2D | 3D | 4D | 5D | 6D |

Question Sets:

1. "Mailbox": ["4B","5B","6B","7B","8B","9B","1C","2C"],
2. "Bag": ["8C","9C","1D","2D","3D","4D","5D","6D"],
3. "Cash": ["4B","5B","6B","7B","8C","9C","1D","2D"],
4. "Check": ["8B","9B","1C","2C","3D","4D","5D","6D"],
5. "$41": ["6B", "1D", "1C", "5D"],
6. "$470.16": ["7B","2D","2C","6D"]

A set for $20 was not created because we know that the value of the cash was $41 and the value of the Check was $470.16. Each subject’s responses are tested for each of the 16 questions. Then to evaluate guilt, we compare each subject’s response to the “Mailbox” questions versus the “Bag” questions (and Cash vs Check, etc.) and see which response is greater. Subjects were not compared to each other. Subjects were only compared to themselves to avoid normalizing sensor values between different subjects.

## Signals and Sensors

Four sensors were chosen