

**The Impact of Evidence Type and Judicial Warning on Juror Perceptions
of Global and Specific Witness Evidence**

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Abstract

The Court of Appeal in England and Wales held (*R. v. Sardar*, 2012) there had been no exceptional circumstances which justified a jury retiring with a transcript of the complainant's interview. This paper reports an investigation into the impact multiple evidence forms and use of a judicial warning has on juror evaluations of a witness. The warning focuses juror attention on placing disproportionate weight on the evidence as opposed to their general impression of it. Sixty jury-eligible participants were presented with witness evidence in transcript, video, or transcript plus video format. Half the participants in each condition received the warning. All mock jurors completed a questionnaire which assessed perceptions of witness and task. Outcomes showed that transcript plus video evidence, when accompanied by a warning, did impact on mock jurors' global assessments of the witness. The warning made the task less clear for jurors and, in the video condition, led to higher ratings of how satisfactory and reliable the witness was. Findings support the provision of a judicial warning to jurors and show some initial support for judiciary opposition to the provision of an additional transcript *only* when jurors are asked to make the more usual global witness assessments.

Key Words: Judicial Warning; Evidence; Juror Perceptions; Witness Testimony

The Impact of Judicial Warning and Evidence Type on Juror Perceptions of Global and Specific Witness Evidence

The case of *R. v. Sardar* (2012) in England and Wales deemed a rape conviction unsafe as the jury had, without good reason, been provided with a transcript of the complainant's video evidence-in-chief and, in addition, were permitted to keep it during deliberations. In this jurisdiction, complainant video evidence is that captured by Achieving Best Evidence (ABE) procedures (i.e., at police interview) which is then used as evidence in chief during trial. In addition, jurors were not warned of the risks of placing disproportionate weight on the transcript rather than forming an impression of the witness. The Court of Appeal concluded that the prosecution had likely gained an unfair advantage. The case of *Sardar* was guided by previous rulings that established transcripts of video evidence could only be used if they assisted jurors to follow the evidence, for example, if a witness has a strong accent or the audio quality was poor.¹ Moreover, any evidence should be accompanied by a judicial warning (*R. v. Welstead*, 1995; *R. v. Popescu*, 2010).

It is apparent this ruling was motivated by two key concerns; first, that transcript evidence will be given greater consideration than other trial evidence, and second, that jurors will focus heavily on a transcript rather than evaluating the witness more generally (i.e., globally). Specific witness attributes are those which are not

¹ See also Minnesota State Bar Association General Rule 1: Transcripts of audio recordings played during trial may be provided to the jury to help them understand what is said in the recording. The decision to furnish jurors with copies of a transcript to assist them in listening to the audio recording is subject to the sound discretion of the trial judge. The need to provide transcripts to the jury during audio playback is generally caused by two circumstances: (1) inability to understand a portion of the tape under the circumstances in which it will be replayed; (2) the need to identify the speakers, especially if two or more persons talk at the same time (the Hon. Alan Pendleton, see <http://mnbenchbar.com/2015/07/using-transcripts-of-audio-recordings-during-trial/> accessed 6 September, 2016.

considered global, for example, how accurate, confident or intelligent the witness might be. The latter point is of interest given that multimedia learning researchers have raised similar concerns arguing that individuals are more likely to attend to text than accompanying graphics (Clark & Mayer, 2011). Such assertions nevertheless lack empirical support, particularly as applied to the courtroom, since no research has investigated whether simultaneously presenting jurors with multiple forms of evidence has an effect on information-processes and thereby juror evaluations. Similarly, there is at present little empirical evidence to suggest that the provision of a judicial warning is a safeguard against bias.

Against this backdrop, the present study aimed to examine the effects of multiple forms of evidence and judicial warning on juror perceptions of witness testimony. We outline the method employed in the study below but turn our attention first to judicial warnings. Given the universal use of warnings in legal contexts it is essential to consider whether warnings, as used in legal cases, are an adequate safeguard against bias.

Despite an “entrenched belief” that judicial warnings are a successful method of educating jurors (Coyle & Thomson, 2014; p.8) research has returned mixed results. First, several studies have demonstrated that warnings encourage juror caution, as warnings about the reliability of eyewitness testimony results in fewer guilty verdicts (Greene, 1988; Katzev & Wishart, 1985; Paterson, Anderson, & Kemp, 2013). Moreover, research shows that warnings can mitigate bias, including bias caused by the emotional expression of a witness or incorrect beliefs about non-verbal indicators of deception (Bollingmo, Wessel, Sandvold, Eilertsen, & Magnussen, 2009; Coyle & Thomson, 2014). These findings suggest that warnings can enhance juror performance and are an effective means of directing attention to appropriate factors

for consideration. It is of particular relevance for the case in point that warnings may affect the extent to which jurors focus on witness demeanour.

In contrast, other researchers have reported that witness testimony warnings had no impact on verdicts or credibility ratings of a witness (Cutler, Dexter, & Penrod, 1990; Nikonova & Ogloff, 2005). In addition, judicial warnings have been shown to be ineffective against hindsight bias and coercion bias (Kamin & Rachlinski, 1995; Kassin & Wrightsman, 1981; Smith & Greene, 2005). Taken together this indicates the efficacy of judicial instructions is variable and may not always assist in the prevention of bias. Moreover, comprehension rates of jury instructions are often found to be low (Rose & Ogloff, 2001). More recent research for example has shown that even when most jurors report they comprehend judicial instructions only a small minority actually demonstrates a full understanding of those instructions (Thomas, 2010). It is thus unclear from existing research whether a judicial warning will be successful in preventing bias, though it may encourage jurors to make more cautious ratings of the witness.

The warning element is only one part of the story. Psychological perspectives relevant to information processing and cognition can also help to explain why when humans process and / or undertake complex or multiple tasks performance might diminish given the finite cognitive resources available. One concept underpinning the *Sardar* case is the assumption that jurors cannot attend to two forms of evidence effectively at the same time. Cognitive-load theory states that constraints on working memory and information-processing systems mean that humans have limited cognitive resources for performing tasks (Baddeley, 2003; Sweller, 1988). Such a theory accounts for when carrying out complex tasks or multiple tasks this can diminish performance given limited cognitive resources (Pashler, 1994; Wagstaff, et

al., 2007; Wheatcroft & Ellison, 2012). Further, some researchers have proposed that individuals can be so limited at thinking and making inferences that mental shortcuts are often taken; that is they are miserly in their thinking (Fiske, 1995). As a result individuals under high cognitive-load may resort to heuristic processing and the use of cognitive shortcuts to simplify processing conditions (Fiske & Taylor, 1991), for example, when processing two separate pieces of evidence. Although heuristics enhance the efficiency of everyday processing they may also increase the likelihood of biased judgements (Kahneman, 2011; Tversky & Kahneman, 1974). In addition to cognitive-load, Sedikides and Skowronski's (1991) 'law of cognitive structure activation' [i.e., that 'stimuli will be encoded as an instance of the structure that is most highly active in memory and the most semantically similar to the stimulus' (p.1)] and Eagly and Chaiken's (1993) 'least effort principle' [i.e., that people have a tendency to use the most convenient search methods when seeking information in the least exacting way - stopping that search once an acceptable solution is found (for a review, see also Chaiken & Trope, 1999) may also have relevance in this complex context. Moreover, a neuropsychological-cognitive model proposed by Wagstaff, Wheatcroft, *et al.* (2007) suggests that technically difficult tasks might be facilitated more readily if unnecessary cognitive burdens can be reduced. Thus, Wagstaff *et al.*'s model helps to consider cognitive load relative to task difficulty in this multifaceted domain, both tasks which are more and less complex (Wheatcroft & Ellison, 2012).

There exists persuasive evidence in the literature to demonstrate juror performance suffers under high cognitive-load. Psychological research into decision-making processes and juror ability suggests that social-cognitive factors may be influential. Indeed, persuasive evidence in the literature shows juror performance suffers under high cognitive load. For example, jurors who must process greater

amounts of information in a trial have been shown to use heuristics, struggle to return appropriate verdicts, and even misinterpret evidence (Horowitz & Bordens, 2000; Horowitz, Bordens, Victor, Bourgeois, & ForsterLee, 2001; Horowitz, ForsterLee, & Brolly, 1997; Tamborini, Huang, Mastro, & Nabashi-Nakahara, 2007). Although one might argue these findings have limited ecological validity due to the use of mock juror paradigms, research with actual jurors has yielded similar results, with juror confidence decreasing as the amount of information to be processed increases (Heuer & Penrod, 1994). It is also possible that jury members are likely to be influenced by group processes activated during the deliberations that follow a trial. One influential theory of jury deliberation places story making as a central feature. Pennington and Hastie's (1991) *story model* proposes that decision making by juries involves an active, constructive comprehension process in which information is moulded into a coherent mental representation: the story (Pennington & Hastie, 1992). The jury applies a 'goodness of fit' to the most acceptable version using principles of coverage, coherence, and uniqueness. Taken together findings demonstrate that jurors under high cognitive-load are more likely to be impaired in their ability to systematically process information and reach unbiased decisions, and theories support the contention that bias is likely to occur.

A number of other factors may also increase cognitive-load and affect juror performance. Research has found that presentation of complex evidence triggers heuristic processing (Bourgeois, Horowitz, & ForsterLee, 1993) causing jurors to assess witnesses using peripheral cues, such as gender or credentials (Cooper, Bennett, & Sukel, 1996; Schuller, Terry, & McKimmie, 2005). Further, that the imposition of two concurrent cognitively demanding tasks increases jurors' use of heuristics and disrupts information-processing (Kleider, Knuycky, & Cavrak, 2012;

Malavanti, 2012). Such disruption to processing may impact on juror confidence in own decision making. For example, Pennington and Hastie (1991) place emphasis on mental representations (i.e., the structure and content of processed information), and note that narratives are imposed on evidence (i.e., story model) as it is processed by jurors making decisions. Those stories may be more or less structured, and thereby more or less accessible, in ways that support more or less confidence expressed by those making assessments of the narrative, and which confidence rating is dependent upon the type of evidence medium used. The implication for the aforementioned legal case is that placing additional demands on jurors may have deleterious effects on their processing capabilities and subsequent considerations, including potential impact on juror confidence.

Clearly, features of a task affect how jurors process and use information. However, evidence modality may also be relevant as auditory and visual information is processed by separate memory subsystems (Baddeley, 2000). This means that more information can be processed at once without causing cognitive overload if presented in a form which utilises both auditory and visual aspects, as each aspect is processed separately (Tindall-Ford, Chandler, & Sweller, 1997). Indeed, research has revealed that presenting information in multiple modalities reduces cognitive-load and improves recall compared to the use of a single modality (Cao, Theune, & Nijholt, 2010; Penney, 1989). The modality of evidence presentation may thus have implication for cognitive-load and hence how important evidence might be processed.

Consistent with this approach are clear differences in how various modes of evidence are perceived by jurors. There is some aged evidence to suggest that jurors find transcript evidence less clear, more fatiguing, and more difficult to attend to than video evidence (Williams, Farmer, Lee, & Cundick, 1975). Findings accord with

modality explanation in the suggestion that processing transcript evidence, which uses only the visual channel, is more cognitively taxing than video evidence - where processing demands may be split across two channels. Moreover, these processing differences may affect how the evidence itself is perceived. Strömwall and Granhag (2002) found that participants provided with video evidence rated a witness account as more consistent, more complete, having greater logical structure, and containing richer detail than participants provided with transcript evidence alone. Lindholm (2005) also noted that video evidence yielded higher credibility ratings of a witness than transcript evidence. The studies carry an implication that witness evidence might be received more positively when presented in video form. However, the evidence is mixed. Pezdek, Avila-Mora and Sperry (2009) reported that witness evidence was rated less confusing, more informative, and more influential by jurors presented with a transcript compared to those assessing a video. Although this contradicts previous findings, it nonetheless demonstrates a distinction in juror perceptions of evidence presented in different forms. This may be partially attributed to cognitive-load; however, the absence of demeanour cues in transcript evidence may also contribute to this effect. We will return to the importance of demeanour later.

Although adding additional modalities of evidence can help to relieve cognitive-load it may result in the opposite outcome if high demands are placed on one processing channel. In multimedia learning, the redundancy principle states that concurrently presenting individuals with graphics, audio narration and written text should be avoided as it can impair information-processing (Clark & Mayer, 2011). In these cases the text is redundant as it merely duplicates the spoken information, hence the visual channel is overloaded unnecessarily (Mayer, 2001). It is interesting to note that providing text is only recommended when the audio information is hard to

comprehend, mirroring the legal argument in the provision of transcripts of video evidence (see *R. v. Popescu*, 2010).

The redundancy principle has received support from a number of studies. Homer, Blake and Plass (2008) identified that students who were given a video, audio track and slides of a lecture reported higher cognitive-load than those given only audio and slides suggesting assessing multiple forms of the same information is cognitively demanding and may affect information-processing. Indeed, a compelling body of research has demonstrated that learning is diminished in cases where redundant text is provided (Kalyuga, Chandler, & Sweller, 2004; Mayer, Heiser, & Lonn, 2001; Moreno & Mayer, 2002). At face value, these findings further support the idea that including additional modes of visual information may prove detrimental.

Regardless, as with other explanations, not all research has shown the same pattern of results. Yadav et al. (2011) compared participants given narratives in text, video (including visual and auditory elements), or video and text format. Surprisingly, participants were more emotionally engaged with cases incorporating a video, yet no differences in the cognitive processing of the different presentation modes were found.

For the judiciary the balance of findings suggest that simultaneous presentation of witness evidence to jurors in video and transcript form will lead to cognitive overload due to multiple demands on the visual channel and may therefore affect how evidence is processed and subsequent evaluations are made of witnesses by jurors. For example, high cognitive-load is associated with the use of heuristics by jurors (Kleider, et al., 2012) thus jurors may focus on peripheral cues such as demeanour rather than systematically assessing testimony content. It is here where the inconsistency between legal and psychological standpoints becomes apparent;

psychological literature suggests that jurors assessing multiple evidence forms will focus more on demeanour, whilst the judiciary assert that jurors will ignore demeanour and focus on the written word (*R. v. Sardar*, 2012). Such discrepancies highlight the need for empirical investigation.

Despite the lack of clarity both disciplines seem to agree that jurors assessing multiple forms of evidence will differ from jurors provided with a single form of evidence in how much they attend to demeanour. Interestingly, the judiciary propose that the ability of jurors to consider witness demeanour is a key component of the oral evidence system and is essential for determining credibility (*R. v. Sardar*, 2012). Indeed, aspects of demeanour such as emotion, speaking style and eye gaze have all been shown to affect juror evaluations of witnesses (Golding, Fryman, Marsil, & Yozwiak, 2003; Hemsley & Doob, 1978; Ruva & Bryant, 2004); however, it should be noted that jurors often misinterpret the meaning of non-verbal behaviours (Blumenthal, 1993). Nevertheless, differences in how transcript and video forms of witness evidence are perceived (Lindholm, 2005) consolidate the view that cues of demeanour may well influence juror assessments. Thus, jurors evaluating both video and transcript evidence will form different opinions of a witness compared to jurors with only transcript or video evidence to consider. However, it is currently unclear if this will be the result of an increased or decreased focus on demeanour.

Various cases show the judiciary hold strong beliefs about the effects of providing jurors with transcripts of video evidence (i.e., one should not do so without good cause), yet such assertions lack an evidential basis and may contradict some psychological approaches to the matter. This study will therefore investigate the perceptions of jurors when provided with simultaneous transcript and video evidence as opposed to video or transcript evidence alone. Psychological literature suggests that

the transcript may be a redundant information source which requires additional cognitive resources for processing, leaving fewer resources available for evidence evaluation. This may, in turn, affect how jurors process and ultimately perceive witness evidence. A further line of inquiry will explore the use of the judicial warning, currently used as a safeguard against bias, when providing jurors with multiple evidence forms. In doing so, it will explore the broader elements of cognition and the minutiae of evidence type and judicial warnings. With these considerations in mind and in accounting for variability in research findings the present study was designed to test some *key* hypotheses.

1. A judicial warning will encourage jurors to apply greater caution to assessments resulting in lower witness ratings across the range of measures.
2. Jurors presented with video and transcript evidence forms will make different assessments of a witness, across the range of measures, compared to jurors presented with video or transcript evidence alone.
3. Jurors assessing video and transcript (i.e., multiple) forms of evidence will be less confident in their witness ratings across the range of measures.
4. a) Jurors will find the assessment of the witness task more confusing, dependent upon the evidence condition and the warning condition received, and, b) less clear, in light of those conditions.

Method

Participants: Sixty jury eligible adult participants were recruited via a participation scheme, from the general population, and across a range of occupations (51.7% were students). All participants spoke English as a first language. The sample size was deemed appropriate for the study concerned and the analytic approach used. The overall sample consisted of 20 males and 40 females aged between 18 and 55 years ($M = 28.65$, $SD = 11.96$). No inducements were provided to the participants, apart from in the case of students, who received course credit for experimental participation.

Design: The study used a 3 (evidence type: transcript / video / transcript + video) x 2 (judicial warning: warning / no warning) between-subjects design. Participants were randomly allocated to one of the conditions and assigned a participant number on arrival.

Materials: The stimuli used (i.e., video and transcript) was based on an adaptation of a real life interview which had been conducted with a real witness and who had provided evidence during a real case. The account was modified and anonymised to create a ten page verbatim interview transcript. An actor (playing the witness who recounts her experience of discovering an injured neighbour) thereby recreated the original transcript in video form. The thirteen minutes long video stimulus was used as one condition or in another condition; to accompany the written witness transcript, where appropriate in the design. The main body of the questionnaire consisted of 9-point Likert scales ranging from, for example, from 9 = 'extremely confident' to 1 = representing 'not at all confident'. A Likert scale was

deemed appropriate as it has been rated the easiest to use by respondents whilst also yielding adequate reliability and validity (Preston & Colman, 2000). In this respect, Section 1 of the questionnaire assessed both global (e.g., satisfactory and reliable) and more specific perceptions (e.g., accurate, clear, credible, intelligent, confident, truthful and likely to be lying) of witness performance, together with jurors' own confidence in their assessments. In piloting the items two independent observers completed ten witness ratings. Inter-rater reliability is employed to assess the extent to which different judges or raters agree in their assessment decisions. It is particularly useful in this context where human observers may not necessarily interpret answers the same way; i.e., raters may disagree as to how well certain responses or materials demonstrate the skill being assessed. The inter-rater reliability was sufficient to proceed with the main data collection (.762). Section 2 measured how clear and confusing the jurors found the task. Section 3 comprised several free narrative questions where participants had the opportunity to provide more detailed information about their experience of the task and factors which had influenced their judgements. These aspects provided some additional information to the main analysis.

Procedure: Following allocation, participants were briefed as to the nature of the study (i.e., to contribute to understandings of the ways in which jurors might perceive evidence during court processes). In doing so, participants read an information sheet and if each was happy to continue provided consent prior to random assignment to one of the experimental conditions. Participants were then informed that they would observe a video of a witness providing evidence before being asked to complete a questionnaire. Participants were randomly allocated to one of the three conditions.

Before receiving the evidence, those in the ‘warning’ conditions were verbally warned by the researcher to: *“Be aware of the danger of placing disproportionate weight on the evidence, as opposed to your general impression and assessment of it.”* The warning is one guided by the Court of Appeal decision in R. v. Sardar (2012) in how judges may use a warning to provide guidance to jurors in the assessment of evidence. Participants were presented with the witness evidence for a total of thirteen minutes; either in transcript, video, or transcript + video form. After considering the evidence all participants completed the questionnaire which assessed personal perceptions of the witness and task.

On completion of the questionnaire, a debrief session took place where participants were given the opportunity to ask questions about the research and thanked for their participation. Briefing material adhered to British Psychological Society ethical principles relevant to the research (2006); in particular, by informing participants that they could at any time ask to withdraw either themselves or their data from the study.

Data Analysis

A series of 3 (evidence type: transcript / video / transcript plus video) x 2 (judicial warning: no warning / warning) independent ANOVAs were conducted on the scores for witness *satisfaction, reliability, credibility, accuracy, clarity, intelligence, confidence, truthfulness and lying, and juror confidence, task clarity and task confusion* (see Tables 1 and 2).

Satisfactory Witness

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

There was no main effect of evidence type, $F(2,54)=.03$, $\eta^2=.00$, $p>.05$, or warning, $F(1,54) = .12$, $\eta^2 = .00$, $p>.05$, on how satisfactory the witness was rated by jurors. However there was an interaction between evidence type and warning, $F(2,54)=6.42$, $\eta^2=.19$, $p<.01$. Further investigation of this interaction revealed that in the video condition, jurors given a warning ($M=5.40$, $SD=1.27$) rated the witness significantly more satisfactory than jurors without a warning ($M=3.60$, $SD=1.65$), $t(18)=2.74$, $p<.017$. Additionally, when a warning was provided, jurors evaluating transcript + video evidence ($M=3.60$, $SD=1.35$) rated the witness less satisfactory than those using video evidence alone ($M=5.40$, $SD=1.27$), $t(18)=3.08$, $p<.017$. The results partially support H1. No other comparisons reached significance, $p>.017$.

Witness Reliability

No main effect of evidence type $F(2,54)=.15$, $\eta^2=.01$, $p>.05$, or warning, $F(1,54)=1.88$, $\eta^2=.03$, $p>.05$, was observed for reliability ratings. Nevertheless an interaction between evidence type and warning was identified, $F(2,54)=4.29$, $\eta^2=.14$, $p<.02$. Post-hoc tests revealed that within the video only condition, the witness was rated more reliable by jurors given a warning ($M=4.40$, $SD=1.35$), than those without a warning ($M=2.60$, $SD=1.27$), $t(18)=3.08$, $p<.017$. The remaining comparisons were not significant, $p>.017$. The results partially support H1.

Witness Credibility

There was no main effect of evidence type, $F(2,54)=.63$, $\eta^2=.02$, $p>.05$, or warning, $F(1,54)=.03$, $\eta^2=.00$, $p>.05$, on juror ratings of witness credibility. No interaction was present, $F(2,54)=.93$, $\eta^2=.03$, $p>.05$. The findings provide no support for H1 and H2.

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

Witness Accuracy

There was no main effect of evidence type, $F(2,54)=.06$, $\eta^2=.00$, $p>.05$, or warning, $F(1,54)=1.46$, $\eta^2=.03$, $p>.05$, on perceived witness accuracy. The interaction was not significant, $F(2,54)=2.16$, $\eta^2=.07$, $p>.05$. Again, outcomes indicate no support for H1 and H2.

Witness Clarity

No main effect of evidence type, $F(2,54)=.19$, $\eta^2=.01$, $p>.05$, or warning, $F(1,54)=1.30$, $\eta^2=.02$, $p>.05$, was observed for ratings of witness clarity. The interaction was not significant, $F(2,54)=.58$, $\eta^2=.02$, $p>.05$. The outcomes show no support for H1 and H2.

Witness Intelligence

There was no main effect of evidence type, $F(2,54)=.56$, $\eta^2=.02$, $p>.05$, or warning, $F(1,54)=.87$, $\eta^2=.02$, $p>.05$, on ratings of witness intelligence. Although an interaction between these factors was reported, $F(2,54)=3.48$, $\eta^2=.11$, $p<.05$, post-hoc comparisons were all found to be non-significant at the prescribed level, $p>.017$. H1 and H2 are unsupported in respect of this measure.

INSERT TABLE 1 HERE

Witness Confidence

A main effect of evidence type was observed for ratings of witness confidence, $F(2,54)=6.41$, $\eta^2=.19$, $p<.01$. Tukey comparisons showed that jurors in the transcript condition ($M=2.90$, $SD=1.37$) rated the witness significantly less confident than jurors

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

in the video ($M=4.20$, $SD=1.88$; $p<.05$) and transcript + video conditions ($M=4.60$, $SD=1.54$; $p<.01$). Although the transcript + video condition yielded the highest confidence rating, the difference between the video only and transcript + video conditions was not significant, $p>.05$. There was no main effect of warning, $F(1,54)=.03$, $\eta^2=.00$, $p>.05$; though the interaction showed a trend toward significance $F(2,54)=2.95$, $\eta^2=.10$, $p=.06$. The results on this measure provide partial support for H2.

Witness Truthfulness

For ratings of truthfulness, no main effect of evidence type, $F(2,54)=.42$, $\eta^2=.02$, $p>.05$, or warning, $F(1,54)=.03$, $\eta^2=.00$, $p>.05$, was observed. The interaction was non-significant, $F(2,54)=.11$, $\eta^2=.00$, $p>.05$. No indication of support for H1 and H2 is shown.

Witness Lying

A main effect of evidence type was identified for jurors' ratings of the likelihood that the witness was lying, $F(2,54)=3.98$, $\eta^2=.13$, $p<.05$. Tukey comparisons revealed that jurors in the transcript + video condition ($M=4.00$, $SD=1.21$) rated the witness more likely to be lying than jurors in the transcript condition ($M=3.00$, $SD=1.12$), $p<.05$. There were no significant differences between the ratings of jurors in video and transcript + video conditions or video only and transcript only conditions, $p>.05$. There was no main effect of warning, $F(1,54)=1.71$, $\eta^2=.03$, $p>.05$, or an interaction, $F(2,54)=1.71$, $\eta^2=.06$, $p<.05$. The results provide partial support for H2.

Juror Confidence

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

There were no main effects of evidence type, $F(2,54)=1.03$, $\eta^2=.04$, $p>.05$, or warning, $F(1,54)=.00$, $\eta^2=.00$, $p>.05$, on jurors' ratings of their own confidence. The interaction was not significant, $F(2,54)=.70$, $\eta^2=.03$, $p>.05$. The outcome on this measure provides no support for H3.

Juror Task Clarity

There was no main effect of evidence type on how clear jurors rated the task, $F(2,54)=1.24$, $\eta^2=.04$, $p>.05$. However a main effect of warning was observed, $F(1,54)=6.51$, $\eta^2=.11$, $p<.02$. This demonstrated that providing jurors with a warning ($M=6.33$, $SD=1.61$) yielded lower ratings of task clarity than not presenting a warning ($M=7.33$, $SD=1.40$). The interaction was not significant, $F(2,54)=.26$, $\eta^2=.01$, $p>.05$. The results provide partial support for H4.

Juror Task Confusion

A main effect of evidence type was detected for jurors' ratings of how confusing the task was, $F(2,54)=4.53$, $\eta^2=.14$, $p<.02$. Tukey comparisons showed that the task was rated less confusing when jurors were given both transcript + video evidence ($M=2.10$, $SD=1.02$), compared to video evidence alone ($M=3.40$, $SD=1.54$), $p<.02$. None of the other comparisons differed significantly, $p>.05$. There was no main effect of warning, $F(1,54)=.55$, $\eta^2=.01$, $p>.05$, or a significant interaction, $F(2,54)=1.26$, $\eta^2=.05$, $p>.05$. The results provide partial support for H4.

INSERT TABLE 2 HERE

Correlations

Pearson's correlations were conducted on the data and those of relevance are reported. A positive correlation was found between perceived confidence and accuracy of the witness ($r = .138, p > .05$) whilst a negative correlation existed the more confident the jurors the less confusing they thought the task was ($r = -.329, p < .02$). However, juror ratings of how confusing they found the task did not significantly correlate with any of the witness ratings (*all* $p > .05$).

Narratives

Table 3 demonstrates some of the key themes which emerged as being important for jurors' assessments of the witness. It is worthy of note that the number of jurors mentioning these elements appears to be broadly similar across the different conditions. For brevity, only the experimental conditions and themes of interest are reported here.

INSERT TABLE 3 HERE

Discussion

The principal aims of the study was to examine judicial warnings as legal mechanisms and the effects of different evidence types on a range of juror assessments of a witness together with the potential for impact on jurors' self-ratings in the assessment process. In summary, the first hypothesis, that the provision of a warning would encourage caution in juror assessments resulting in lower witness ratings, the second; that jurors presented with different evidence forms will make different witness assessments across a range of measures, and fourth; that jurors will find the assessment of the witness task more confusing and less clear, dependent upon

the evidence condition and whether a warning is given or not, were all partially supported. Broadly speaking, the provision of the judicial warning resulted in juror ratings of the witness as more satisfactory and reliable. Providing jurors with the warning also revealed lower ratings for task clarity. In terms of evidence type, jurors provided with the transcript rated the witness significantly less confident. Furthermore, jurors assessing the witness using multiple evidence forms rated the witness more likely to be lying. For jurors themselves, the task was rated less confusing when both transcript and video were provided. The third hypothesis, however, that jurors in assessing multiple forms of evidence will be less confident in their ratings of the witness, was unsupported. We now turn our attention a more detailed consideration of the findings.

Judicial Warning

The most striking finding was that when jurors were presented with a judicial warning the witness was rated less satisfactory by the juror group considering both transcript + video evidence compared to those with video evidence alone. This outcome lends partial support to H1, and H2; that jurors who consider multiple evidence forms would rate witnesses differently from jurors who have access to a single form of evidence. The effect only occurred when jurors were given the warning which suggests the judiciary is justified in concern of cases where warnings are not provided to jurors due to the potential effect on how jurors may perceive evidence. Further, as jurors who are permitted access to a transcript ought to be provided with a warning, the finding that juror assessments are affected by the combination of a warning and multiple evidence forms is of great relevance for any legal system which uses juries.

The literature which surrounds cognitive-load may extend an explanation of the finding and of particular relevance are the ways in which information is managed. Theory suggests that processing both transcript + video evidence places higher demands on jurors' available cognitive resources (Mayer, 2001); a problem which may have been exacerbated in this case by the additional processing requirements of a warning placed upon assessors. Wagstaff *et al.*'s (2007) cognitive neuropsychological theory of facilitation and inhibition suggests that more complex tasks require greater cognitive effort and thereby activate executive and frontal systems with potential to err as a result of lowered processing capacity. Moreover, inhibition of more appropriate outcomes may also be influenced and result in defaults to more autonomic responses that require little in the way of cognitive work (Fiske, 1995). Those undertaking processing of both transcript + video evidence thus likely need to work much harder minimizing the ability to 'free up' capacity in the brain to process information. Either that, or individuals may be miserly in their thinking (Fiske, 1995).

Indeed research tells us that simultaneously performing two tasks impairs jurors' information-processing and encourages heuristic processing (Kleider *et al.*, 2012; Malavanti, 2012). So, the processing strategies of jurors assessing multiple evidence forms together with a warning may have been similarly affected. For example, jurors could heuristically rate the witness as less satisfactory due to the demands inherent within the task. In the complex context of the courtroom, mental shortcuts, which can often help to streamline information in daily activities, can be detrimental and lead to less effective outcomes (Wheatcroft & Ellison, 2012). Notwithstanding the replication of this finding, it has practical implications for the legal system. Jurors' rating of how satisfactory they believe witnesses to be is a more global assessment of the witness. Thus, judicial bodies may be right to avoid

providing transcripts to jurors when making such appraisals. This is of particular significance given that jurors in the courtroom are encouraged to form general (i.e., more global) opinions of witnesses (*R. v. Sardar*, 2012).

Further evidence that the provision of a warning affected global ratings of the witness was found within the video condition. Jurors given the warning rated the witness as more satisfactory and reliable than those who did not consider a warning. This outcome contradicts the hypothesis (H1); that the warning would encourage caution in juror assessments, resulting in lower witness ratings. Moreover, it does not support studies which have shown that warnings make jurors more sceptical of all witnesses (Greene, 1988; Katzev & Wishart, 1985). Instead, it seems the warning might have been successful in directing jurors to develop an overall impression of the witness. According to Eagly and Chaiken's (1993) people tend to use the most convenient search methods when seeking information and stopping that search once a solution is found which is acceptable. In mental shortcut terms the warning then has acted as a signal to directing attention helping in the increased access to resources that appears to have helped jurors cognitively process information more readily without potentially overloading central and frontal mechanisms. Taken together, the warning given yielded more positive witness ratings despite the fact it reminded jurors to be cautious in making assessments. Overall, this might be thought of as a reassuring result as judicial warnings which simply make jurors sceptical of all witnesses may serve to unfairly disadvantage reliable witnesses (Paterson *et al.*, 2013). Further, the findings reiterate the importance of providing a warning to jurors even when video evidence is presented alone. On the face of it, in the current case, not presenting a warning would have been detrimental in terms of how reliable and satisfactory jurors rated the witness. Such an outcome thereby supports the judicial position on the

importance of legal warnings and the relevance of their application. Plus, as the warning appears to affect global, rather than specific, evaluations of the witness it may be useful to develop judicial warnings to encourage jurors to consider how satisfactory and reliable they find the witness.

In addition, mock jurors rated the task less clear when a warning was provided for consideration and accords with existing literature which has demonstrated jurors often struggle to comprehend judicial warnings (Rose & Ogloff, 2001; Thomas, 2010), providing some support for H4. Again, as noted earlier, both process and application of a warning is intuitively complex and thereby cognitively demanding (Wagstaff *et al.*, 2007). Although warnings are an essential part of legal proceedings the findings here show the judiciary must remain cautious in the presentation of warnings as it is clear how the task is perceived by jurors could lead to heuristics being applied to the processing task. As a result, the enhancement of judicial warnings to minimise the imposition of cognitive load must be researched in greater detail. In doing so, one may also draw upon the recommendation made to direct jurors towards assessments of satisfaction and reliability.

Further, the constitution of the jury is such that other factors, such as the age, gender, ethnicity, attractiveness, or even the reputation of the judge may have a role to play. However, the inclusion of these elements was beyond the scope of this study. What can be said is that as the judicial direction is toward jurors it is less likely the reputation of the judge would be known to those lay persons in the court. Investigation into the relevance of age, gender, ethnicity and attractiveness however may well make for interesting findings.

We turn our attention to those findings which relate to evidence type.

Evidence Type: Video, Transcript, and Video plus Transcript

The second key area of interest was the consideration of the effects of providing jurors with multiple forms of evidence. Although transcript + video evidence affected global assessments of the witness when accompanied by a judicial warning many of the hypothesised differences between transcript + video evidence and other evidence types failed to emerge for specific assessments of witness performance.

Contrary to H2, juror ratings of how accurate, clear, credible, truthful, and intelligent the witness did not differ significantly across the various evidence conditions. Unlike research from other contexts which has demonstrated multiple forms of information placed a greater cognitive-load on participants (Homer, *et al.*, 2008) this was not found here. The reasons for this cannot be established; however, it may indicate that jurors made efforts to attend to the particular form, and in doing so, narrowed the search for evidence to apply their ratings. Moreover, there may be limitations in comparing a student to a juror, as, in the case of a student one requires a certain amount of cognitive need to learn whereas in the case of assessing a witness a juror's cognitive capabilities are based on central or peripheral abilities together with motivation to process the information. This could well form the basis for further empirical investigation to provide a meaningful comparison.

Although the findings do not support literature which has identified differences in jurors' credibility ratings of transcript + video evidence (Lindholm, 2005) it is consistent with researchers who have found no differences in the cognitive-processing of narratives presented in different forms (Yadav, *et al.*, 2011). The contradictions illustrate the complexities involved in research of this kind; that the findings in this field can be mixed and that cognitive-load explanations may not

necessarily be applicable to, or across, all contexts. Indeed, the skills individual jurors bring to dealing with cognitive loads may well be differential and is a clear area of expansion which requires further research.

Nevertheless, the most noteworthy point is that supplying a transcript alongside video evidence did not affect jurors' specific ratings of the witness. Judicial concern about the provision of additional transcript evidence is mitigated for specific witness assessments. Nonetheless, jurors tend not to make specific assessments of witnesses but instead evaluate them in a global, more general, fashion. Given this, any tendency to recommendation against additional transcript evidence would remain valid.

Drawing upon comments made by jurors in the free narrative section of the questionnaire appeared to support the finding that juror perceptions of video and transcript + video evidence were not as different as expected. Two main ideas appeared to inform juror assessments; these were 'consistency of witness testimony' (e.g., how well the witness restated and repeated key information) and 'non-verbal factors' (e.g., body language, appearance, tone of voice). The comments accord with research which reports that testimony consistency and witness demeanour influence juror evaluations (Berman & Cutler, 1996; Ruva & Bryant, 2004). Most importantly, the number of jurors commenting on these factors was similar across video and transcript + video conditions suggesting the presentation of multiple evidence forms did not differentially affect the types of cues attended to by jurors. Further, that juror's in the transcript + video condition made reference to non-verbal factors indicates these jurors did not necessarily, as the judiciary suggest, apply more consideration to the written transcript. While encouraging from a legal standpoint it is important to acknowledge that witness demeanour can be misleading as jurors often hold

inaccurate beliefs about the meaning of non-verbal behaviours (Blumenthal, 1993). The judiciary should therefore be mindful of the potential limitations of judgements based on demeanour cues. Nevertheless only a small number of jurors in each condition identified demeanour as influential in their assessments which suggests mock jurors in this study attended to a number of different factors rather than appraising non-verbal factors alone. Taken together, it seems jurors assessing multiple evidence forms based their assessments on the same factors as jurors evaluating only video evidence.

Even when an effect of evidence type was observed for specific witness evaluations, differences were not detected between the video and transcript + video conditions. Jurors rated the witness as more likely to be lying when presented with transcript + video evidence, as opposed to transcript evidence alone. Such a finding offers partial support for H2 as it demonstrates that juror ratings did vary across evidence conditions - albeit not for the conditions necessarily of interest to the judiciary. Whilst this may indicate that jurors assessing transcript + video evidence were able to attend to cues beyond the transcript the relevance of the finding is largely limited; given that transcripts alone do not tend to be used as the sole method of witness evidence presentation in court, notwithstanding certain witnesses who may be classed vulnerable. The important outcome was that jurors in the video and transcript + video conditions did not differ in their perceptions that the witness was lying - adding to the notion that providing transcripts alongside video evidence does not affect more specific ratings.

Similarly, transcript evidence yielded lower ratings of witness confidence than video or transcript + video evidence. The ratings of transcript + video evidence differed from transcript, but not video evidence. This may well indicate it was

important for jurors to be able to visually assess the witness as jurors with only written information returned lower ratings of witness confidence. Importantly, for judiciaries, juror ratings of witness confidence were consistent across video and transcript + video conditions. The outcome contributes to the idea that specific assessments of the witness remain unaffected by the conditions presented here. With regard to the relationship between confidence and accuracy, no correlation was observed between perceived confidence and accuracy of the witness (.138). Interestingly, this contradicts research which has shown jurors often judge more confident witnesses as more accurate (Brigham, 1990; Penrod & Cutler, 1995). In context, this could be viewed positively given that the most confident witness is not necessarily the most accurate (Wheatcroft & Woods, 2010).

The study also explored the impact of evidence type on jurors' own confidence in ratings made and found the method of evidence presentation had no effect on juror confidence. This contradicts the prediction that jurors assessing multiple evidence forms would be less confident in own assessments (H3) and does not necessarily support previous literature (Heuer & Penrod, 1994). It is nevertheless encouraging that juror confidence remained stable across all evidence conditions as overconfidence has been associated with inaccurate responses in previous research (Wheatcroft, Wagstaff & Kebbell, 2004). Neither did the addition of a transcript adversely increase or decrease juror confidence. An interesting finding was that the more confident jurors were, the less confusing they rated the task ($r = .329$); so, those who were higher in confidence seem, overall, less affected by task complexity. In sum, although the provision of transcript evidence has other detrimental effects, it does not appear to manipulate juror confidence.

Turning to jurors' perceptions of the task itself, the hypothesis (H4); that multiple evidence forms would make the task more confusing and less clear was partially supported. Whilst evidence type had no impact on jurors' perceptions of task clarity, jurors rated the task as less confusing when assessing both transcript + video evidence, compared to video evidence alone. Consistent with this, several jurors reported that the transcript + video were "helpful when combined" and "helped to understand the evidence of the witness much more easily". Although these comments provide an interesting insight they cannot be considered representative of the experiences of all mock participants, nor indeed all jurors. Furthermore, this outcome does not undermine the recommendation that transcript + video evidence should not be presented to jurors, as it is relevant only to jurors' own perceptions of the task, rather than appraisals made of the witness.

On balance, it appears that differences in jurors' perceptions of the task did not translate into differences in ratings of the witness as no differences between evidence conditions for specific assessments of witness performance were found. Further, jurors' ratings of how confusing they found the task did not correlate with any of the witness ratings ($p > .05$). In contrast to studies which have demonstrated jurors are often influenced by psychological factors, such as emotions and attitudes (Bornstein, 1998; Casper, Benedict, & Perry, 1989), these findings suggest jurors were able to separate feelings about the task from perceptions of the witness. Thus jurors may be better equipped to perform the role than some research has previously suggested. Of course, no research is without its limitations. First, the sample may not have been representative of the general jury-eligible population due to the prevalence of student participants, which may limit the generalizability of findings. Thus, the sample size may be a limitation which could have impacted upon the statistical power of the

study. Nevertheless, the outcomes may have been enhanced had a larger sample been available. Second, the study lacks some ecological validity, particularly as jurors only assessed evidence of a single witness. In reality, a feature of real trials is that jurors would be required to assess evidence across multiple witnesses. The research would benefit from investigating this factor, bearing in mind witnesses in actual trials will be dependent upon judges and magistrates exercising vigilance and intervening on rule of law where appropriate. Jurors were also required to make their judgements in isolation, which neither reflects the true experience of jurors nor provides insight into the effects of multiple evidence forms on juror deliberation. Having said this, Meyers, Brashers and Hanner (2000) observed in mock juries that the position favoured prior to group discussion becomes the final verdict approximately 90 percent of the time.

On the question of method, obviously the experimental design used here cannot reflect the full range of variables present in a real trial situation. Nevertheless, it could be argued that ecological validity was enhanced by a) the use of a real case transcript and b) the use of an actress in the witness video condition, to reflect more accurately the ways in which information is presented. On the other hand, real testimony does have important consequences. At the same time, the real trial context could exaggerate the findings of this study, with jurors finding greater difficulty in their comprehension of questions as a result of the greater cognitive burdens alluded to above. Future research should nevertheless seek to address these issues and explore whether the findings can be replicated using a more representative sample and in conditions, where possible, of greater ecological validity. Research may also be advised to investigate the validity of demeanour cues for jurors' assessments of witnesses with particular reference to the global-specific dimension identified in this paper.

Conclusion

The study showed mock jurors' global assessments of a witness were significantly affected by the presentation of transcript + video evidence in conjunction with a judicial warning. Conversely, specific assessments of the witness and task were unaffected by the addition of a transcript; however, this is perhaps less important given that jurors tend to, and are directed to, make global appraisals of witnesses. Taken together, the findings provide some empirical support for the judiciary's leaning toward the opposition of transcript use and the assertion in *R. v. Sardar* (2012) that there were "serious errors both in letting the jury see the transcript... and in failing to direct to them as to the dangers of giving disproportionate weight to the transcript" (p. 4). Notwithstanding replication of these outcomes it seems that jurors who must assess witnesses in a global fashion ought not to be provided with the accompanying transcript. Findings also emphasise the importance of providing jurors with a warning should video evidence be presented alone. Finally, the judiciary might develop warnings to encourage jurors to consider how satisfactory and / or reliable they find witnesses.

References

- Achieving Best Evidence in Criminal Proceedings (ABE; 2011). Guidance on interviewing victims and witnesses, and guidance on using special measures.* London: Home Office.
- Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature Reviews Neuroscience*, 4(10), 829-839. DOI: 10.1038/nrn1201
- Baddeley, A. D. (2000). The episodic buffer: a new component of working memory? *Trends in Cognitive Sciences*, 4(11), 417-423. DOI: 10.1016/S1364-6613(00)01538-2

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Berman, G. L., & Cutler, B. L. (1996). Effects of inconsistencies in eyewitness testimony on mock-juror decision making. *Journal of Applied Psychology, 81*(2), 170-177. DOI: 10.1037/0021-9010.81.2.170
- Blumenthal, J. A. (1993). A wipe of the hands, a lick of the lips: The validity of demeanor evidence in assessing witness credibility. *Nebraska Law Review, 72*(1), 1157-1207.
- Bollingmo, G., Wessel, E., Sandvold, Y., Eilertsen, D. E., & Magnussen, S. (2009). The effect of biased and non-biased information on judgments of witness credibility. *Psychology, Crime and Law, 15*(1), 61-71. DOI: 10.1080/10683160802131107
- Bornstein, B. H. (1998). From compassion to compensation: The effect of injury severity on mock jurors' liability judgments. *Journal of Applied Social Psychology, 28*(16), 1477-1502. DOI: 10.1111/j.1559-1816.1998.tb01687.x
- Bourgeois, M. J., Horowitz, I. A., & ForsterLee, L. (1993). Effects of technicality and access to trial transcripts on verdicts and information processing in a civil trial. *Personality and Social Psychology Bulletin, 19*(2), 220-227. DOI: 10.1177/0146167293192012
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. DOI: 10.1191/1478088706qp063oa
- Brigham, J. C. (1990). Target person distinctiveness and attractiveness as moderator variables in the confidence-accuracy relationship in eyewitness identifications. *Basic and Applied Social Psychology, 11*(1), 101-115. DOI: 10.1207/s15324834basps1101_7
- Cao, Y., Theune, M., & Nijholt, A. (2010). Cognitive-aware modality allocation in intelligent multimodal information presentation. In L. Shao, C. Shan, J. Luo & M. Etoh (Eds.), *Multimedia Interaction and Intelligent User Interfaces* (pp. 61-83). London, UK: Springer London.
- Casper, J. D., Benedict, K., & Perry, J. L. (1989). Juror decision making, attitudes, and the hindsight bias. *Law and Human Behavior, 13*(3), 291-310.
- Chaiken, S. & Trope, Y. (1999), (Eds.), *Dual Process Theories in Social Psychology*. New York: Guilford

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Clark, R. C., & Mayer, R. E. (2011). *E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (3rd ed.). San Francisco, CA: John Wiley & Sons.
- Cooper, J., Bennett, E. A., & Sukel, H. L. (1996). Complex scientific testimony: How do jurors make decisions? *Law and Human Behaviour, 20*(4), 379-394.
- Coyle, I. R., & Thomson, D. M. (2014). Opening up a can of worms: How do decision-makers decide when witnesses are telling the truth? *Psychiatry, Psychology and Law, 21*(4), 475-491. DOI: 10.1080/13218719.2013.837803
- Cutler, B. L., Dexter, H. R., & Penrod, S. (1990). Nonadversarial methods for improving juror sensitivity to eyewitness evidence. *Behavioral Sciences and the Law, 20*(14), 1197-1207.
- Eagly, A.H., & Chaiken, S. (1993). *The Psychology of Attitudes*. Fortworth, TX: Harcourt-Brace.
- Fiske, S. T., & Taylor, S. E. (1991). *Social Cognition* (2nd ed.). New York, NY: McGraw-Hill.
- Fiske, S.T. (1995). Social cognition. In A. Tesser (Ed.), *Advanced Social Psychology*, pp. 148–193. New York: McGraw-Hill.
- Golding, J. M., Fryman, H. M., Marsil, D. F., & Yozwiak, J. A. (2003). Big girls don't cry: The effect of child witness demeanor on juror decisions in a child sexual abuse trial. *Child Abuse & Neglect, 27*(11), 1311-1321.
- Greene, E. (1988). Judge's instruction on eyewitness testimony: Evaluation and revision. *Journal of Applied Social Psychology, 18*(3), 252-276. DOI: 10.1111/j.1559-1816.1988.tb00016.x
- Hemsley, G. D., & Doob, A. N. (1978). The effect of looking behavior on perceptions of a communicator's credibility. *Journal of Applied Social Psychology, 8*(2), 136-142. DOI: 10.1111/j.1559-1816.1978.tb00772.x

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Heuer, L., & Penrod, S. (1994). Trial complexity: A field investigation of its meaning and its effects. *Law and Human Behaviour, 18*(1), 29-51. DOI: 10.1007/BF01499142
- Homer, B. D., Blake, L., & Plass, J. L. (2008). The effects of video on cognitive load and social presence in multimedia-learning. *Computers in Human Behavior, 24*(3), 786-797.
- Horowitz, I. A., & Bordens, K. S. (2000). The consolidation of plaintiffs: The effects of number of plaintiffs on jurors' liability decisions, damage awards, and cognitive processing of evidence. *Journal of Applied Psychology, 85*(6), 909-918. DOI: 10.1037//0021-9010.85.6.909
- Horowitz, I. A., Bordens, K. S., Victor, E., Bourgeois, M. J., & ForsterLee, L. (2001). The effects of complexity on jurors' verdicts and construction of evidence. *Journal of Applied Psychology, 86*(4), 641-652.
- Horowitz, I. A., ForsterLee, L., & Brolly, I. (1997). Effects of trial complexity on decision making. *Journal of Applied Psychology, 81*(6), 757-768. DOI: 10.1037//0021-9010.81.6.757
- Kahneman, D. (2011). *Thinking Fast and Slow*. Allen Lane: London
- Kalyuga, S., Chandler, P., & Sweller, J. (2004). When redundant on-screen text in multimedia technical instruction can interfere with learning. *Human Factors, 46*(3), 567-581. DOI: 10.1518/hfes.46.3.567.1640
- Kamin, K. A., & Rachlinski, J. J. (1995). Ex post \neq ex ante: Determining liability in hindsight. *Law and Human Behavior, 19*(1), 89-104.
- Kassin, S. M., & Wrightsman, L. S. (1981). Coerced confessions, judicial instruction, and mock juror verdicts. *Journal of Applied Social Psychology, 11*(6), 489. DOI: 10.1111/j.1559-1816.1981.tb00838.x
- Katzev, R. D., & Wishart, S. S. (1985). The impact of judicial commentary concerning eyewitness identifications on jury decision making. *The Journal of Criminal Law & Criminology, 76*(1), 733-745.

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Khan, A., & Rayner, G. D. (2003). Robustness to non-normality of common tests for the many-sample location problem. *Journal of Applied Mathematics & Decision Sciences*, 7(4), 187-206. DOI: 10.1155/S1173912603000178
- Kleider, H. M., Knuycky, L. R., & Cavrak, S. R. (2012). Deciding the fate of others: The cognitive underpinnings of racially biased juror decision making. *The Journal of General Psychology*, 139(3), 175-193.
- Lindholm, T. (2005). Group-based biases and validity in eyewitness credibility judgments: Examining effects of witness ethnicity and presentation modality. *Journal of Applied Social Psychology*, 35(7), 1474-1501. DOI: 10.1111/j.1559-1816.2005.tb02180.x
- Malavanti, K. F. (2012). *Knowledge updating in jurors: cognitive load affects juror decision making*. Unpublished Doctoral Thesis, Baylor University, Waco, TX.
- Mayer, R. E. (2001). *Multimedia Learning*. New York, NY: Cambridge University Press.
- Mayer, R. E., Heiser, J., & Lonn, S. (2001). Cognitive constraints on multimedia learning: When presenting more material results in less understanding. *Journal of Educational Psychology*, 93(1), 187-198. DOI: 10.1037//0022-0663.93.1.187
- Meyers, R. A., Brashers, D. E., & Hanner, J. (2000). Majority-minority influence: Identifying argumentative patterns and predicting argument-outcome links. *Journal of Communication*, 50(4), 3-30. DOI: 10.1111/j.1460-2466.2000.tb02861.x
- Moreno, R., & Mayer, R. E. (2002). Verbal redundancy in multimedia learning: When reading helps listening. *Journal of Educational Psychology*, 94(1), 156-163. DOI:10.1037/0022-0663.94.1.156
- Nikonova, O., & Ogloff, J. R. P. (2005). Mock jurors' perceptions of child witnesses: The impact of judicial warning. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 37(1), 1-19. DOI: 10.1037/h0087241
- Pashler, H. (1994). Dual-task interference in simple tasks: Data and theory. *Psychological Bulletin*, 116(2), 220-244.

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Paterson, H. M., Anderson, D. W. M., & Kemp, R. I. (2013). Cautioning jurors regarding co-witness discussion: The impact of judicial warnings. *Psychology, Crime and Law*, *19*(3), 287-304. DOI: 10.1080/1068316X.2011.631539
- Penney, C. G. (1989). Modality effects and the structure of short-term verbal memory. *Memory & Cognition*, *17*(4), 398-422. DOI: 10.3758/BF03202613
- Pennington, N., & Hastie, R. (1991). A cognitive theory of juror decision-making: the story model. *Cardoza Law Review*, *13*, 497.
- Pennington, N., & Hastie, R. (1992). Explaining the evidence: Tests of the story model for juror decision making. *Journal of Personality and Social Psychology*, *62*, 189-206. DOI: [10.1037/0022-3514.62.2.189](https://doi.org/10.1037/0022-3514.62.2.189)
- Penrod, S., & Cutler, B. S. (1995). Witness confidence and witness accuracy: Assessing their forensic relation. *Psychology, Public Policy and Law*, *1*(4), 817-845. DOI: 10.1037/1076-8971.1.4.817
- Pezdek, K., Avila-Mora, E., & Sperry, K. (2009). Does Trial presentation medium matter in jury simulation research? Evaluating the effectiveness of eyewitness expert testimony. *Applied Cognitive Psychology*, *24*(5), 673-690. DOI: 10.1002/acp.1578
- R. v. Popescu*, (2010) EWCA 1230
- Preston, C. C., & Colman, A. M. (2000). Optimal number of response categories in rating scales: Reliability, validity, discriminating power, and respondent preferences. *Acta psychologica* *104*(1), 1-15. DOI: 10.1016/S0001-6918(99)00050-5
- Rose, V. G., & Ogloff, J. R. P. (2001). Evaluating the comprehensibility of jury instructions: A method and an example. *Law and Human Behaviour*, *25*(4), 409-431. DOI: 10.1023/A:1010659703309
- Ruva, C. L., & Bryant, J. B. (2004). The impact of age, speech style, and question form on perceptions of witness credibility and trial outcome. *Journal of Applied Social Psychology*, *34*(9), 1919-1944.
- R. v. Sardar*, (2012). EWCA Crim 134

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

- Schuller, R. A., Terry, D., & McKimmie, B. (2005). The impact of expert testimony on jurors' decisions: Gender of the expert and testimony complexity. *Journal of Applied Social Psychology, 35*(6), 1266-1280. DOI: 10.1111/j.1559-1816.2005.tb02170.x
- Sedikides, C., & Skowronski, J. J. (1991). The law of cognitive structure activation. *Psychological Inquiry, 2*(2), 169-184. DOI: [10.1207/s15327965pli0202_18](https://doi.org/10.1207/s15327965pli0202_18)
- Severance, L. J., & Loftus, E. F. (1982). Improving the ability of jurors to comprehend and apply criminal jury instructions. *Law & Society Review, 17*(1), 153-198. DOI: 10.2307/3053535
- Smith, A. C., & Greene, E. (2005). Conduct and its consequences: Attempts at debiasing jury judgments. *Law and Human Behavior, 29*(5), 505-526. DOI: 10.1007/s10979-005-5692-5
- Strömwall, L. A., & Granhag, P. A. (2002). Affecting the perception of verbal cues to deception. *Applied Cognitive Psychology, 17*(1), 35-49. DOI: 10.1002/acp.851
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12*(2), 257-285. DOI: 10.1207/s15516709cog1202_4
- Tamborini, R., Huang, R.-H., Mastro, D., & Nabashi-Nakahara, R. (2007). The influence of race, heuristics, and information load on judgements of guilt and innocence. *Communication Studies, 58*(4), 341-358.
- Thomas, C. (2010). *Are juries fair?* London, UK: Ministry of Justice.
- Tindall-Ford, S., Chandler, P., & Sweller, J. (1997). When two sensory modes are better than one. *Journal of Experimental Psychology: Applied, 3*(4), 257-287. DOI: 10.1037/1076-898X.3.4.257
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*(4157), 1124-1131. DOI: 10.1126/science.185.4157.1124
- Wagstaff, G. F., Wheatcroft, J. M., Cole, J., Brunas-Wagstaff, J., Blackmore, V., & Pilkington, A. (2007). Some cognitive and neuropsychological aspects of social inhibition and facilitation. *European Journal of Cognitive Psychology, 20*(4), 828-846. DOI: 10.1080/09541440701469749

JUDICIAL WARNING AND EVIDENCE EFFECTS ON JUROR PERCEPTIONS

R. v. Welstead, (1996) 1 Cr. App. R. 59

Wheatcroft, J. M., & Ellison, L.E., (2012). Evidence in Court: Witness preparation and cross-examination style effects on adult witness accuracy. *Behavioral Sciences & the Law*, 30, 821-840. DOI: 10.1002/bsl.2031

Wheatcroft, J. M., & Woods, S. (2010). Effectiveness of witness preparation and cross-examination non-directive and directive leading question styles on witness accuracy and confidence. *International Journal of Evidence and Proof*, 14(3), 187-207. DOI: 10.1350/ijep.2010.14.3.353

Wheatcroft, J. M., Wagstaff, G. F., & Kebbell, M. R. (2004). The influence of courtroom questioning style on actual and perceived eyewitness confidence and accuracy. *Legal and Criminological Psychology*, 9(1), 83-101. DOI: 10.1348/135532504322776870

Williams, G. R., Farmer, L. C., Lee, R. E., & Cundick, B. P. (1975). Juror perceptions of trial testimony as a function of the method of presentation: A comparison of live, color video, black-and-white video, audio, and transcript presentations. *Bigham Young University Law Review*, 1975(2), 375-422.

Yadav, A., Phillips, M. M., Lundeberg, M. A., Koehler, M. J., Hilden, K., & Dirkin, K. H. (2011). If a picture is worth a thousand words is video worth a million? Differences in affective and cognitive processing of video and text cases. *Journal of Computing in Higher Education*, 23(1), 15-37. DOI 10.1007/s12528-011-9042-y