Adaptive Lie Detection and Perceived Prevalence of False Reports in Evaluation of Sexual Offence Allegations

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Abstract

Research suggests that perceptions of the prevalence of truth and lies are important in informing evaluations of the honesty of others and, relatedly, the accuracy of the statements made by others. This research investigates these perceptions of prevalence and their influence specifically in the context of sexual offence reports. Results provide insight into perceptions of the prevalence of true and false statements in this context, and the influence of these perceptions on legal decision-making. Importantly, results support predictions informed by the Adaptive Lie Detector Framework and Fuzzy-Trace Theory by showing that providing evidence-based information on prevalence changes evaluations of witness testimony, but that this change is influenced by the framing of information provided as well as precise information itself. These findings provide new insight into how juries function as lie detectors, and into why juries may convict relatively few defendants in cases primarily reliant on defendant and complainant testimony.

Keywords: Deception detection; Adaptive lie detector; Juror decision making; Witness testimony; Fuzzy-Trace Theory; Psychology and law.

General Audience Summary

In some legal cases, including cases involving sexual offences, testimony from a defendant and complainant are often primary evidence that is considered by a jury. In these cases, jurors must examine the testimony of the defendant and the complainant and determine who they believe is telling the truth (or, more broadly, whose account they believe is accurate). Relatively little is known about how juries perform in this role. In this paper, I draw on a lie detection framework known as the Adaptive Lie Detector framework and a psychological theory of memory and decision-making known as Fuzzy-Trace Theory in order to examine the influence of one particular factor – perceptions of the prevalence of true and false allegations – on evaluations of testimony given by others. Results provide insight into people's perceptions of prevalence relevant to these judgments, suggesting that, at least in the UK, people may currently overestimate the prevalence of false allegations of both rape and child sexual assault. As predicted, results showed that providing evidence-based information to people led them to update their perceptions of prevalence, but the influence that this information had on subsequent evaluations was dependent on how the information was framed. When the information was framed as a rate of true allegations (encouraging extraction of a gist that most allegations are true) participants believed the complainant more when compared to the defendant. In contrast, when the information was framed as a rate of false allegations (encouraging extraction of a gist that some allegations are false) participants believed the complainant less when compared to the defendant. Results provide important insight into how jurors may operate when seeking to judge witness honesty and statement accuracy, and have implications for current debates relating to increasing prosecutions in cases involving sexual offences.

In legal cases juries can be required to operate as 'lie detectors,' evaluating the honesty of complainants, defendants, and other witnesses and, relatedly, the accuracy of their accounts (Fisher, 1997; Rand 2000). This role is particularly important in many cases involving allegations of sexual offences, since there are often no independent eyewitnesses to alleged offences (e.g., Menaker & Cramer, 2012). Legal decision-making in these types of case has been recognised as sub-optimal over the last few years. Put simply, the number of successful convictions for sexual offences is extremely low when compared to the number of incidents reported. For example, in England and Wales, data for the year to March 2020 showed 55,120 police recorded rapes, but only 1,439 convictions (Topping & Barr, 2020). Understanding better how juries function in their lie detection role is important in contextualising low conviction rates and in determining whether increasing successful prosecutions without increasing wrongful convictions is possible. The current article draws on the Adaptive Lie Detector (ALIED) Framework and Fuzzy-Trace Theory (FTT) to develop and test predictions relating to how juries function as lie detectors, with a focus on the importance of a specific type of context surrounding judgments – estimates of the prevalence of true and false allegations. For all studies in this article, all measures, conditions, data exclusions, and sample size determinations are reported.

Base Rates in Decision-Making and the Adaptive Lie Detector Framework

Existing research provides insight into the impact of information on or estimates of the general prevalence of underlying events on human decision-making. Research based on statistical learning highlights how humans observe statistical properties of their environment (e.g., how frequently organic products are healthy), and draw on those properties to guide ecologically rational behaviour (e.g., perceiving organic products as more healthy than non-organic products where organic foods are, on average, healthier; Perkovic and Orquin, 2018). In the context of deception detection, humans would be expected to observe (not necessarily

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consciously) the relative prevalence of truths and lies, and to incorporate this information into their evaluations of the veracity of statements made by others. The ALIED Framework provide a specific account of when and how this information will influence deception detection.

According to the ALIED framework, grounded in literature on bounded rationality (Gigerenzer and Selten, 2001), decision-makers adapt the information they use when making lie detection judgments based on what information is available (Street, 2015). As information pertaining to a specific statement becomes less diagnostic of honesty or deception, context is predicted to have a heavier weighting in deception detection – people will become more influenced by how often they believe they are likely to encounter lies, on average. So, for example, the 'truth bias' observed by existing research, whereby people tend to presume others are telling the truth, might be explained by the fact that people generally do, on average, tell the truth. This reliance on context is sensible and rational. If context suggests that most speakers will lie and an assessor has no or little individuating information (i.e., no information relevant to that specific statement to differentiate it from underlying averages), "a smart strategy is to be biased towards guessing speakers will lie" (Street 2015: 5). This framework is consistent with research examining the use of base rates (including prevalence estimates) in decision-making. While this research shows that base rates are generally underweighted by decision-makers (Tversky & Kahneman, 1982), it also suggests that the influence of base rates will be greater where decision-makers lack relevant information to individuate cases at hand from underlying probabilities (Epley & Dunning, 2000; see also Shah et al., 2016).

Adaptive Lie Detection in the Legal Context

In the legal context, cues that appear in witness testimony are often ambiguous. Even inconsistencies in testimony, which have traditionally been thought of as hallmarks of

deception, can be (correctly) interpreted as resulting from stress or natural memory decline, as well as being a result of deception (e.g., Fisher, 2013). This potential lack of individuating cues creates a situation in which the ALIED framework suggests that people's evaluations will be influenced by their perceptions of the prevalence of truths vs. lies, specifically in the relevant legal context (e.g. in the context of sexual offence allegations). This influence of perceived prevalence is consistent with theory underlying jury decision-making more generally (see e.g., the role of plausibility in Pennington & Hastie's Story Model, Pennington & Hastie 1991; 1992) and previous work that has provided support for the idea that perceptions of prevalence impact legal lie detection judgments (Domagalski et al., 2020; Helm & Growns, 2022; Kassin et al., 2005).

This influence of perceptions of prevalence has the potential to be problematic in the context of true and false allegations where the stakes of lie detection decisions are high and perceptions of prevalence are susceptible to error and bias. It is likely impossible to accurately quantify the prevalence of false allegations since when an accusation is made it is very difficult to say whether it is false. Importantly, an allegation being false is different from an allegation that cannot be proved through investigation (and therefore might be labelled unsubstantiated, see International Association of Chiefs of Police, 2005: 12-13). Perhaps as a result of these difficulties, estimates of the rates of false allegations vary widely – one review of twenty studies reported estimates ranging from 1.5% of allegations being false to 90% of allegations being false (Rumney, 2006) – and statements relating to prevalence are often made in the absence of any data (e.g. MacDonald, 2008). This lack of clarity creates a situation in which different groups can easily form different conclusions as to prevalence (e.g. Helm & Growns, 2022; Ortiz & Smith, 2022).

Importantly, a smaller set of studies have begun to converge on more empirically-supported estimates of prevalence in this area that can provide insight which public

perceptions of false allegation rates can be compared to. One large and comprehensive study by the British Home Office analysed 2,643 rape cases over a 15-year period – relying on multiple sources of data to identify false allegations (categorised as allegations where "there is a clear and credible admission by the complainant's or where there are strong evidential grounds" Kelly et al., 2005). That study estimated that only around 3% of allegations were false, suggesting systematic over-estimation of the prevalence of false accusations (Kelly et al., 2005). Other similar research projects have reached roughly the same estimates, leading to conclusions that the prevalence of false allegations in the context of rape is between 2% and 10% (Lisak et al., 2010). In the case of false allegations of child sexual assault specifically, one study in the 1980s examining a large ($N = 1,249$) sample of child protective services cases in the US estimated the rate of false allegations at around 4-8% in that context (Everson & Boat, 1989). Similar estimates have been reached by a range of related work, although it is important to note that each of these studies have methodological limitations (see O'Donohue et al., 2018). Partly as a result of the lack of clarity and the varied reports in this area, the extent to which beliefs in the general population reflect these evidence-based estimates is unclear.

Given the likely impact of perceptions of prevalence in context of sexual offences, and their susceptibility to error and bias, it is important to understand the perceptions that form the current backdrop against which legal lie detection judgments are being made. In a short initial study, perceptions of this prevalence, specifically in the UK, were examined.

Study 1: Perceptions of Prevalence

Method

Participants

Participants in Study 1 were 200 adults based in the UK who were recruited via the Prolific survey platform. All participants correctly answered the single attention check

question and were therefore included in the final sample. Participants in the sample had an average age of 35.91 years (*SD* = 11.83, *range* = 18-69), and half self-identified as female (49.5% as male and 0.5% as gender diverse). The racial composition of the sample was 87.5% White, 4.5% Black, 4.5% Asian, and 3.5% other. These demographics roughly correspond to the racial composition of the UK as a whole (see Office for National Statistics, 2011).

Design and Procedure

All participants answered questions about the prevalence of four events relevant to sexual offence allegations, two involving child complainants and two involving adult complainants. They were asked to answer each question based on their own knowledge and opinions. Analyses in this paper focus on two of the questions: roughly what percentage of allegations of sexual assault made by children are not true (i.e. are false allegations)? And, roughly what percentage of allegations of rape are false (meaning that the rape did not actually occur)? Following completion of this task, participants answered a short set of demographic questions. All materials underlying the study and the final dataset are available at https://osf.io/6c8pw/?view_only=a03a52056e9647af88d1cb5d1d836574.

Results

Estimates given by participants in response to each of the prevalence questions are displayed in Figure 1.
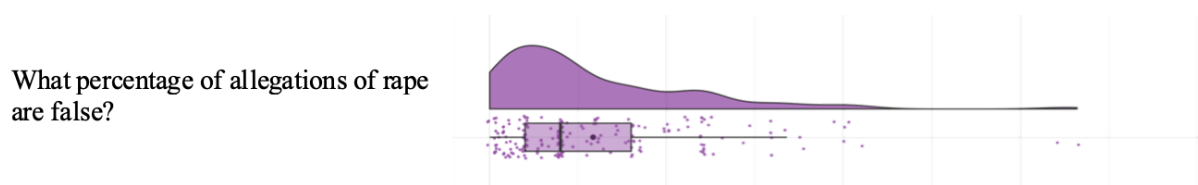
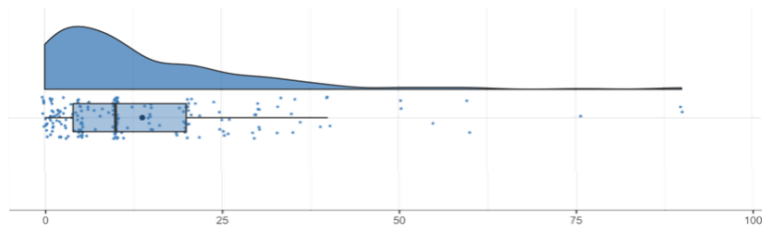What percentage of allegations of child sexual assault are not true?

Figure 1. Participant estimates of the prevalence of events from Study 1. Raincloud plots depict the jittered participants' averaged data points, box-and-whisker plots, means (represented by circles), and frequency distributions.

In terms of perceptions of the percentage of allegations of rape that are false, the mean estimate was 14.54 (95% CI [12.60, 16.50], SD = 13.92), and the median estimate was 10 (IQR = 15). In terms of perceptions of the percentage of allegations of child sexual assault that are not true, the mean estimate was 13.73 (95% CI [11.61, 15.85], SD = 15.13), and the median estimate was 10 (IQR = 16.25).

Discussion

Results demonstrate a wide range of estimates of the proportion of allegations of rape and child sexual assault that are not true – from less than 5% to more than 25% (and in a small number of cases even more than 50%). Average responses represent an overestimation of the proportion of allegations that are false, when compared to evidence-based estimates (see above research suggesting approximately 2-10% of allegations of rape and 4-8% of allegations of child sexual assault are false). Specifically, even the lower bound of the 95% confidence intervals around our study means were higher than the higher end of these estimates.

If estimates of prevalence are influencing lie detection judgments, and these estimates overestimate the prevalence of false allegations, jurors may be unnecessarily discounting the testimony of complainants in cases involving sexual offences. In Study 2, the impact of perceptions of the prevalence of false allegations and of information seeking to change these perceptions of prevalence was examined.

Study 2: Manipulating Perceptions of Prevalence and Legal Lie Detection

If perceptions of the prevalence of false allegations are influencing lie detector judgments in the context of sexual offences, and these perceptions generally overestimate the prevalence of false allegations, providing participants with official estimates as to prevalence might be an effective way to help decision-makers contextualize their judgments with the right information, and thus to improve the quality of judgments. Study 2 examined experimentally how changing participants perceptions of prevalence would influence legal lie detector judgments, and associated verdicts.

As described above, the ALIED framework and existing research suggest that changing perceptions of prevalence will influence legal lie detector judgments such that perceiving lying in a particular context as more common makes it more likely a particular actor in that context will be viewed as dishonest and, relatedly, their testimony inaccurate (meaning it does not reflect what really happened). Consideration must also be given to precisely how information on prevalence will influence their decision-making. Psychological theory, specifically Fuzzy-Trace Theory (FTT), suggests that when decision-makers are given numbers they will encode those numbers (verbatim representations) but will also encode meaningful representations of those numbers at varying levels of precision from categorical to ordinal (for example, "some people lie," "most people tell the truth," "people lie in less than 50% of cases") (gist representations) (Reyna, 2012, Wilhelms et al., 2014; see Helm et al., 2017 in the jury decision-making context). Adult decision-makers are thought to rely on gist representations rather than verbatim representations where possible when making decisions (Reyna et al., 2014). As a result, according to FTT, when people take into account prevalence in their decisions, they will take into account the gist of prevalence rather than verbatim figures (e.g., relying on the fact that "some allegations are false" rather than that "4% of allegations are false").

Gist extracted from information often corresponds with verbatim information (for example, a higher verbatim number is more likely to be encoded as "high" than a lower verbatim number; see Hans et al., 2022). As a result, errors in verbatim representations are likely to correspond with inappropriately assigned gist (gist assigned based on misunderstanding). However, gist can also be influenced by irrelevant factors, such as how information provided is framed (e.g. Chick et al 2016; Reyna et al., 2014). This framing can interrupt the correspondence between verbatim and gist representations by emphasizing a particular gist. So, for example, telling participants that about 95% of allegations are true might lead them to rely on a gist that "the majority of allegations are true," but telling participants that about 5% of allegations are false might lead them to rely on a gist that "some allegations are false." Understanding this impact of framing is important since when insight into prevalence is given to people, for example by the press, it is often framed in a particular way – emphasizing the problem of a lack of convictions (e.g., Boycott, 2013) or the problem of false accusations (e.g., Piper, 2014).

Study 2 tested three specific predictions, based on the ALIED framework, results of Study 1, and FTT, specifically in the context of a child sexual assault case:

(1) Providing an evidence-based estimate of the rate of false allegations (specifically 4% - 8% of allegations) will reduce people's estimates of the prevalence of false allegations, since this estimate is lower than average estimates.

(2) Providing an evidence-based estimate of the rate of false allegations (specifically 4% - 8% of allegations) will lead people to believe a complainant more (and a defendant less).

(3) The influence of providing an evidence-based estimate of the rate of false allegations (specifically 4%-8% of allegations) will vary depending on how the estimate is framed. The estimate will have more of an effect on judgments where it is framed as a

rate of true allegations rather than a rate of false allegations, through emphasizing the fact that the majority of allegations are true and thus promoting belief in the complainant.

Method

Participants

Participants in Study 2 were 377 adults based in the UK from the Prolific survey platform. This sample size was determined prior to data collection and based on an *a priori* power analysis for detecting a medium effect ($f = .2$) in a 3 (between subjects factor) x 2 x 2 (within subjects factors) experimental design with 90% power using the *Webpower* package in R (Zhang & Mai, 2018) ($N = 327 + 50$ to account for attrition). In the final analysis, participants were excluded for a number of reasons determined prior to data collection. Ten participants were excluded for not completing measures of interest in the study, 12 participants were excluded due to failing one of our three attention check questions, and 15 participants were excluded due to failing to accurately repeat the prevalence information that had been provided to them immediately after it had been provided (four participants in the false framing condition and eleven participants in the true framing condition). This left a final sample size of 340. Because exclusion criteria were not preregistered, and some attention check exclusions required subjectivity (specifically due to marking a participant's answer about the scenario as correct or incorrect), analyses were also conducted using the full sample that responded to relevant questions ($N = 367$). All significant results replicated in this full sample, and analyses involving this sample as well as the full dataset can be found on osf. Participants in the final sample had an average age of 37.13 years ($SD = 11.83$, *range* = 19-74), and 48.8% self-identified as female (50.3% as male and 0.9% as gender diverse). The racial composition of the sample was 87.1% White, 3.5% Black, 4.7% Asian and 4.7% other.

Design and Procedure

In this study, the prevalence information given to participants was manipulated. Participants either saw no prevalence information (control condition), were told that some research suggests 4-8% of allegations of child sexual assault are false (false framing), or were told that some research suggests 92-96% of allegations of child sexual assault are true (true framing).[1] Where participants were given prevalence information, they were told that it should not dictate their decisions in evaluating evidence but that it may be helpful to them in contextualizing their evaluation. They were asked to provide the official figure they had been given after having been shown it, to confirm they had read and understood the information (see above for information on participants excluded due to not being able to provide this information). Participants giving an answer outside the range provided were scored as inaccurate and excluded from the final sample.

Participants then read case materials in a vignette involving a girl accusing her teacher of child sexual assault (these case materials were taken from existing work in this area; Helm & Growns, 2022). Participants first saw some brief information introducing the task, and then read a summary of each side's position, and testimony from the complainant and defendant in the case in the form of responses to direct examination questions. After reviewing the materials participants were asked how likely they thought it was that the defendant sexually assaulted the complainant (on a scale from 0 [he definitely did not] to 100 [he definitely did]), and were given instructions on the law relating to the alleged crime and the burden of proof and asked to indicate their preferred verdict (guilty or not guilty). After giving a verdict they were asked to rate the accuracy of the testimony given by the complainant and the defendant (defined as the extent to which the testimony was consistent with what actually

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[1] Note that due to an initial Qualtrics error and due to the removal of participants who incorrectly reported prevalence rates, the control and false framing conditions were oversampled compared to the true framing condition in the final sample ($n_{control} = 129$, $n_{falseframing} = 127$, $n_{trueframing} = 84$). Even with the smaller sample size, the Study had more than 80% power to detect a medium effect ($f = .2$) in our experimental design. Non-parametric analyses not requiring equal sample size were also used to support parametric analyses.

happened) and the honesty of the complainant and the defendant (defined as the extent to which they were telling what they believed to be the truth) on 11 point scales from 0 (not at all) to 10 (completely). Participants then had the opportunity to provide a written explanation of their verdict.

Participants were then asked to provide an indication of their own beliefs as to the percentage of allegations of child sexual assault that are false (precise prevalence estimates). This question was included to examine how the information provided influenced perceptions as to prevalence in each condition and to ensure any differences between the false framing and true framing conditions were not the result of different presumptions about the remaining percentage of cases (e.g. in the false framing condition interpreting the remaining 92-96% of cases as being ambiguous rather than necessarily being true). Participants were also asked how they would rate the number of false allegations, on a five-point scale from "a very low amount" to "a very high amount." Finally, participants were asked whether their opinions on the prevalence of false allegations changed as a result of the survey, and answered questions relating to demographics. All materials underlying the study and the final dataset are available at https://osf.io/6c8pw/?view_only=a03a52056e9647af88d1cb5d1d836574.

Results

The Impact of Information on Perceived Prevalence

A univariate analysis of variance (Type III sums of squares) using condition (control, false framing, true framing) to predict precise prevalence estimates revealed a significant main effect of condition ($F(2, 334) = 46.44$, $MSe = 16615.82$, $p<.001$, $\eta_p^2 = .22$). As predicted, estimates of the prevalence of false allegations were significantly lower among participants in the two conditions where they were provided with information on prevalence than in the control condition ($M_{control} = 30.06$, $SD = 19.40$, $M_{falseframe} = 7.59$, $SD = 11.17$, $p<.001$, $d = 1.42$, 95% CI [1.14, 1.70]; $M_{trueframe} = 14.26$, $SD = 26.14$, $p<.001$, $d = .71$, 95%

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CI [.42, .99]). Unexpectedly, estimates in the false framing condition were significantly lower than estimates in the true framing condition ($p = .01$, $d = -.36$, 95% CI [-.64, -.08]).

Note that the estimate of the prevalence of false allegations in the control condition is higher than the same prevalence rating in Study 1, which was 13.73 (95% CI [11.61, 15.85], $SD = 15.13$) (and participants in our true framing condition gave estimates similar to this rating). This suggests that, consistent with prior work (Helm & Growns, 2022), seeing case facts involving an alleged false allegation can lead to increased ratings of the prevalence of false allegations. This effect likely led to estimates across conditions being higher than they would have been if asked for prior to rather than after viewing case facts.

The Impact of Information on Testimony Evaluations and Verdicts

Relative Believability. A repeated measures analysis of variance (Type III sums of squares) was run to examine the impact of information on prevalence on testimony evaluations. In this analysis, condition (control, false framing, true framing) was a between subjects factor and rating type (accuracy, honesty) and rating actor (complainant, defendant) were within subjects factors. This analytical approach was used as an initial omnibus test of the third study prediction: that the provision of information will lead people to believe a complainant more, and a defendant less. Including defendant and complainant ratings together in the analysis allowed examination not only of how individual ratings were influenced but how they were influenced compared to each other (note that this comparison is key since an increase in belief in the complainant is only legally important where this increase increases the relatively believability of the complainant when compared to the defendant). Follow-up mean comparisons then tested the fourth study prediction: that this influence will differ based on the framing of the information. Note that this initial ANOVA included honesty and accuracy in one analysis, but findings of ANOVAs examining honesty and accurately separately produced similar results (see supplemental materials for these

analyses). A series of non-parametric analyses examining each rating individually were also used to provide further insight into results and to control for differences in sample size.

The ANOVA revealed two unpredicted effects. First, the analysis revealed a main effect of rating actor ($F(1, 333) = 16.35$, $p<.001$, $\eta_p^2 = .05$) such that overall ratings of accuracy and honesty were higher for the complainant than for the defendant ($M_{complainant} = 6.09$, $SD = 2.28$, $M_{defendant} = 5.28$, $SD = 2.31$, $d = .20$, 95% CI [.09, .30]). Second, the analysis revealed a significant interaction between rating type and rating actor ($F(1, 333) = 52.64$, $p<.001$, $\eta_p^2 = .14$). The complainant was rated as significantly more honest than accurate ($M_{accuracy} = 5.87$, $SD = 2.25$, $M_{honesty} = 6.31$, $SD = 2.47$, $p <.001$, $d = -.37$, 95% CI [-.48, -.26]) and the defendant was rated as significantly more accurate than honest ($M_{accuracy} = 5.43$, $SD = 2.20$, $M_{honesty} = 5.18$, $SD = 2.59$, $p <.001$, $d = .18$, 95% CI [.07, .29]).

In addition, the analysis revealed the predicted interaction between condition and rating actor ($F(2, 333) = 8.23$, $p<.001$, $\eta_p^2 = .05$). In the control condition, participants rated the complainant as significantly more accurate and honest than the defendant ($M_{complainant} = 5.89$, $SD = 2.37$, $M_{defendant} = 5.04$, $SD = 2.26$, $p = .03$, $d = .20$, 95% CI [.02, .37]). In the false framing condition, the difference between complainant and defendant ratings was reduced, such that there was no significant difference between ratings of complainant and defendant accuracy ($M_{complainant} = 5.78$, $SD = 2.19$, $M_{defendant} = 5.87$, $SD = 2.32$, $p = .81$, $d = -.02$, 95% CI [-.20, .15]). In the true framing condition, the difference between complainant and defendant ratings was increased, such that the extent to which the complainant was rated as more accurate and honest than the defendant was greater than in the control condition ($M_{complainant} = 6.84$, $SD = 2.14$, $M_{defendant} = 4.74$, $SD = 2.19$, $p <.001$, $d = .53$, 95% CI [.30, .76]). These results and accompanying distributions are displayed in Figure 2.
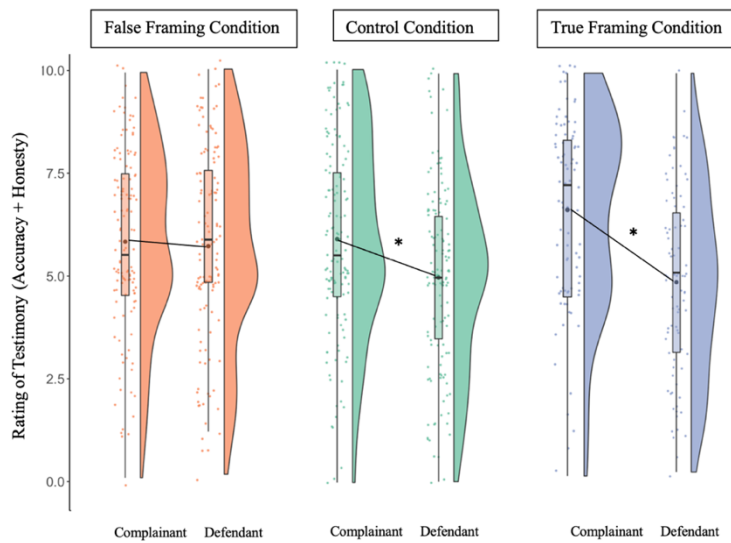
Figure 2. Combined accuracy and honesty ratings for complainant and defendant by condition. Raincloud plots depict the jittered participants' average data points, box and whisker plots, means (represented by circles), and frequency distributions.

Follow-Up Non-Parametric Tests: Testimony Evaluations. Non-parametric tests were conducted in order to examine the impact of condition on each of our four ratings separately in order to get more insight into the precise impact of our conditions. Kruskal-Wallis tests showed that condition significantly influenced each of our ratings – complainant accuracy ($H(2)$=14.46, p<.001), complainant honesty ($H(2)$=9.73, p=.01), defendant accuracy ($H(2)$=9.76, p=.01), and defendant honesty ($H(2)$=16.45, $p < .001$).

Follow-up Mann-Whitney U tests showed that providing information framed as a rate of true allegations led participants to rate the complainant as more accurate and honest (but did not significantly influence ratings of the defendant). Complainant accuracy and honesty were both rated as significantly higher in the true framing condition when compared to the control condition ($U[N_{control} = 129, N_{trueframing} = 84] = 4057.50$, z = 3.13, $p = .002$ and $U[N_{control} = 129, N_{trueframing} = 84] = 4244.00$, z = 2.57, $p = .01$, respectively) and when compared to the false framing condition ($U[N_{falseframing} = 127, N_{trueframing} = 84] = 3778.50$, z = 3.63, $p <.001$ and $U[N_{falseframing} = 127, N_{trueframing} = 84] = 3998.00$, z = 2.99, $p =.003$, respectively). Defendant accuracy and honesty ratings in the true framing condition did not significantly differ from ratings in the control condition ($U[N_{control} = 129, N_{trueframing} = 84] =$

5244.00, z = -.40, p = .69 and $U[N_{control}$ = 129, $N_{trueframing}$ = 84] = 4801.00, z = -1.19, p = .23,

respectively).

Conversely, providing information framed as a rate of false allegations led

participants to rate the defendant as more accurate and honest (but did not significantly

influence ratings of the complainant). Defendant accuracy and honesty were both rated as

significantly higher in the false framing condition when compared to the control condition

($U[N_{control}$ = 129, $N_{falseframing}$ = 127] = 6687.50, z = 2.58, p = .01, and $U[N_{control}$ = 129,

$N_{falseframing}$ = 127] = 6242.50, z = 3.05, p = .002) and when compared to the true framing

condition ($U[N_{trueframing}$ = 84, $N_{falseframing}$ = 127] = 4160.00, z = 2.74, p =.01, and $U[N_{trueframing}$

= 84, $N_{falseframing}$ = 127] = 3624.50, z = 3.71, p <.001). Complainant accuracy and honesty

ratings in the false framing condition did not significantly differ from ratings in the control

condition ($U[N_{control}$ = 129, $N_{trueframing}$ = 84] = 5244.00, z = -.40, p = .69, and $U[N_{control}$ = 129,

$N_{trueframing}$ = 84] = 4801.00, z = -1.19, p = .23, respectively).

Verdicts. A logistic regression with condition included as two dummy variables

(control vs. true framing and control vs. false framing) as predictors of verdict were used to

examine the impact of conditions on verdicts. This regression (Nagelkerke R^2 = .06) showed

that participants in the true framing condition were more likely to consider the defendant

guilty than participants in the control condition (B = .82, SE = .30, OR = 2.27, p = .01). The

odds of a defendant being found guilty were more than twice as high in the true framing

condition when compared to the control. There was no significant difference in verdicts

between the false framing condition and the control condition (B = -.35, SE = .31, OR = .71,

p = .25).

Precise Prevalence Estimates and Testimony Evaluations

Finally, exploratory analyses examined the relationship between precise prevalence

estimates and testimony evaluations. An implication of the prediction that data provided will

lead participants to update beliefs as to percentage prevalence, but that it is gist of that information, rather than precise estimates, that will influence judgments, is that where a particular gist is presented (through framing), percentage estimates of prevalence may not predict decisions. Exploratory analyses were conducted to examine associations between precise prevalence estimates and testimony evaluations (complainant accuracy, complainant honesty, defendant accuracy, defendant honesty). These analyses showed that precise prevalence estimates were significantly correlated with ratings of complainant accuracy $rho(364) = -.22$ ($p<.001$) and complainant honesty $rho(363) = -.18$ ($p<.001$), such that rating false allegations as more prevalent was associated with finding the complainant less accurate and honest. Precise prevalence estimates were not significantly associated with ratings of defendant accuracy $rho(364) = .01$ ($p=.85$) or defendant honesty $rho(364) = .10$ ($p=07$). However, precise prevalence estimates were significantly associated with all four ratings in the control condition, such that rating false allegations as more prevalent was associated with finding the complainant less accurate and honest and the defendant more accurate and honest ($rho[126] = -.49$ [$p<.001$]; $rho[126] = -.47$ [$p<.001$]; $rho[126] = .28$ [$p=.002$]; $rho[126] = .37$ [$p<.001$]). In the two other conditions (true framing and false framing), none of these correlations were significant.

Discussion

Results of Study 2 support predictions by showing that providing official estimates of prevalence of false allegations in the context of child sexual assault to decision-makers can influence not only their perceptions of prevalence (in this context leading people to believe false allegations are less common), but also their judgments about the honesty of witnesses and, relatedly, the accuracy of witness statements and ultimate legal responsibility. Importantly, as predicted, results suggest that the influence of providing information on prevalence can depend on how that information is framed, with gist rather than verbatim

driving judgments. In this study, framing information on prevalence as a rate of true allegations increased the extent to which participants rated the complainant as accurate and honest compared to the defendant (specifically by increasing ratings of the accuracy and honesty of the complainant and not altering ratings of the defendant). This effect occurred despite participants in this condition ending up rating false allegations as being significantly more common than participants in the false framing condition did, and was associated with a significantly higher likelihood of finding the defendant guilty. Providing the same information framed as a rate of false allegations did not, as anticipated, have less of an impact in terms of increasing ratings of accuracy and honesty of the complainant when compared to the defendant, but actually resulted in decreasing ratings of accuracy and honesty of the complainant when compared to the defendant (specifically through increasing ratings of the accuracy and honesty of the defendant and not altering ratings of the complainant).

These results suggest that it is the gist of information on prevalence, rather than verbatim information (precise prevalence estimates) that is relied on and reflected in legal lie detection judgements (although absent interference gist judgements are likely to correspond well to verbatim judgements; see Hans et al., 2022). In fact, while changing gists influenced judgements (discussed above), exploratory analyses showed that relationships between precise prevalence estimates and lie detector judgements were non-significant where information on prevalence framed to emphasise a particular gist was given. Put simply, impressions of prevalence influence legal lie detection judgments, but the influence this information has depends on the "gist" of information, rather than precise figures.

General Discussion

Much existing research examining failures to prosecute successfully in cases involving sexual offences has focused on the potential influence of rape myths - "descriptive or prescriptive beliefs about rape…that serve to deny, downplay, or justify sexual

violence…" (Dawtry et al., 2019; Gerger et al., 2007; Leverick, 2020). This research has led legal systems to take steps to counter the potential influence of rape myths. For example, in England and Wales judges are provided with guidance to draw on when countering rape myths. The guidance states: "*There is no typical rape, typical rapist, or typical person that is raped. Rape can take place in almost any circumstance. It can happen between all different kinds of people. And people who are raped react in a variety of different ways.*" (s20 Crown Court Compendium Part 1: Jury and Trial Management and Summing Up, see also Miller [2010] EWCA Crim 1578). The research in this paper suggests that gist-based beliefs about the prevalence of lies vs truths in allegations of sexual assault may also be having an impact on juror judgments. Importantly, these beliefs are susceptible to being based on misunderstandings. Providing decision-makers with correct information and assisting them in assigning an appropriate gist will be likely to influence judgments.

Results clearly show the importance of surrounding context on evaluations of the honesty of witnesses, in line with the ALIED framework. This insight, consistent with adaptive decision-making perspectives (Gigerenzer and Selten, 2001), suggests that lay decision-makers may be engaging in processes with the potential to promote economically rational evaluations of the statements of others (Perkovic and Orquin, 2018) but that their abilities are limited by the information that they have and the low diagnosticity of relevant cues. The low diagnostiticy of cues forces reliance on underlying context and judgments relating to underlying context are prone to inaccuracy due to both the difficulty of establishing reasonable prevalence estimates and biasing influences including polarised media reporting of both true and false allegations that can influence gist-based perceptions.

An important normative question in this context is whether the standard of proof required to prove a criminal case – "beyond a reasonable doubt" – actually requires jurors to rely on a gist that "some allegations are false." If so, it could be that failures to convict result

from justified reliance on a gist relating to prevalence, despite errors in verbatim estimates. The rate of false allegations is very low but in any given case there is a small possibility that an allegation may be false, rendering it difficult to know an allegation is true beyond a reasonable doubt, absent reliable corroborating evidence. Seeking to increase convictions without increasing wrongful convictions is therefore a complex task. More radical legal change may be needed to change the landscape of convictions in this field.

The results of this study should be interpreted in light of some limitations. Importantly, the study utilised relatively brief case materials and participants were aware that their decisions would not impact real litigants. It is possible that if more extensive case materials were given, as in real cases, participants would have more to go on in the materials themselves and therefore have less room to be influenced by context. However, it should be noted that there are no reliable cues indicating honesty or deception, even in more detailed accounts (e.g., DePaulo et al., 2003; Hartwig & Bond, 2011; Luke, 2019). In reality, the influence of perceived prevalence in this area is likely to combine and interact with other influences on jury decision-making, including cues in testimony that may influence how that testimony is evaluated. However, this influence of perceived prevalence may be an important part of the puzzle in understanding how juries function when operating as lie detectors, and the ALIED Framework is a useful framework to draw on to account for this influence and to better conceptualise jury decisions in this area.

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