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Forensic experts' perceptions of expert bias

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ABSTRACT

How do expert witnesses perceive the possible biases of their fellow expert witnesses? Participants, who were attendees at a workshop at the American Academy of Psychiatry and Law were asked to rate for their biasing potential a number of situations that might affect the behavior of an opposing expert. A Rasch analysis produced a linear scale as to the perceived biasing potential of these different kinds of situations from the most biasing to the least biasing. Working for only one side in both civil and criminal cases had large scaled values and also were the first factor. In interesting contrast, a) an opposing expert also serving as the litigant's treater and b) an opposing expert being viewed as a "hired gun" (supplying an opinion only for money) were two situations viewed as not very biasing. Order of Hierarchical Complexity also accounted for items from the 1st, 2nd and 3rd factors. The result suggests that the difficulty in understanding the conceptual basis of bias underlies the perception of how biased a behavior or a situation is. The more difficult to understand the questionnaire item, the less biasing its behavior or situation is perceived by participants.

1. Introduction

The objectivity that an expert witness brings to the legal system is the most valued quality of an expert, whether that expertise is in psychiatry or elsewhere. One of the most challenging but necessary ideals for expert witnesses to uphold, therefore, is dealing with "expert bias." Expert bias is seen as a deviation from the "ideal" neutral balanced assessments, judgments and the like. Perceived bias here is operationally defined as how strongly biasing the study participants found certain situations to be. Participants in the study were asked to rate on a scale of 1 to 6 how potentially biasing are situations as described in the items, or how biased they believe the expert witness as described in the item is. Here we concentrate on the perceptions of expert witnesses themselves because of the large degree of experience they have in observing possibly biasing situations. We differentiate between experts' perceptions and juror and judges' perceptions, making no assumptions about their similarity or differences.

In our previous work on expert bias (Commons, Miller, & Gutheil, 2004), we showed that expert witnesses in our survey perceived the existence of a good deal of such bias. In that previous study, it appeared as if some situations were perceived as more biasing than others. In other words, some of the potentially biasing situations had higher significance values and larger effect sizes. This did allow a conclusion that some situations were perceived by experts to be actually more biasing than others, but there was no way to ascertain specifically how much more or how much less biasing each situation was perceived to be. The purpose of the current study is to find out how potentially biasing each of the situations is perceived to be, on a ruler-like scale with the numbers on the ruler being equally spaced. Jurors understand measures that are ruler-like because they understand measurement with rulers. Hence, jurors may readily understand the results of using a technique called Rasch analysis (Rasch, 1960) as described below. We hoped that forensic experts might benefit from being informed as to the perceived degree of seriousness of various biasing situations. With such information, forensic experts can consider altering their own behavior and/or informing the jury of the seriousness of biases which the other side may hold in a cross examination.

The second focus of the current study is to understand perceived bias from a psychophysical perspective. In psychophysics, one finds the properties of stimuli to explain the responses. In this study, we can predict the perceived bias of a questionnaire item by noting the subject's difficulty in understanding that item. Past research has explained why and how bias exists: cognitive shortcuts such as heuristics, availability bias, confirmation bias, and self-serving bias whose goal is to protect self-esteem and support optimism in people, and so forth (Kahneman, Slovic, & Tversky, 1982). A question that remains is why some biases are easier to identify and overcome than others. For example, it is obvious that having monetary interest in the outcome of a case is a biasing factor. In order to eliminate the effect of such bias on decision making, an interest-free, third party is usually called upon to make judgment of a conflict between two opposing sides. It is less obvious, for example, to realize that absolute

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bias-freeness is impossible, and holding such a belief is itself an indication of bias. This paper explores the possibility that the difficulty of understanding the items may influence how expert witnesses rate the biasing potential of a situation or the degree of bias of the subject.

One underlying factor that may predict perceived bias is the difficulty of the task. It is assumed that tasks have an inherent difficulty. Here that difficulty is called *Order of Hierarchical Complexity* (Commons, 2008; Commons, Trudeau, Stein, Richards, & Krause, 1998). The tasks in our study are reasoning about how biasing a given situation is. We predict that the more hierarchically complex the task, the less likely people are going to perceive bias.

1.1. Rasch analysis

In this study, Rasch analysis is used to show the degree of perceived bias in an objective, empirical manner. In order to understand our results, some basic knowledge of Rasch scales is necessary. A Rasch model produces an additive scale. It can be used to analyze a large variety of human sciences data. This model, for example, through the use of probabilistic equations, converts raw ratings of items into scales of Rasch scores that have equal intervals. Such a scale can then be used as a type of ruler against which to measure the data on survey items as well as on respondents (Bond & Fox, 2007). Statistically speaking, this scale will be linear (Bradley & Terry, 1952; Luce, 1959). As a result, a change of severity of the Rasch scores of 1, is the same going from -2 to -1 as going from 0 to $+1$. Doubling on the Rasch scale means the same change in severity anywhere along its linear axis. For example, a perceived bias with a value of 2.3 is half as severe as a perceived bias of 4.6. After analyzing data with a Rasch model, a number of questions can be answered. First, where on the scale does each independent variable fall (e.g. in this case, how severe are each of the perceived biases for an item)? Second, what is the range of scaled values between all variables for all participants? Third, for each participant, what is the scaled value of overall severity of these biases when measured on the same scale?

The answer to the first question will give expert witnesses a scale of how biasing each situation appears. This should allow experts to point to some empirical data when confronted with some of these situations. The answer to the second question should help answer: How much of a difference does a change in score make? Consider the difference of 1 unit between two scores, for example an item with a score of 1.5 and an item of 2.5. For a small range of scaled perceived bias scores, this would be a big difference, whereas for a large range this would be a small difference.

1.2. Factor analysis

Another way to consider the issue of how bias is perceived is to examine characteristics of the items themselves. Although the data might fit a one dimensional Rasch model, there can still be characteristics of the items that form sub-dimensions. In order to explore sub-dimensions of items, a factor analysis will be performed. Factor analysis is a method to explain correlations between observed variables, in this case, items in the questionnaire. It uncovers unobserved, latent properties of the items called factors (Gorsuch, 1983).

1.3. Difficulty of items as measured by Model of Hierarchical Complexity

Next, we explore the a priori difficulty of understanding the biasing potential of an item. What is its relationship to the factors found from the factor analysis? To explain the factors, we propose to consider how these items are viewed: what is the required stage of performance needed successfully to understand an item (Commons, 2008; Commons & Miller, 1998)? More difficult items, requiring higher stages of conceptual development, may be found to be less biasing.

The Model of Hierarchical Complexity (MHC) measures the a-priori difficulty of tasks. Adults vary greatly in how detailed a task they understand and do. Because less complex tasks must be completed and practiced before more complex tasks can be acquired, the Model argues that this accounts for the developmental changes seen in individual persons' performance on tasks. For example, persons cannot perform arithmetic until they can truly and correctly count. In order for difficulty to be precisely measured, the Model proposes a metric. That is, that Task A is considered to be hierarchically more difficult or complex than Task B if Task A is made up of two or more simpler actions (such as Task B and a third task, C), and these simpler task actions are coordinated in a non-arbitrary way. If Task A consisted of a combination of Task B and Task C, then it would be what is called one Order of Complexity higher than Tasks B and C. The Model specifies that there are 16 orders of complexity, starting with tasks that are completed by the simplest animals and infants, and progressing to highly complex tasks that only some adults complete. These orders are shown in Table 1.

An individual's stage of development or performance is based on the Order of Hierarchical Complexity of the task that he or she correctly completes, and because of that is given the same name and number as the Order of Hierarchical Complexity of the task. So, if an individual completes a task that is at order 10 (Formal), performance on that task is also considered to be at the Formal Stage.

The Model of Hierarchical Complexity (MHC) has been shown to account for performances in a variety of different domains (Commons, 1999). For example, when the action described by an item is at a higher order than a task that the participant can understand, the grasp of the value of the task is too high for the participant, and the participant cannot perceive its value.

The order of complexity of the task is determined through analyzing the demands of each task by breaking it down into its constituent parts. The following is a list of tasks people do at each Order of Hierarchical Complexity from 8 to 12. At each order, key features are described and then examples of such tasks are given. They should be understood as only examples but not an exhaustive list. Tasks of all domains can theoretically be mapped to this scale.

At the *concrete order 8*, two or more primary stage 7 operations may be coordinated. Coordinating two perspectives becomes possible and deals can be made. People respond to threats by making a deal. For example, the insurance company lawyer says to an expert, “if you do not say what I want you to say, you will never work again in this town.” Giving in to such a threat creates bias. However, negotiations are specific to the person that one is dealing with and based on concrete experiences.

At the *abstract order 9*, two or more concrete order 8 operations may be coordinated. It becomes possible to coordinate concrete instances and form the notion of a variable and understand the value of the variable. For example, concrete interactions with people may lead to the understanding of social norm. People may figure out what their responsibilities are on a job, based on what the socially accepted role of the position is. For example, an expert witness may know that the social norm of this position is to be bias-free. People performing at this stage have an idea of a variable, such as acting as

Table 1
Orders of Hierarchical Complexity.

Order	Name	Order	Name
0	Calculatory	8	Concrete
1	Sensory or motor	9	Abstract
2	Circular sensory-motor	10	Formal
3	Sensory-motor	11	Systematic
4	Nominal	12	Metasystematic
5	Sentential	13	Paradigmatic
6	Preoperational	14	Cross-paradigmatic
7	Primary	15	Metacrossparadigmatic