# Error value tradeoffs in social decision-making, and beyond: Do personality values consistently map onto tradeoff preferences?☆

Gary L. Brase*, Taylor M. Beashore, Kevin L. Kenney

*Department of Psychological Sciences, Kansas State University, 492 Bluemont Hall, Manhattan, KS 66506, United States of America*

## ARTICLE INFO

## ABSTRACT

Many decisions in life involve tradeoffs between two incommensurate options, so that one's choice reveals the values placed on the options. For example, judicial decisions weigh the possibilities of false convictions versus false acquittals. Using a signal detection model, this research demonstrate that Americans generally prefer a judicial error value tradeoff that favors relatively more false acquittals, a pattern generally consistent with the "Blackstone ratio" (i.e., 10:1) in legal history. At the same time, there is substantial variation in these error value tradeoffs and several individual difference measures were assessed as potential factors to account for this variation. Contrary to expectations, judicial error value tradeoff preferences were not significantly related to political liberalism/conservatism, individualism/communalism, social dominance orientation, or political party affiliation. There was, however, a significant relationship between greater authoritarianism and preference for less bias to avoid false convictions. A third study replicated this finding and extended the research scope to other error value tradeoff contexts (e.g., in military, immigration, and business regulation settings). Additionally, Study 3 found significant relationships between context-specific attitudes and libertarianism/authoritarianism, liberalism/conservativism, and social dominance orientation for immigration, military, business regulation contexts.

## 1. Introduction

Life is full of tradeoffs, but not all tradeoffs are the same. The nature of tradeoffs is generally described as a situation in which, as one desired thing is increased, it necessarily means that a different desired thing is decreased. For example, when my alarm goes off in the morning I debate about getting out of bed. I could hit the snooze button to get 15 more minutes of blissful sleep, but perhaps be late for work. Or I could get up now and be at work on time, but also maybe not function as well due to lack of sleep. Tradeoffs fundamentally are created by some limited resource (time, money, space, energy, etc.) and the decisions people make about how those resources are allocated, therefore revealing the relative importance people place on those different possible outcomes.

Because of the intrinsic connection between tradeoff decisions and how much one values the different outcomes, Hadari (1988, p. 656) argues for a specific definition of *value trade-offs*:

a) A decision-making unit must choose a course of action whose

implementation involves two values, $V_a$ and $V_b$, both held as positive values;

b) The alternatives available would each necessarily entail sacrificing, at least to some degree, either $V_a$ to $V_b$ or the opposite: to use technical language, past some point the values to be upheld are divergent;

c) No common unit of measurement applies to both $V_a$, and $V_b$: the values are incommensurable (for example, not both reducible to monetary units).

Although this definition excludes some tradeoffs (e.g., in which a common metric can be used to compare options), by doing so it focusses in on tradeoffs that are typically much more problematic. Value tradeoffs are difficult precisely because of these disparate types of resources that the options demand. Thus, there are value tradeoffs that entail choosing speed versus accuracy, price versus quality, and quantity versus quality.

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## 1.1. Error value tradeoffs

A particular family of value tradeoffs has a further complication. Sometimes the tradeoff occurs within a context where there is an actual true state of the world, and the relevant decision is a judgement about if that state holds or not. For example, when a defendant is on trial for a crime which he is (as a true state) either guilty or not guilty of committing. The decision by the court is about whether that state (guilty) is true or not. And, of course, there are some non-zero error rates associated with these types of decisions (false convictions and false acquittals). In these types of situations, the value tradeoffs are about both the different error rates and which errors are more acceptable than others (Arkes & Mellers, 2002). This tradeoff of error values can be contrasted with a tradeoff of simple values, such as a price-quality tradeoff when purchasing food: Although the quality of a meal increases as its affordability decreases, the tradeoff involved here does not entail correct or erroneous decisions in an objective sense.

This research will use the term *error value tradeoffs* to describe decisions that not only reveal tradeoffs between the values of different resources, but also reveal what is valued in terms of actual truth. Error value tradeoffs therefore can indicate both what resources are valued and *what outcomes and people are valued*. To continue our earlier example, a justice system that favors fewer false convictions at the expense of more false acquittals indicates that individual rights are more important than societal authority. A justice system with an inverse prioritization of errors indicates an inversion of the importance of individuals and authority.

Error value tradeoffs are easily construed as situations of signal detection (Green & Swets, 1966), wherein there are four possible outcomes: Correct Rejections (e.g., acquittal of the innocent), "Hits" (conviction of the guilty), "False Alarms" (conviction of the innocent), and "Misses" (acquittal of the guilty). With overlapping distributions of guilty and innocent people due to imperfect knowledge, there is a criterion which establishes the relative rates of these outcomes (Fig. 1) and therefore inherently can produce bias. A so called "liberal bias" is the tendency to have more hits and false alarms, while a "conservative bias" is the tendency to have more misses and correct rejections (Macmillan & Creelman, 2005). When there is a higher threshold for conviction, for instance, there is necessarily an increase in the probability of a guilty person getting away with criminal activity. Viewed through a signal detection theory perspective, such a situation (i.e., favoring fewer false convictions at the expense of more false acquittals) is a preference for a conservative bias. One should note that the

conservative/liberal labels used in signal detection theory are not necessarily aligned with liberal or conservative political ideologies.

The error value tradeoff inherent in any justice system has been a topic of debate throughout human history, and Volokh (2006) documents this long history of different tradeoff preferences regarding the ratio of false convictions to false acquittals. The most commonly discussed judicial error value tradeoff comes from Sir William Blackstone, who declared in the 18th century that "It is better that ten guilty persons escape than that one innocent suffer." This 10:1 tradeoff is referred to as the Blackstone ratio and is a seminal point in discussions of law as well as a philosophical standard for civil rights. For instance Blackstone's 10:1 ratio underlies current western ideals that the burden of proof is on the prosecution (i.e., a defendant is innocent until proven guilty) and that a defendant must be proven guilty to some high standard (e.g., beyond a reasonable doubt; Volokh, 2006). The intent of these structural features in a justice system is to favor errors of wrongful acquittals over the errors of wrongful convictions. As reviewed in Volokh (2006), however, a range of other error ratios in justice systems have been proposed throughout history, dating back at least to ancient Greece and Biblical directives. These proposed ratios vary from the favoring of 1000 false acquittals to prevent 1 false conviction, to favoring 100 false convictions to prevent 1 false acquittal (Volokh, 2006).

Dalgleish, Shanteau, and Park (2010) suggested that the threshold for judicial conviction varies from person to person, and that this helps explain why a group of people can be presented with the same evidence in a trial yet disagree on finding the defendant guilty or not guilty: their thresholds are different. Specifically, there is an error value tradeoff made between the rate of false convictions and false acquittals, and different people favor different tradeoffs. One person might place more importance on protecting innocent defendants, so they require more evidence (i.e., a higher, more conservative threshold to convict) and this leads to fewer false convictions but more false acquittals. Another person might place more importance on protecting society and ensuring that criminals are caught; they will require less evidence (i.e., a lower, more liberal threshold to convict) and this leads to fewer false acquittals but more false convictions (Arkes & Mellers, 2002).

## 1.2. The current work

The current work was designed to examine what underlying traits or characteristics can predict the nature of people's error value tradeoffs. Given the relative scarcity of empirical work in this area, this research starts with one particular tradeoff –the Blackstone ratio—and establishing some basic understanding of that tradeoff (Studies 1 and 2). Study 3 extends this work to additional contexts in which error value tradeoffs occur.

### 1.2.1. Do people agree with the Blackstone ratio?

It is not clear how well people's naïve decisions about judicial error tradeoffs fit with the historical Blackstone ratio standard. Furthermore, there is no established methodology for eliciting error value tradeoff decisions in research. One could allow people to give open-ended response, but this can introduce issues of coding and possibly exceedingly high variance. One could alternatively constrains the tradeoff responses to a small set of alternatives, but this risks artificial restriction of range and possible bias in the available options. The following studies use a few response options in order to develop an effective methodology to elicit tradeoff decisions that are reasonably constrained yet provide people latitude to express their tradeoffs faithfully.

### 1.2.2. Associated individual differences

There clearly are different views about what error value tradeoffs should be (Volokh, 2006), along with the social policies that reflect those views. Are there basic individual differences that predict these different views? Previous work (Dalgleish et al., 2010; Volokh, 2006) has suggested four traits as potentially associated with the judicial error
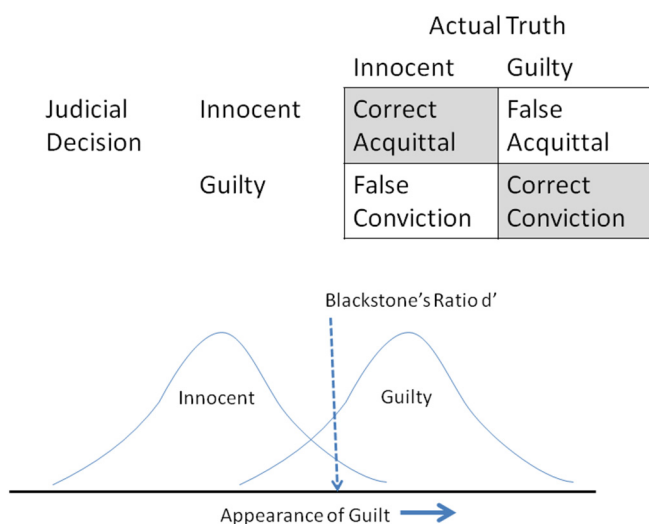


Actual Truth

| | | Innocent | Guilty |
|---|---|---|---|
| Judicial Decision | Innocent | Correct Acquittal | False Acquittal |
| | Guilty | False Conviction | Correct Conviction |

**Fig. 1.** Signal detection theory, as applied to the issue of judicial decision making.