RUNNING HEAD: Eyeclosure and rapport-building

Does rapport-building boost the eyewitness eyeclosure effect in closed questioning?

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Purpose: Several studies have documented that people's ability to correctly report details of witnessed events is enhanced when they merely close their eyes. Yet closing one's eyes in front of a stranger could sometimes create social discomfort, which other studies suggest can impair memory reports. This paper reports two experiments exploring the extent to which the memory benefits of eyeclosure are enhanced when efforts are taken to build interviewer/witness rapport, thus potentially reducing discomfort. **Methods**: In both studies participants observed filmed events and, afterwards, half underwent a basic rapport-building exercise with an interviewer. All participants then answered closed questions about specific details of the event, and half were instructed to close their eyes throughout this questioning. We recorded the proportion of questions answered correctly, incorrectly, or with 'don't know' responses. **Results**: Both eyeclosure and rapport-building separately enhanced correct responding. The data offer no evidence, though, that rapport-building moderated this eyeclosure benefit. This is despite the fact that rapport-building did appear to moderate the effect of eyeclosure on participants' self-reported comfort during the interviews. **Conclusions**: These studies give us initial cause for doubt over a hypothesised—but heretofore untested—social psychological constraint on the benefits of eyeclosure.

Keywords: Eyeclosure, rapport, eyewitness interviewing, comfort, questioning.

Does rapport-building boost the eyewitness eyeclosure effect in closed questioning?

Eyeclosure can be a valuable tool for supporting witnesses in investigative interviews (Mastroberardino, Natali, & Candel, 2012; Vredeveldt et al., in press). For instance, Perfect et al. (2008) found that people who closed their eyes whilst remembering events were better able to correctly answer—and less likely to incorrectly answer—questions about those events, compared to people who kept their eyes open. Other studies show that the benefits of eyeclosure uphold when people recall events that occurred one week or even several years beforehand (Vredeveldt, Baddeley, & Hitch, 2014; Wagstaff et al., 2004), as well as in non-laboratory settings (Vredeveldt & Penrod, 2013). There is therefore much to gain from understanding the boundaries of this technique's potential. In the present research, we asked whether building interpersonal rapport with witnesses might enhance the eyeclosure effect.

People often spontaneously close or avert their eyes when undertaking challenging tasks (Doherty-Sneddon, Bruce, Bonner, Longbotham, & Doyle, 2002; Doherty-Sneddon & Phelps, 2005), and eyewitness recollection is just one context in which this visual disengagement has been shown to enhance performance (for other examples, see Einstein, Earles, & Collins, 2002; Glenberg, Schroeder, & Robertson, 1998; Phelps, Doherty-Sneddon, & Warnock, 2006). The benefits of eyeclosure have commonly been attributed to two cognitive mechanisms: the reduction of cognitive load, and/or the reduction of modality-specific interference (Vredeveldt, Hitch, & Baddeley, 2011). In the context of eyewitness memory, the cognitive load hypothesis

proposes that by reducing environmental interference, eyeclosure frees up witnesses' cognitive resources to invest in recollecting past events. In contrast, the modality-specific interference hypothesis proposes that by reducing *visual* interference specifically, eyeclosure improves witnesses' ability to mentally visualise past events. In support of the cognitive load hypothesis, studies show that eyeclosure enhances recollection not only of visual information—as the modality-specific interference hypothesis predicts—but also auditory information (e.g., Perfect et al., 2008). In contrast, Vredeveldt and colleagues have gathered evidence in favour of modality-specific processes. In particular, when focusing solely on witnesses' reporting of highly specific, fine-grained details, they found that eyeclosure selectively enhances visual recall (e.g., Vredeveldt et al., 2014; Vredeveldt & Penrod, 2013). Together these findings point to both modality-specific and generalised cognitive processes underpinning eyeclosure effects.

Eyeclosure and (dis)comfort

Alongside growing evidence concerning cognitive mechanisms, some researchers have speculated that social psychological variables might also play important roles in eyeclosure effects. In particular, several findings converge on the idea that closing the eyes could affect witnesses' levels of comfort. We might perhaps expect eyeclosure to enhance comfort. For example, people sometimes report feeling less daunted and better able to concentrate when removed of the burden of having eye-contact with their interviewer (Kuivaniemi-Smith, Nash, Brodie, Mahoney, & Rynn, 2014; Nash, Houston, Ryan, & Woodger, 2014). Indeed, when people are urged to look at an experimenter whilst performing certain perceptual tasks, they

perform better if the experimenter wears dark glasses, looks away, or puts a bag over their head (Buchanan et al., 2014). In contrast, there is also evidence that "closing your eyes while someone else is staring is universally uncomfortable" (Gibson, 2008, p.137). Vredeveldt and Penrod (2013) found that eyeclosure was more beneficial when witnesses were interviewed indoors rather than outdoors – a finding that the authors proposed might result from witnesses' discomfort with closing their eyes in potentially 'dangerous' (i.e., outdoors) environments. Perfect (2008) speculated that eyeclosure could lead witnesses to feel vulnerable, and consistent with this idea, Vredeveldt's (2011) participants who were interviewed with their eyes closed tended to rate their comfort as worse than did those who kept their eyes open. The potential for eyeclosure to evoke discomfort is even recognised in interviewer training manuals—Fisher and Geiselman (1992, pp.133–134) advised "Some eyewitnesses will be reluctant to close their eyes, especially if proper rapport has not yet been established by the interviewer."

There are important implications to the possibility that eyeclosure fosters discomfort. We know that comfort and social anxiety can influence witnesses' informativeness and accuracy. Wagstaff et al. (2008), for instance, showed that the mere presence of observers alongside the interviewer impaired witnesses' memory reports; Doherty-Sneddon and McAuley (2000) similarly found that social co-presence increased young children's susceptibility to misinformation. In other studies, witnesses' suggestibility correlated positively with their state anxiety during interviews (adult witnesses in McGroarty & Baxter, 2007, child witnesses in Almerigogna, Ost, Bull, & Akehurst, 2007; but see contrary evidence in Kieckhaefer, Vallano, & Schreiber Compo, 2014). An implication of these findings, then, is that

any discomfort aroused by eyeclosure might thwart the technique's benefits. Discomfort might distract witnesses, for example (Doherty-Sneddon, Bonner, & Bruce, 2001), which might partially counteract any cognitive load reduction that facilitates the eyeclosure benefit. We might therefore predict that this benefit could be boosted through enhancing witnesses' comfort, for example by building rapport.

Rapport-building

Rapport-building is a fundamental interviewing skill (K. Collins, Doherty-Sneddon, & Doherty, 2014; Kassin et al., 2007) emphasised in the foremost investigative interviewing protocols (Fisher & Geiselman, 1992; Milne & Bull, 2003; Orbach et al., 2000). Defined as a "harmonious, empathetic, or sympathetic relation or connection" between people (Newberry & Stubbs, 1990, p.14), rapport is important for building relationships and trust, and can be developed through communicating positivity, friendliness, and mutual attention (Abbe & Brandon, 2012; Tickle-Degnen & Rosenthal, 1990). A growing research base highlights positive effects of rapport-building in investigative contexts, and links rapport with a greater cooperativeness of suspects (Bull & Soukara, 2010) and victims (Holmberg, 2004).

There is evidence that establishing rapport can aid witnesses' memory reports. In one study, R. Collins, Lincoln, and Frank (2002) showed participants a mock-crime film and then interviewed them using either a rapport-building, neutral, or abrupt approach. Rapport was manipulated through verbal and non-verbal interviewer behaviours such as referring to witnesses by their names, and adapting the tone of speech and body posture. The data indicated that participants in the rapport-building condition recalled more correct information than those in the

neutral and abrupt conditions, without a concomitant increase in errors. Vallano and Schreiber Compo (2011) corroborated and extended these conclusions, showing that rapport-building increased the correct detail that mock-witnesses reported, but also decreased inaccuracies and susceptibility to misinformation. More recently, Kieckhaefer et al. (2014) showed that rapport-building partly inoculated witnesses against misinformation effects when rapport was built before—but not after—exposure to the misinformation.

To summarise, both eyeclosure and rapport-building have the potential to benefit witnesses' memory reports. But if eyeclosure sometimes causes discomfort, as some researchers propose, then its benefits might be enhanced when efforts are first taken to build interviewer-witness rapport. We might therefore predict rapport-building and eyeclosure to interact; specifically, that the boost in correct responding due to eyeclosure is greater if rapport has been built, than if rapport has not been built. Likewise, we might predict any decline in incorrect responding as a result of eyeclosure to be greater if rapport has been built, than if rapport has not been built. In the present research, we followed Perfect et al.'s (2008) precedent by implementing a closed questioning paradigm as a first step to test these predictions.

Experiment 1

Method

Participants and Design. A total of 66 students and local volunteers (52 females and 14 males, aged 18-65, M= 25.73, SD= 11.58), participated for course credit or a raffle entry. Each was randomly assigned to one of the four conditions in a 2 (Eyes-Open vs. Eyes-Closed) x 2 (Rapport vs. No-Rapport) between-subjects

design. Power analysis indicates that this sample size is adequate to detect medium-large main and interaction effects (Cohen's *f*= .35, assuming power= .80 and α= .05).

Materials. For the event stimulus we used a 6 min 30 s silent film-clip. The film depicted an electrician entering a property, carrying out jobs, and stealing some items (Takarangi, Parker, & Garry, 2006). We generated 17 questions, each concerning a discrete and verifiable visual detail of the film (e.g., "What was written on the front of the van?"). Prior to data collection, we defined the responses for each question that would qualify as correct.

At the end of the interview, participants completed a short and simplistic questionnaire wherein they rated the quality of their rapport with the interviewer (1= Poor rapport; 7= Good rapport) and their comfort during the interview (1= Uncomfortable; 7= Comfortable). These questions were intermixed among filler questions concerning how friendly the interviewer was, how clearly she spoke, how easy the interview was, and whether the questions were confusing.

Procedure. Participants volunteered for a study on 'witness memory', and were tested individually in a laboratory. All sessions were conducted by one female experimenter, who undertook several practice interviews in each condition prior to commencing the study. After consenting to take part, participants began by watching the film on a computer screen. Next, they took part in an interview with the experimenter, which began differently according to experimental condition. As in Perfect et al.'s (2008) first experiment, we included no purposive filler period between the film and interview. First we introduced our rapport manipulation. All participants were asked a series of questions about themselves (e.g., "What is your

occupation?"). In the Rapport conditions the experimenter asked these questions in a friendly tone, using them to encourage participants to talk openly about themselves. To this end, she engaged participants in conversation by responding to their answers and taking an interest ("Oh that's interesting, do you enjoy that? What's your favourite part?..."), and sometimes reciprocating information about herself. In contrast, in the No-Rapport conditions the experimenter asked these questions in a neutral tone and simply noted participants' responses without probing or reaction. All participants were asked the same questions in the same order, but the conversations were not scripted beyond this sequencing so that they would occur naturally. In all cases these discussions lasted only a few minutes.

After the rapport manipulation, all participants were told what the questioning phase would involve. The experimenter explained that she would ask questions about the film, and that they should take their time, respond as accurately as possible, and say 'I don't know' whenever appropriate. Participants in the Eyes-Closed conditions were instructed to close their eyes for the duration of the interview, and told that closing the eyes can help people when remembering. Explaining the motivation for eyeclosure inevitably raises questions of demand effects; however, we included this explanation for two reasons. First, because doing so more closely mirrors real investigative interviews, wherein the purpose of closing the eyes would be explained to witnesses (just as, for instance, the purpose of techniques in the Cognitive Interview is explained, see Fisher & Geiselman, 1992). Second, because many witnesses would likely guess the purpose of closing their eyes even if it were not explained, and so omitting this explanation would not rule out demand effects. Whereas explaining the purpose of eyeclosure might enhance the

eyeclosure effect, then, in our view doing so offers a realistic characterisation of the technique, rather than a confound. All Eyes-Closed participants initially complied with the eyeclosure instruction, and any who opened their eyes during the interview were reminded to close them. Eyes-Open participants were given no instruction regarding eyeclosure; none spontaneously closed their eyes.

Next, the questioning phase began. The interviewer asked the 17 questions about the film in a fixed order. Participants responded verbally after each question, and the experimenter simply wrote down their responses without probing or giving verbal feedback. After answering the final question, participants opened their eyes where applicable, and then completed the questionnaire. They did so privately, and sealed their completed questionnaire into an envelope; to promote honest responding, participants were told that the experimenter would not see their responses. Finally, all were debriefed and compensated.

After completion of data collection, the experimenter coded each of the 17 responses for every participant either as Correct, Incorrect, or Don't Know (DK).[1] Whenever participants provided an answer but hedged to indicate low confidence (e.g., "I think it was blue"), this was taken as a positive response rather than a DK response. Moreover, subjective information (e.g., "he was really old") was ignored, and whenever participants changed their minds, only their final answer was accepted (e.g., "Three… No, wait, four").

[1] Unfortunately the interviews in Experiment 1 were not recorded, and so we were unable to formally assess the response coding reliability in this experiment. The reliability analysis reported for Experiment 2, however, supports the claim that coding in this closed-question format was generally unambiguous.

Results

Post-interview ratings. To check whether our rapport manipulation was effective, we examined participants' ratings of their rapport with the interviewer. A 2 (Eyes-Open vs. Eyes-Closed) × 2 (Rapport vs. No-Rapport) between-subjects ANOVA revealed a large effect of rapport-building, $F(1, 62)= 37.46$, $p< .001$, $\eta^2_p= .38$, $d= 1.43$, 95% CI on d [0.90, 1.98]. Participants in the Rapport conditions gave higher ratings ($M= 6.64$, $SD= 0.60$) than those in the No-Rapport conditions ($M= 5.24$, $SD= 1.23$). The effect of eyeclosure on rapport ratings was smaller and non-significant, $F(1, 62)= 3.48$, $p= .07$, $\eta^2_p= .05$, $d= 0.36$ [-0.13, 0.84]; those who closed their eyes ($M= 6.15$, $SD= 0.99$) gave rather higher ratings than those who did not ($M= 5.72$, $SD= 1.35$). The eyeclosure x rapport-building interaction did not reach significance, $F(1, 62)= 3.13$, $p= .08$, $\eta^2_p= .05$.

Our data revealed that whereas Rapport participants ($M= 6.48$, $SD= 0.71$) felt substantially more comfortable than did No-Rapport participants ($M= 5.48$, $SD= 1.03$), $F(1, 62)= 20.70$, $p< .001$, $\eta^2_p= .25$, $d= 1.13$ [0.60, 1.64], there was little difference between Eyes-Open ($M= 6.00$, $SD= 0.88$) and Eyes-Closed participants ($M= 5.97$, $SD= 1.14$), $F(1, 62)= 0.02$, $p= .89$, $\eta^2_p< .001$, $d= -0.03$ [-0.51, 0.45]. Interestingly, although the interaction effect did not reach statistical significance, eyeclosure tended to make No-Rapport participants less comfortable ($d= -0.38$), but made Rapport participants more comfortable ($d= 0.47$), $F(1, 62)= 2.80$, $p= .10$, $\eta^2_p= .04$.

Memory data.

Correct responses. To examine whether rapport-building and eyeclosure had separate and combined effects on recall, we conducted a 2 (Eyes-Open vs. Eyes-

Closed) × 2 (Rapport vs. No-Rapport) between-subjects ANOVA on the proportion of questions answered correctly. As Table 1 illustrates, this analysis revealed that eyeclosure increased correct responding, $F(1, 62)= 25.72$, $p< .001$, $\eta^2_p= .29$, $d= 1.24$, 95% CI on d [0.72, 1.76], and so too did rapport-building, $F(1, 62)= 5.94$, $p= .02$, $\eta^2_p= .09$, $d= 0.51$ [0.02, 1.00]. However, there was little evidence that the two effects were dependent, as the interaction effect was very small and nonsignificant, $F(1, 62)= 0.22$, $p= .64$, $\eta^2_p< .01$.

Incorrect responses. An ANOVA on the proportion of questions answered incorrectly (Table 1) revealed no significant effect of eyeclosure, $F(1, 62)= 0.05$, $p= .82$, $\eta^2_p< .01$, $d= -0.05$ [-0.53, 0.43], but Rapport participants did answer fewer questions incorrectly than No-Rapport participants, $F(1, 62)= 17.15$, $p< .001$, $\eta^2_p= .22$, $d= -1.04$ [-1.55, -0.52]. The interaction between eyeclosure and rapport-building was very small and nonsignificant, $F(1, 62)= 0.30$, $p= .58$, $\eta^2_p< .01$.

***Don't Know responses*.** A final ANOVA revealed that eyeclosure led to fewer DK responses (Table 1), $F(1, 62)= 24.85$, $p <.001$, $\eta^2_p= .29$, $d= -1.24$ [-1.76, -0.71], whereas rapport-building had little effect, $F(1, 62)= 0.58$, $p= .49$, $\eta^2_p< .01$, $d= -0.16$ [-0.64, 0.33]. There was no substantial interaction between these variables, $F(1, 62)= 0.47$, $p= .49$, $\eta^2_p< .01$.

In summary, whereas both eyeclosure and rapport-building benefited witnesses' memory reports, these data offer little evidence that interviewer/witness rapport-building moderates the effectiveness of the eyeclosure technique.

[INSERT TABLE 1 ABOUT HERE]

Relationships with post-interview ratings. Rapport ratings were correlated with memory performance (correct responses, $r = .32$, $p < .01$, incorrect responses, $r = -.24$, $p < .05$, DK responses, $r = -.24$, $p = .051$). In contrast, comfort ratings were not significantly correlated with correct ($r = .14$, $p = .27$), incorrect ($r = -.13$, $p = .29$), or DK responding ($r = -.09$, $p = .47$). Using the PROCESS bootstrapping macro for SPSS (Hayes, 2013), we conducted several mediation analyses to test whether rapport or comfort ratings would mediate the relationships between (X) rapport-building or eyeclosure, and (Y) correct, incorrect, or DK responding. None of these analyses provided support for indirect effects.

Experiment 2

In Experiment 2, we aimed to replicate and extend the findings of Experiment 1, using a larger sample and a different stimulus event. Given the importance of accumulating data to test competing explanations of the eyeclosure effect, we also manipulated modality, asking questions about visual and auditory aspects of the witnessed event. This manipulation allowed us to test the extent to which the eyeclosure benefit was specific to visual details (supporting the modality-specific interference hypothesis) or extended to auditory details (supporting the cognitive load hypothesis).

Method

Participants and Design. A total of 112 students and local volunteers (83 females and 29 males, aged 18-79, $M = 24.45$, $SD = 9.91$) participated for course credit or a raffle entry. The design was identical to Experiment 1 except for the addition of information modality (Visual vs. Auditory) as a within-subjects manipulation.

Participants were assigned randomly to one of the four between-subjects conditions. Power analysis indicates that this sample size is adequate to detect medium-sized main and interaction effects for the between-subjects contrasts (i.e., the least-powerful contrasts; Cohen's *f*= .27, assuming power= .80 and α= .05).

Materials. All participants saw a 6 min 35 s film-clip from TV documentary 'Crimewatch', depicting a reconstruction of an aggravated burglary wherein an elderly man was attacked in his home. The reconstruction was introduced by a police officer, and interspersed with short interviews with the victim's friends and family. Based on the reconstruction and interview segments, we generated 20 questions: 10 probing discrete and verifiable auditory details (e.g., "what was the victim's surname?"), and 10 probing visual details (e.g., "what colour was the front door?"). For each question we determined in advance the responses that would qualify as correct. We used the same post-interview questionnaire as in Experiment 1.

Procedure. The procedure was identical to Experiment 1 except for the following details. First, the film stimulus and corresponding interview questions differed, as described above. During the questioning phase, which was audio-recorded, participants answered the 20 interview questions in a fixed order, with questions about visual and auditory details intermixed. Second, as in Perfect et al.'s (2008) second experiment, we added a short filler task: immediately after watching the film, participants solved arithmetic puzzles for 5 min. Participants were randomised to conditions during this filler, rather than at the start of the study, thus preventing unintended differences between conditions during encoding of the film.

Each interview was conducted by one of two female experimenters, both of whom undertook several practice interviews in each condition prior to commencing the study. Assignment to interviewers was not random, but based only on their availability.[2] All participants confirmed during debriefing that they had not seen the film beforehand.

Results

Post-interview ratings. As in Experiment 1, a 2 (Eyes-Open vs. Eyes-Closed) × 2 (Rapport vs. No-Rapport) between-subjects ANOVA confirmed that rapport ratings in the Rapport conditions were significantly higher (M= 6.52, SD= 0.71) than in the No-Rapport conditions (M= 5.46, SD= 1.17), a large effect, $F(1, 108)= 32.51$, $p< .001$, $\eta^2_p= .23$, $d= 1.08$, 95% CI on d [0.69, 1.48]. There was no main effect of eyeclosure, $F(1, 108)= 0.46$, $p= .50$, $\eta^2_p< .01$, $d= 0.11$ [-0.26, 0.48], as participants who closed their eyes (M= 6.05, SD= 0.98) gave similar ratings to those who did not (M= 5.93, SD= 1.22). There was no significant eyeclosure x rapport-building interaction, $F(1, 108)= 0.23$, $p= .63$, $\eta^2_p< .01$.

Next we examined participants' comfort ratings. This time, the interaction between eyeclosure and rapport-building reached statistical significance, $F(1, 108)= 8.18$, $p< .01$, $\eta^2_p= .07$. Mirroring the trends in Experiment 1, eyeclosure made

[2] The two experimenters'data did not differ significantly on any dependent variable (all $p> .06$). Consequently, and because both experimenters' interviews were distributed equally across conditions (the experimenters conducted 20 and 8 interviews per condition, respectively), we do not consider interviewer effects further.

participants somewhat less comfortable when rapport was not built, $t(44.89) = 1.76$, $p = .09$, $d = -0.47$ [-1.00, 0.06], but more comfortable when rapport was built, $t(35.10) = 2.80$, $p = .02$, $d = 0.63$ [0.09, 1.17]. Overall, Rapport participants ($M = 6.30$, $SD = 1.23$) felt more comfortable than No-Rapport participants ($M = 5.63$, $SD = 1.47$), $F(1, 108) = 7.38$, $p < .01$, $\eta^2_p = .06$, $d = 0.50$ [0.12, 0.88], but there was little difference between Eyes-Open ($M = 5.95$, $SD = 1.33$) and Eyes-Closed participants ($M = 5.98$, $SD = 1.47$), $F(1, 108) = 0.02$, $p = .89$, $\eta^2_p < .001$, $d = 0.03$ [-0.35, 0.40].

Memory data. The first author independently examined 23 interview recordings (20.5% of the dataset) blind to condition, coding each of the responses as correct, incorrect, or DK. He agreed with the experimenters' coding on 98.4% of responses ($\kappa = .98$), therefore the experimenters' classifications were used in analyses.

Correct responses. We began by conducting a 2 (Eyes-Open vs. Eyes-Closed) × 2 (Rapport vs. No-Rapport) x 2 (Visual vs. Auditory details) mixed-factor ANOVA on the proportion of questions answered correctly. As Table 2 illustrates, eyeclosure increased correct responding, $F(1, 108) = 11.60$, $p = .001$, $\eta^2_p = .10$, $d = 0.63$, 95% CI on d [0.25, 1.01], as did rapport-building, $F(1, 108) = 6.81$, $p = .01$, $\eta^2_p = .06$, $d = 0.47$ [0.10, 0.85]. However, the interaction between eyeclosure and rapport-building was very small, $F(1, 108) = 0.13$, $p = .72$, $\eta^2_p < .01$. No contrast involving Modality reached statistical significance, although the Modality x Rapport-building interaction indicated that rapport benefited visual recall somewhat more than auditory recall, $F(1, 108) = 3.07$, $p = .08$, $\eta^2_p = .03$. Of particular note, the Modality x Eyeclosure interaction was very small, consistent with the theory that eyeclosure decreases cognitive load, $F(1, 108) = 0.16$, $p = .69$, $\eta^2_p < .01$.

Incorrect responses. An ANOVA on the proportion of questions answered incorrectly showed that eyeclosure led to fewer incorrect responses (Table 2), $F(1, 108)= 5.33$, $p= .02$, $\eta^2_p= .05$, $d= -0.43$ [-0.80, -0.05]. Moreover, the effect of rapport-building tended non-significantly in the same direction, $F(1,108)= 3.92$, $p= .05$, $\eta^2_p= .04$, $d= -0.37$ [-0.74, 0.01]. The interaction between eyeclosure and rapport-building was small and non-significant, $F(1, 108)= 1.97$, $p= .16$, $\eta^2_p= .02$. We found a main effect of Modality, whereby incorrect responses were more frequent for questions about visual details ($M= .24$, $SD= .17$) than about auditory details ($M= .20$, $SD= .13$), $F(1, 108)= 5.83$, $p= .02$, $\eta^2_p= .05$, $d= 0.28$ [0.05, 0.52]. No other interaction was significant; in particular, the Modality x Eyeclosure interaction was very small, $F(1, 108)= 0.82$, $p= .37$, $\eta^2_p< .01$.

Don't Know responses. Analysis of the proportion of questions answered with DK responses revealed no main effects of eyeclosure, $F(1, 108)= 1.82$, $p= .18$, $\eta^2_p= .02$, $d= -0.25$ [-0.63, 0.12], or rapport, $F(1,108)= 0.83$, $p= .36$, $\eta^2_p= .01$, $d= -0.17$ [-0.54, 0.20], nor a statistical interaction, $F(1, 108)= 2.70$, $p= .10$, $\eta^2_p= .02$. There was, however, a main effect of Modality, with more DK responses concerning auditory details ($M= .34$, $SD= .16$) than concerning visual details ($M= .30$, $SD= .18$), $F(1, 108)= 4.18$, $p= .04$, $\eta^2_p= .04$, $d= 0.24$ [0.01, 0.47]. No other interactions were significant, including the Modality x Eyeclosure interaction, $F(1, 108)= 0.10$, $p= .75$, $\eta^2_p< .01$.

[INSERT TABLE 2 ABOUT HERE]

Relationships with post-interview ratings. Participants' rapport ratings correlated significantly with the proportion of visual questions answered with correct ($r= .24$, $p= .01$) and DK responses ($r= -.25$, $p< .01$), but not with incorrect

responses (r= -.02, p= .86). For auditory questions there were no significant correlations with rapport ratings (correct, r= .15, p= .11; incorrect, r= -.02, p= .84; DK, r= -.15, p= .12). Comfort ratings were not significantly correlated with the proportion of correct (r= .03, p= .75), incorrect (r= -.03, p= .74), and DK responses (r= -.01, p= .94) about visual details. The same held for auditory details (correct, r= .06, p= .54; incorrect, r= -.10, p= .30; DK, r= .02, p= .84). Mediation analyses using PROCESS provided no evidence that rapport or comfort ratings significantly mediated any of the relationships between rapport-building, eyeclosure, and memory reporting.

Effect size estimations

In recent years, psychological scientists have been criticised for over-relying on null hypothesis significance-testing, instead of on estimates of the size and meaningfulness of studied effects (Cumming, 2012; Loftus, 1996). Mindful of this debate, we examined our data across both experiments to obtain more precise estimates of the degree of interactivity between eyeclosure and rapport-building. To this end, we treated our factorial designs as regression models, observing the parameter estimates for the interaction term in each model (collapsing across information modality for Experiment 2). A positive value for these estimates would indicate that eyeclosure increases scores to a greater extent (or decreases them to a lesser extent) when rapport has been built than when it has not. Conversely, a negative value would indicate that eyeclosure decreases scores to a greater extent (or increases them to a lesser extent) when rapport has been built than when it has not.

We combined data across experiments using random-effects meta-analytic models, transforming each interaction parameter into a standardised mean

difference (SMD; equivalent to Cohen's *d*). In terms of correct responding, our analyses confirmed that there was no evidence of a meaningful interaction: the point estimate of the summary interaction effect size was close to zero, SMD= -0.04, 95% CI [-0.19, 0.10], p= .57. In other words, although rapport-building was in itself beneficial, it did not meaningfully enhance or lessen the eyeclosure benefit to correct responding. In terms of incorrect responding, a comparable analysis led to the same conclusion: whereas the point estimate was negative, the confidence interval included zero as a plausible effect size, SMD= -0.11 [-0.26, 0.04], p= .15. The same was true for DK responding, SMD= 0.13 [-0.02, 0.28], p= .09.

Recall that in both studies eyeclosure tended to reduce comfort when rapport was not built, but improve comfort when rapport was built. Across studies, this interaction effect was small but reliable, SMD= 0.25 [0.10, 0.40], p< .01. Specifically, eyeclosure affected witnesses' comfort negatively in the absence of rapport-building (SMD= -0.44 [-0.86, -0.02], p= .04), but positively when rapport had been built (SMD= 0.57 [0.15, 1.00], p< .01). Looking last to participants' rapport ratings, there was no substantial interaction between eyeclosure and rapport-building across studies, SMD= -0.11 [-0.28, 0.05], p= .18.

Discussion

The present research is the first to directly examine the extent to which a hypothesised social psychological moderator—namely, rapport-building—influences the eyeclosure benefit in closed questioning. Contrary to our predictions, we found little evidence of such moderation. Indeed, our effect size estimations indicate that any interaction between rapport-building and eyeclosure on memory

reports is likely to be very small, if not zero. Whereas our data do not directly speak to the mechanisms underpinning the effect of rapport-building, it might for example be that rapport increases witnesses' motivation to perform well, supports their task engagement, and/or encourages them to invest greater time and effort in attempting to retrieve information.

Replicating others' findings, eyeclosure increased our participants' ability to correctly answer questions about witnessed events (e.g., Perfect et al., 2008; Vredeveldt et al., 2011). In Experiment 2, this benefit held across visual and auditory modalities – a finding that provides new supporting evidence in favour of a cognitive load mechanism. We also found rapport-building to have a (rather smaller) benefit to correct responding. This finding actually differs from those of several prior studies, wherein benefits of rapport-building emerged during free-recall but not in closed questioning (R. Collins et al., 2002; Vallano & Schreiber Compo, 2011). Our studies seem therefore to be among the first to document memorial benefits of rapport-building during closed questioning.

In contrast to the memory data, rapport-building did moderate one important effect of eyeclosure. Specifically, without a rapport intervention, eyeclosure tended to make participants less comfortable, but with a rapport intervention, it made them more comfortable. This finding provides empirical support for an intuition expressed by Fisher and Geiselman (1992); namely that building rapport could lessen witnesses' unease with closing their eyes. It therefore has important investigative implications, as there are myriad other procedural and ethical reasons why investigators should strive for comfortable witnesses; not least that closing the

eyes can only benefit memory if witnesses are willing to close them (see Vredeveldt et al., in press, for positive indications of such willingness in a field sample).

Some limitations of the present research are important to note. First is that we examined only a situation in which baseline rapport and comfort were good, and we used contrived stimulus events that were unlikely to provoke stress during encoding or retrieval. Indeed, even our No-Rapport participants mostly rated their rapport and comfort in the upper-half of the scales. In real investigative interviews, many witnesses would experience greater anxiety, which might create reluctance about closing their eyes; undoubtedly there is a need to test the eyeclosure technique in more challenging interview conditions. A related limitation is that we assessed rapport and comfort using single-item self-report measures; research using more complex questionnaires or even psychophysiological measures would therefore be a methodological improvement.

Three further considerations are of note, first of which is that most of our interviews involved both female witnesses and interviewers, quite different from the representation of gender-dyads in genuine police interviews (Dando, Wilcock, & Milne, 2008)[3]. Second, we focused only on closed questioning, whereas most effective interviewing practices favour open-ended, witness-led styles (Fisher & Geiselman, 1992; Milne & Bull, 2003). It would therefore be important to extend our findings to free-recall tasks, which would furthermore provide data on the amount of time and effort expended by witnesses in recounting their memories. Finally, our

[3] Participant gender and age were not significantly associated with any dependent variable in this research.

Eyes-Closed participants were told that eyeclosure should assist their remembering, whereas participants in prior studies were either told nothing, or given a decoy justification ("it may help you to relax"; Vredeveldt et al., in press). We have argued that disclosing the purpose realistically characterises the eyeclosure technique; nevertheless it would be useful to explore whether witnesses' understanding of the purpose of closing their eyes affects its benefits.

To conclude, whereas rapport-building seems to positively affect witnesses' subjective experience of eyeclosure, we found no evidence of any impact upon the memorial benefits of eyeclosure. In this respect, our results lend new support to the cross-situational robustness of the eyeclosure technique.

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Table 1. *Mean proportion of questions (out of 17 questions) answered with correct, incorrect, and DK responses in Experiment 1. 95% confidence intervals in parentheses.*

	Condition			
	Eyes-Open		Eyes-Closed	
Response type	No-Rapport	Rapport	No-Rapport	Rapport
Correct	.41 [.32, .50]	.54 [.45, .64]	.66 [.58, .75]	.75 [.67, .84]
Incorrect	.13 [.10, .17]	.07 [.03, .10]	.14 [.10, .18]	.05 [.02, .09]
Don't Know	.46 [.36, .55]	.39 [.30, .48]	.20 [.11, .29]	.19 [.10, .28]

Note: Proportions within each column do not always add to 1.00 due to rounding

Table 2. *Mean proportion of questions (out of 20 questions overall, 10 for each modality) answered with correct, incorrect, and DK responses in Experiment 2. 95% confidence intervals in parentheses.*

		Condition			
		Eyes-Open		Eyes-Closed	
Detail type	Response type	No-Rapport	Rapport	No-Rapport	Rapport
Visual	Correct	.36 [.29, .43]	.48 [.41, .55]	.45 [.38, .52]	.54 [.47, .61]
	Incorrect	.27 [.21, .33]	.25 [.18, .31]	.28 [.21, .34]	.17 [.11, .23]
	Don't Know	.38 [.31, .44]	.27 [.20, .33]	.27 [.21, .34]	.29 [.23, .36]
Auditory	Correct	.40 [.34, .47]	.43 [.36, .49]	.49 [.43, .56]	.52 [.46, .58]
	Incorrect	.23 [.18, .28]	.23 [.18, .28]	.19 [.14, .23]	.14 [.10, .19]
	Don't Know	.36 [.31, .42]	.35 [.29, .41]	.32 [.26, .38]	.34 [.28, .39]
Overall	Correct	.38 [.33, .43]	.45 [.41, .50]	.47 [.42, .52]	.53 [.48, .58]
	Incorrect	.25 [.21, .29]	.24 [.19, .28]	.23 [.19, .27}	.16 [.11, .20]
	Don't Know	.37 [.32, .42]	.31 [.26, .36]	.30 [.25, .34]	.31 [.27, .36]

Note: Proportions within each subsection of each column do not always add to 1.00 due to rounding