



# Schematic influences of rape myth acceptance on visual information processing: An eye-tracking approach <sup>☆</sup>

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## ABSTRACT

Schematic influences of rape myth acceptance (RMA) on visual information processing were studied. After reading a short text on a rape case, students viewed a “police photograph” of the plaintiff’s living room, where the rape allegedly happened, while their eye-movements were recorded. The photograph contained two myth-consistent cues, one being expected in the situation (wine bottle and glasses), the other unexpected (poster of a nude male). Results of Study 1 ( $N = 60$ ) showed that participants higher in RMA fixated the expected cue both earlier and less long, which may indicate hypervigilance and greater ease of processing, respectively. Higher RMA also predicted longer initial fixation of the unexpected cue. These processing differences mediated participants’ verdicts and blame judgments. In Study 2 ( $N = 30$ ), participants’ level of RMA was manipulated experimentally via social norm feedback. This manipulation significantly affected eye-movement patterns for the expected myth-consistent cue. Results support the notion that RMA actively guides visual information processing of relevant stimuli.

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## Introduction

Stereotypical rape-related attitudes bias information processing both in the laboratory and in real-life situations. For instance, in studies on the attribution of responsibility and blame in mock-juries (Krahé, 1991), on men’s self-reported likelihood of raping (Abrams, Viki, Masser, & Bohner, 2003), and on the recovery process of rape survivors (Burt & Katz, 1988; Littleton, Axsom, Radecki Breitkopf, & Berenson, 2006), these attitudes have been shown to play a key role. Such rape myths can be defined as beliefs “that serve to deny and justify male sexual aggression against women” (Lonsway & Fitzgerald, 1994, p. 134); they address stereotypes about victims and perpetrators as well as the contexts in which an assault would occur (Bohner, 1998; Bondurant, 2001). This functional definition of rape myths is well-suited to capture beliefs that greatly differ in content. Following suggestions by Burt (1991), there are a number of content categories for myths targeting women alone. These range from beliefs that no harm was done (e.g., “A lot of women lead a man on and then they cry rape”) to beliefs that the sexual contact was in fact welcome (e.g., “Many women secretly desire to be raped”).

Since Burt (1980) introduced the construct of rape myth acceptance (RMA) – that is the level of endorsement of these myths –

into the psychological literature, research has focused on various issues including the correlational links of RMA to other constructs (for reviews, see Bohner, 1998; Lonsway & Fitzgerald, 1994), general and gender-specific functions of RMA (e.g., Bohner, Siebler, & Schmelcher, 2006; Bohner, Weisbrod, Raymond, Barzvi, & Schwarz, 1993; for a review, see Bohner, Eyssel, Pina, Siebler, & Viki, 2009), as well as measurement issues. This research has resulted in the development of several RMA scales (Burt, 1980; Cowan & Quinton, 1997; Gerger, Kley, Bohner, & Siebler, 2007; Payne, Lonsway, & Fitzgerald, 1999) and has spawned a variety of intervention programs (e.g., Berkowitz, 2003; Foubert & Marriott, 1997).

Indeed, RMA is prevalent among the general public and likewise among members of the police force, medical examiners, and criminal justice professionals (Burt, 1980; Feild, 1978; Süßenbach & Bohner, 2011; Weis, 1982) and further research on RMA is therefore warranted.

### RMA as a cognitive schema

Most recently, Eyssel and Bohner (2011) conceptualized RMA in terms of a cognitive schema that “guides and organizes an individual’s interpretation of specific information about rape cases” (p. 1581). To test the social-cognitive function of RMA further, Eyssel and Bohner (2011, Expt. 1) provided participants with varying amounts of irrelevant information pertaining to either plaintiff or defendant in a mock-jury study. Irrespective of whether the information was about plaintiff or defendant, the more information participants received, the stronger were the effects of RMA on blame judgments. Further

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evidence for schema-guided information processing comes from a study by Krahé, Temkin, and Bieneck (2007): Using a mock-jury paradigm, Krahé and colleagues investigated the role of RMA and victim–perpetrator relationship on judgments of guilt and blame. As predicted, type of prior relationship as well as RMA affected the verdicts of prospective lawyers. Furthermore, participants with higher levels of RMA were more sensitive or vigilant to the manipulation regarding the prior victim–perpetrator relationship. Consequently, participants high in RMA blamed the victim more, the more intimate the relationship between plaintiff and perpetrator had been prior to the alleged assault. In clinical psychology, such heightened vigilance for certain stimuli has a long tradition in cognitive theories of emotional disorders (e.g., Beck's schema model; Beck, 1976). Subsequently, research in this area has successfully linked cognitive schemata to hypervigilance, an attentional bias in favor of schematic cues (e.g., Mogg, Millar, & Bradley, 2000; Sieswerda, Arntz, Mertens, & Vertommen, 2007). For example, Mogg et al. (2000) reported that individuals with generalized anxiety disorder first look at threatening rather than neutral faces compared to healthy controls. One goal of the present research is to study increased vigilance and its boundary conditions with regard to stereotypical expectations about sexual assault.

In previous research, information about an alleged rape case has commonly been presented in text format to systematically vary aspects of the context. That is, participants are typically presented with short vignettes (e.g., to study effects of prior alcohol consumption, see Cameron & Stritzke, 2003). However, using vignettes has certain shortcomings: For instance, ecological validity is often low, given the brevity of the depicted scenarios. As a consequence, the focal pieces of information necessarily catch the attention of the readers and are subsequently integrated in participants' decision-making. Additionally, as a result of conversational norms (Grice, 1975), participants might interpret any information given in the context of a short vignette as relevant to the task at hand. In fact, participants might assume that the researcher is observing general principles of cooperation and therefore only presents them with information that is relevant. Hence, for some studies, a correlation between level of RMA and judgments of blame attributed to an intoxicated victim comes as no surprise, given that some classic RMA measures (Burt, 1980; Cowan & Quinton, 1997) include items related to victim intoxication. Due to content overlap, one may doubt the theoretical significance of these findings. In a similar vein, providing information using textual vignettes might be relevant for the type of influence that can be attributed to the schema construct in more general terms, thus addressing aspects of its fundamental conceptualization. Decades ago, Bartlett (1995/1932) has already emphasized the *active* role of schemata in the allocation of attention and the search for information. However, biased processing of well-structured and easily accessible information, as documented in past studies on schematic influences of RMA (e.g., Krahé et al., 2007), is not well suited for testing such a conceptualization. To investigate the active role of RMA-related schemata more directly, we therefore propose to use materials high in face validity to test the social-cognitive functions of RMA. To do so, we provided participants with case-relevant information using complex and realistic photographs. This way, we manipulated content features of the photographs. In addition, we argue that the presentation of photographs is less blatant than the vignette technique and also less well-structured, thereby reducing demand effects and increasing the potential for subjective interpretations by participants.

In order to establish the notion that RMA as a cognitive schema actively guides an individual's thoughts, it seems necessary to measure RMA-related process variables rather than only outcome differences. To do so, we applied eye-tracking methodology, a means to gather information about participants' attention to schema-related stimuli. For our current purposes, this methodology provides two types of data: (1) information on how fast a participant looks at a schematic stimulus, and (2) information on how long a participant looks at a schematic stimulus during the first visit. Whereas

information of the first type can be used as a measure of vigilance (e.g., Loftus & Mackworth, 1978), information of the second type represents a measure of encoding time (e.g., De Graef, Christiaens, & d'Ydewalle, 1990; Holmqvist et al., 2011) but also of integrating the object into the scene (Henderson, Weeks, & Hollingworth, 1999). High vigilance for, and fast processing of schematic stimuli might thus reflect hypervigilance and ease of processing, respectively, two elements of schematic processing.

### *The role of expectancy*

However, not just any information that is encompassed by a rape myth will be processed in such a schematic fashion. As outlined by Smith and Queller (2001), schemata are not chronically active, but rather need to be activated by thought about their topics or an encounter with relevant information. Furthermore, schemata are independent units. With regard to RMA, this could imply that a schema about the typical perpetrator of rape does not necessarily activate a schema about a typical victim. Therefore, we assume that information pertaining to rape myths will only be processed schematically if the corresponding schema is activated and confirming information is hence expected. The likelihood of whether the schema is ultimately activated depends in turn on participants' RMA level. That is, when reading case information (e.g., about an alleged rape after a fraternity party), people high in RMA are more likely to activate schema-related knowledge structures (e.g., "woman feeling ashamed following drunk but consensual sex") leading to schematic processing (i.e., hypervigilance and ease of processing) of subsequent visual stimuli (e.g., photograph depicting alcoholic beverages at the scene). Schematic processing of such visual stimuli is, in our opinion, rather unlikely when participants are confronted with the visual stimuli prior to reading the case-related information or when the visual stimuli do not fit the narrative of the case, and could therefore not be expected. Whereas unexpected stimuli might affect participants' blame judgments to an equal degree, on a process level these cues should not be associated with schematic biases such as hypervigilance or ease of processing. Consequently, we assume that schematic processing is highly dependent on participants' expectations. Similarly, expectedness influences viewing patterns in reading and scene perception with shorter fixation durations for words that are highly predictable in a given context (Balota, Pollatsek, & Rayner, 1985) as well as for uninformative (i.e., more expected) compared to informative (i.e., less expected) objects in scene perception (Nuthmann, Smith, Engbert, & Henderson, 2010).

In the present study, we used an alcoholic beverage to operationalize a rape-myth-consistent cue that was expectable in the given rape case. This manipulation was chosen because it directly addresses stereotypical rape scripts and rape-related schemata. It has been shown repeatedly that alcohol consumption of female plaintiffs is used to mitigate rape claims. Furthermore, based on a pilot test in which participants read the rape case and then provided their expectations regarding a photograph like the one used in the main study, we found that participants with higher RMA were more likely to report that they would expect alcoholic beverages in the scene. Therefore, we assumed that information regarding alcohol consumption might be processed rather automatically by participants with high RMA, especially because alcohol consumption might have been anticipated in the context of the specific rape case at hand. To contrast expected from unexpected stimuli, we also included a cue that could not have been anticipated but can be used to subjectively confirm a rape myth. As such, a poster depicting a nude male torso was displayed in the plaintiff's living-room. We assumed that participants with high RMA would infer something about the complainant's character from this poster (e.g., high sexual interest) which corresponds to the content categories of rape myths "she asked for/she deserved it" proposed by Burt (1991). Although we did not make a specific prediction, it seemed likely that some participants, as a result of their

agreement with rape myths, would use this information. Thus, expectedness and unexpectedness as employed here are resultant from situational (the vignette) and individual (level of rape myth acceptance) factors.

## Study 1

In the first study, we explored the impact of RMA, an individual difference variable, and additional case-relevant information on judgments of a rape case. Specifically, we used photographs of the alleged crime scene and manipulated their content: depending on condition, the photograph included either two rape myth-consistent cues (i.e., information that can be interpreted to confirm a rape myth) or irrelevant placeholders (control condition). Based on a pilot test, the expectedness of the two rape myth-consistent cues was varied: one cue, consisting of a bottle of wine and two glasses on the sofa table, was highly expected, whereas the other, consisting of a poster depicting a nude male torso, was unexpected. Expectedness was defined as the extent to which each cue could have been anticipated by a perceiver high in RMA in the context of the corresponding rape case, which participants read just before viewing the photograph.

Whereas we did not predict any correlation between RMA and participants' visual focus on the placeholders in the control condition, specific predictions based on schema theory could be made for the expected stimulus (i.e., the wine bottle and glasses) in the experimental condition. Schemata are thought to influence attention, in that the expected schematic stimulus is more likely to be noticed quickly (Smith & Queller, 2001), as a result of higher vigilance for it. While the expected stimulus should be attended to faster, processing time for this same cue should be shorter because incoming information fits existing knowledge structures.

For the rape-myth-consistent but unexpected cue (i.e., the poster depicting a nude male torso) predictions are less straightforward: with regard to this cue, no hypervigilance is predicted, so the time until the stimulus is noticed should not depend on perceivers' RMA. With regard to processing time, likewise, no clear-cut predictions can be made. If all participants consider the poster relevant, but nevertheless draw different conclusions from it depending on their level of RMA, we would predict no correlation between RMA and processing time for the unexpected stimulus. If, however, the information that the unexpected stimulus conveys is deemed more relevant with increasing RMA, this should result in its thorough encoding. On the contrary, participants lower in RMA might only briefly look at the poster, in order to subsequently decide that it appears not relevant for judging the case and continue searching the photograph for more informative cues. This would lead to a positive correlation between processing time and RMA. To summarize, the following hypotheses were examined in this study:

- (1) Participants' rape myth acceptance affects their judgments of the rape case leading to more victim blame, less perpetrator blame, and more lenient verdicts with higher RMA.
- (2) In the experimental condition, higher RMA leads to earlier fixation of the expected schematic stimulus (the bottle of wine and wine glasses).
- (3) In the experimental condition, higher RMA leads to faster processing of the expected schematic stimulus, that is a shorter initial fixation of this stimulus.
- (4) Earlier (Hypothesis 2) and shorter initial fixation (Hypothesis 3) of the expected schematic stimulus result in more victim blame, less perpetrator blame, and more lenient verdicts.
- (5) For the unexpected schematic stimulus (i.e., the poster depicting a nude male torso), the effects described in Hypotheses 2 to 4 are either absent or reversed.

## Method

### Participants

A sample of 60 students (all male, no psychology students) with an average age of 24.77 years ( $SD = 3.96$ ) from the University of Bielefeld participated in this study. Participants were approached on campus and randomly assigned to one of two conditions (type of photograph: control condition  $n = 20$ , experimental condition  $n = 40$ ). To improve the power of the statistical tests within the more relevant experimental condition, two-thirds of participants were assigned to this condition.

### Apparatus

Eye movements were recorded monocularly at 240 Hz with an I-View X-High-Speed system (SMI, Berlin) using pupil locations as well as corneal reflections. The experiment was presented on a 365 mm (1280 pixel) wide by 270 mm (1024 pixel) high CRT monitor refreshing at 60 Hz. The computer screen was positioned 700 mm in front of the participant, who sat with head supported by the chin and forehead rest of the iView tracking column. Integrated software was used for stimulus presentation (SMI Experiment Center) as well as data analysis (BeGaze).

### Procedure

Participants believed to take part in two ostensibly unrelated studies. They completed a variety of computerized self-report measures including a RMA scale using MediaLab (Jarvis, 2005). The first study was said to measure a variety of attitudes within the population. After completion, participants were escorted to a different lab to take part in a second study on reading comprehension in a lay-juror task. Initially, they were familiarized with the eye tracker. After calibration of the eye-tracker (using 13-point calibration), participants read the rape case and then viewed the additional evidence (i.e., the photograph of the plaintiff's living-room) for 10 s. Presentation time of the picture as well as entry point to the picture was held constant to assure comparability of participants' eye tracking data. The stimulus presentation time was chosen based on a prior study that had used the same material and allowed participants to determine the viewing time themselves. In that study, participants viewed the photograph for about eight seconds on average, with no differences between conditions (Süßenbach, Böhner and Eyssel, 2010). Therefore, a presentation time of 10 s was considered optimal to allow for a thorough inspection of the material. After viewing the picture, participants provided verdict, blame and responsibility attributions using a paper-and-pencil questionnaire. During the second study, a separating wall divided participants from the experimenter. Participants were debriefed and received 2 Euros and candy for their participation.

### Materials

#### Rape myth acceptance

Participants completed an 11-item short version<sup>1</sup> of the Acceptance of Modern Myths About Sexual Aggression (AMMSA) scale (Gerger et al., 2007) in German language. The scale's items (e.g., "Women often accuse their husbands of marital rape just to retaliate for a failed relationship"; "Women like to play coy. This does not mean that they do not want sex") were designed to measure contemporary myths

<sup>1</sup> Specifically, we used items 3, 4, 5, 6, 10, 12, 15, 16, 22, 23, 27 (see, Gerger et al., 2007, pp. 439–440, or visit [www.zpid.de/index.php?wahl=products&uwahl=frei&uwahl=testarchiveintro](http://www.zpid.de/index.php?wahl=products&uwahl=frei&uwahl=testarchiveintro)).



regarding sexual violence. Each item was rated on a 7-point response scale ranging from 1, *completely disagree*, to 7, *completely agree*.

#### Rape case

Participants were asked to take the perspective of a lay juror and were presented with a short vignette pertaining to a rape case. The following scenario was described:

Male defendant and female plaintiff had met in a club and had engaged in lively conversation. Later that night, the defendant offered to escort the plaintiff home where she invited him into her apartment. Both parties agreed that they continued their conversation in the plaintiff's living-room and then started kissing. However, the statements diverge with regard to the subsequent events. Whereas the defendant claimed that consensual sexual intercourse had taken place, the plaintiff stated that she had been raped.

#### Manipulation of cues in photograph

After receiving the case information, participants were told that they would view a picture of the crime scene that had supposedly been taken by a police officer the day after the alleged assault. Thus, participants viewed a picture of the plaintiff's living-room. Importantly, two aspects of the photograph were varied between conditions: in the experimental condition, a bottle of wine and two half-empty glasses were visible on the coffee table, whereas in the control condition, a coffeepot and two mugs were shown (see Fig. 1). To contrast processing of expected and unexpected schema-relevant information, an additional aspect was manipulated: in the back of the room, a wall poster was visible. In the experimental condition, this poster depicted the nude torso of an athletic male, whereas in the control condition a poster of the Eiffel Tower was visible. To summarize, the photograph in the experimental condition included an expected and an unexpected schema-relevant cue, whereas neutral cues served as placeholders in the control condition.

#### Establishing cue expectedness

In order to establish differences in expectedness between the two critical stimuli in the experimental condition, 20 pilot participants were asked to read the rape case and to report what they would expect to see on a photograph taken by a police officer the following day. Participants provided their responses using an open-ended response format. The pretest ended with two items regarding how much participants would expect to see alcoholic beverages on the sofa table and how much they would expect to see a wall poster with erotic content (e.g., attractive partly-nude males). Responses were marked on 7 point scales from *not at all expect* to *very much expect*. These measures were followed by the 11-item short version of the AMMSA that was also administered in the main study.

When answering the open question, pilot participants were more likely to report expecting alcoholic beverages with increasing RMA,  $r(18) = .42$ ,  $p < .05$ , one-tailed. None of the participants expected information that would morally undermine the plaintiff or that could be used to infer high sexual interest on her behalf, as might be the case with erotic posters. In response to the rating items, pilot participants reported much higher expectations to see alcoholic beverages ( $M = 5.60$ ) than an erotic wall poster ( $M = 2.35$ ),  $t(19) = 8.17$ ,  $p < .001$ . Therefore, we concluded that our operationalization of expected versus unexpected schematic stimuli was successful.

#### Dependent variables

Participants were asked to take the perspective of a lay juror and responded to eight items pertaining to the case. Responses were marked on scales ranging from 1 to 7. First, participants provided a verdict by indicating the likelihood of the defendant's guilt ("In your opinion, how probable is the defendant's guilt?", from *not at all probable* to *very probable*) and subsequently recommended a sentence length ("What sentence length do you consider appropriate?", from *acquittal* to 6 years). Blame attributions were assessed using four items measuring attributions of responsibility for and influence on what happened separately for defendant and plaintiff ("How responsible is he/she for what happened?", from *not at all responsible* to *fully responsible*, and, "How much influence did he/she have on the outcome of the situation?" from *no influence at all* to *very much influence*). These items were used to measure perpetrator and victim blame respectively. In addition, responses to two more items were assessed ("He had to act that way", from *completely disagree* to *completely agree*, and "How severe are the consequences for her?", from *not severe at all* to *very severe*).

## Results

#### RMA and dependent variables

Individual scores for the self-report scales were obtained by averaging across the corresponding items. Accordingly, indices of victim blame, perpetrator blame, and participants' verdicts were formed. Additionally, a composite measure reflecting the overall case evaluation using all eight items was computed, with higher means indicating more victim blame, less perpetrator blame and more lenient verdicts. Table 1 presents the internal consistencies, overall means and standard deviations. Regression analyses were conducted. RMA was a significant predictor of all individual indices (absolute betas ranged from  $\beta = .28$  for verdict to  $\beta = .40$  for perpetrator blame) as well as of the overall case evaluation ( $\beta = .47$ ),  $t(57) = 4.00$ ,  $p < .001$ , thus supporting Hypothesis 1.



Fig. 1. Conditions of type of photograph.

Note. All participants were instructed to look at a black x before the photograph was displayed. For illustration purposes only, we inserted the x into the photograph.

**Table 1**  
Descriptive statistics and Cronbach's alpha for the self-report measures (Study 1).

Measure	N items	$\alpha$	M	SD
Rape myth acceptance	11	.83	3.12	0.96
Victim blame	2	.66	4.26	1.31
Perpetrator blame	2	.65	5.37	1.15
Verdict	2	.68	2.69	1.45
Overall case evaluation	8	.80	3.32	0.96

### Eye-movements

Two areas of interest comprising the poster and the beverage were defined separately for both the experimental and the control photograph. A third area of interest common to both photographs was included. Both photographs showed a teddy bear on the sofa. This stimulus was included into our analysis to strengthen the notion that the subjective meaning of the stimuli and not some other feature like surprise is responsible for the obtained results. Eye movement responses were assessed individually. Data of 8 participants (3 in the control, 5 in the experimental condition) had to be excluded because of imprecise eye-tracking.<sup>2</sup> Table 2 presents descriptive information on how participants viewed the areas of interest in both conditions. It shows when participants first fixated the area of interest ("time before fixation"), how long that first fixation lasted ("first fixation duration"), how long the area of interest was fixated in total ("dwell time"), and how often participants fixated the area of interest ("fixation count"). Apparently, low-level visual properties (e.g., luminance, contrast, etc.), in which the expected stimulus and its control (i.e., wine and coffee pot) differed, did not lead to any overall differences in how these stimuli were attended to between conditions. In contrast, although being very similar in color, luminance, and contrast, participants in the experimental condition spent more time looking at the poster (i.e., the nude male torso) than did participants in the control condition (where the poster depicted the Eiffel Tower),  $t(1,50) = 2.93, p < .01$ .

Processing time was measured using first fixation duration, which reflects the length of time the fovea fixates a cue after first landing on it. In contrast to the total time spent dwelling on a cue, first fixation duration is assumed to reflect encoding operations without being contaminated by later processes unrelated to encoding (De Graef et al., 1990; Henderson, Pollatsek, & Rayner, 1987). The time that passed before the first fixation on a cue was used as an index of vigilance. Table 3 presents the correlations between the eye tracking measures and RMA as well as the dependent measures in the experimental condition.

In keeping with Hypothesis 2, participants fixated the expected schematic cue earlier with increasing RMA, leading to a negative correlation between RMA and total time (in ms) before the first fixation of the bottle of wine,  $r(24) = -.36, p < .05$ , one-tailed. Using ordinal information (i.e., whether first, second, third, etc. fixation landed on the cue), any impact of individual speed differences concerning fixations can be minimized. Similar to the absolute measure, this index of time before the first fixation was negatively correlated with RMA,  $r(24) = -.37, p < .05$ , one-tailed, as well as with the overall case evaluation,  $r(24) = -.38, p < .05$ , one-tailed. Higher RMA was therefore associated with earlier fixations of the bottle of wine. Earlier fixations of the bottle of wine were in turn associated with more victim blame, less perpetrator blame and more lenient verdicts.

As predicted in Hypothesis 3, during the first fixation participants spent less time on the schematic cue with increasing RMA,  $r(33) =$

**Table 2**  
Means and standard deviations of eye-tracking variables for relevant areas of interest (Study 1).

Area of interest	Time before fixation	First fixation duration	Dwell time	Fixation count
Bottle of wine	1526 (1365)	282 (233)	1114 (1213)	2.20 (1.81)
Coffee pot	2194 (2603)	269 (203)	813 (780)	2.47 (1.84)
Poster (male torso)	3202 (2055)	440 <sup>a</sup> (286)	949 <sup>b</sup> (620)	2.20 <sup>a</sup> (1.41)
Poster (Eiffel-tower)	4345 (2519)	280 <sup>a</sup> (273)	464 <sup>b</sup> (403)	1.47 <sup>a</sup> (1.23)
Teddy (experimental)	1610 (1309)	219 (143)	436 (330)	1.63 (1.17)
Teddy (control)	1744 (1970)	196 (133)	485 (376)	2.06 (1.43)

Note. Values reported for time before fixation, first fixation duration, and dwell time are in milliseconds. Standard deviations are shown in parentheses.

<sup>a</sup> Marginally significant difference between conditions,  $p < .10$ .

<sup>b</sup> Significant difference between conditions,  $p < .05$ .

$-.35, p < .05$ . Shorter initial fixations can be interpreted as reflecting faster encoding of this cue, and they were associated with more lenient verdicts,  $r(33) = .38, p < .05$ , and more victim blame,  $r(33) = -.34, p < .05$ . Although shorter fixations of the alcohol cue appeared to be associated with less perpetrator blame, this correlation was not significant,  $r(33) = .14, p = .41$ .<sup>3</sup>

In line with Hypothesis 5, participants with higher RMA did not fixate the poster depicting the nude male torso earlier – the unexpected, yet rape-myth-consistent information. Contrary to results for the expected cue, the encoding time of the poster was positively correlated with RMA,  $r(33) = .51, p < .01$ . Longer first fixation duration of the poster was in turn associated with more lenient verdicts,  $r(33) = -.36, p < .05$ , and less perpetrator blame attributions,  $r(35) = -.39, p < .05$ . However, first fixation duration of the poster was unrelated to victim blame,  $r(33) = .08, p = .66$ .

It seems plausible to assume that participants interpreted the stimuli in the experimental condition in accordance with their RMA. Consequently, participants' judgments were more in line with their RMA in the experimental condition than in the control condition,  $r_{\text{Experimental}}(33) = .51$  vs.  $r_{\text{Control}}(15) = .32$ . However, this difference is not significant and should be interpreted rather cautiously. A mediation analysis was conducted to test whether RMA-related differences in encoding as measured via first fixation duration mediate effects of RMA on subsequent judgments in the experimental condition. To integrate the first fixation durations of the two cues in the experimental condition into one measure reflecting RMA-biased processing, these indices were centered, one was multiplied by  $-1$  to reverse scoring, and finally, the indices were aggregated with higher values indicating first fixation duration biases that are positively correlated to RMA. A successful partial mediation might sustain the argument that differences between RMA-judgment correlation coefficients across conditions are systematic rather than random. A bootstrapping analysis based on 5000 bootstraps (Preacher & Hayes, 2004) was used to test whether encoding differences mediate the effect of RMA on the overall case evaluation. The results showed a significant indirect effect of the aggregated eye-tracking

<sup>3</sup> Degrees of freedom vary between correlations including time before fixation and correlations including encoding time because correlations calculated for time before fixation were based on data from participants who stably fixated the stimulus (e.g.,  $N = 26$  for the bottle of wine). However, people understand the gist of a scene very rapidly and subsequently focus on informative stimuli (Henderson, 2003). Since expectancy for the bottle of wine increases with participants' RMA (and consequently renders the stimulus more uninformative), it is possible that especially participants with high RMA did not directly fixate the expected stimulus, but rather processed it peripherally. In line with this reasoning, participants were less likely to fixate the expected stimulus with increasing RMA,  $r_{pb}(33) = .42, p < .05$ . Participants' encoding time was set to zero if they did not fixate the stimulus. Therefore correlations including encoding time use information by all participants ( $N = 35$  in the experimental condition).

<sup>2</sup> After reading the rape case, but before seeing the photograph, participants were asked to fixate an "x" in the middle of the screen. Based on the deviation from this fixation, inclusion versus exclusion of eye movement data for each participant was decided.

**Table 3**  
Correlations of eye tracking measures with RMA and dependent variables (Study 1).

Type of cue	RMA	OCE	V	PB	VB
Encoding time (first fixation duration)					
Bottle of wine <sup>a</sup>	-.35*	-.45**	.38*	.14	-.34*
Nude male torso <sup>a</sup>	.51**	.43*	-.36*	-.39*	.08
Teddy <sup>b</sup>	-.04	.04	-.04	.07	-.01
Time before fixation					
Bottle of wine <sup>c</sup>	-.36†	-.33	.25	.27	-.32
Nude male torso <sup>d</sup>	.01	.03	.00	-.16	.11
Teddy <sup>b</sup>	.07	.13	-.21	.02	-.06

Note. OCE = overall case evaluation. V = verdict. PB = perpetrator blame. VB = victim blame.

<sup>a</sup>  $n = 35$  (total sample in the experimental condition with encoding time set to zero if participants did not fixate the stimulus).

<sup>b</sup> For this cue, correlations were calculated across experimental and control condition ( $n = 52$ ).

<sup>c</sup>  $n = 26$  (including only participants with a stable fixation on the cue).

<sup>d</sup>  $n = 31$  (including only participants with a stable fixation on the cue).

\*  $p < .05$ .

\*\*  $p < .01$ .

†  $p < .05$ , one-tailed.

measure reflecting RMA-dependent encoding differences  $t = 1.78$ ,  $p < .05$ , one-tailed, that led to a reduction of the effect of RMA on the dependent variables, from  $t = 3.44$ ,  $p < .001$ , to  $t = 1.97$ ,  $p < .05$  reflecting a corrected  $r_{\text{Experimental}} = .32$ . Hence, these results support the assumption that encoding differences as measured with eye tracking partially mediated the effect of RMA on case-related judgments in the experimental condition. No significant correlations were found for the corresponding cues (i.e., coffee pot, Eiffel Tower) in the control condition (all  $ps > .10$ ), or for the control stimulus (i.e., teddy bear) over both conditions.<sup>4</sup> Neither did any of the other self-report measures obtained during the first part of the study relate to eye-movements. A  $2 \times 2$  mixed model ANOVA with the first fixation duration of the two areas of interest (i.e., the beverages and poster) as levels of a within-subjects factor, condition (experimental vs. control condition) as a between-subjects factor, and RMA as a covariate, yielded a significant three-way interaction,  $F(2, 48) = 7.49$ ,  $p < .01$ ,  $\eta^2 = .24$ . This analysis implies that differences in first fixation durations for these two areas of interest are significantly different between conditions as a consequence of RMA.

## Discussion

As predicted, RMA had an overall influence on participants' judgments of blame and guilt in a rape case. However, by means of the content manipulation of the photograph, we observed more fine-grained differences in the use of rape myth-consistent cues as a consequence of their expectedness. Whereas the eye movement data of the stimuli in the control condition were unrelated to RMA and the dependent variables, the cues in the experimental condition showed diametrically opposed correlation patterns. This supports the notion that these latter cues were both encoded in light of participants' RMA, but differentially in terms of processes because of their differing expectedness: the bottle of wine was processed more rapidly by participants with higher RMA because for them it represented an expected schematic cue, whereas the poster depicting a nude male torso elicited prolonged encoding with increasing RMA. This could point to the conclusion that participants low in RMA just did not

consider the poster relevant for the task at hand, whereas participants high in RMA might have used additional processing time to interpret the poster as additional "evidence" for blaming the plaintiff and exonerating the defendant.

These individual differences in encoding were themselves related to participant's verdict and blame attributions. Whereas encoding time of wine and poster showed equally strong – albeit opposite – correlations with the overall case evaluation and the verdict, longer encoding of the poster was associated with an exoneration of the perpetrator, but it did not lead to more victim blaming. In contrast, shorter encoding of the alcohol cue was associated with more victim blame, but it did not lead to an exoneration of the perpetrator. This latter asymmetry is in accordance with a double standard of women's drinking (Lyons & Willot, 2008). Overall, the findings corroborate the assumption that RMA can work like a cognitive schema, leading to heightened vigilance for a rape-myth-consistent cue when that cue is linked to a specific RMA-related expectation for it. As our results suggest, expected schematic stimuli are encoded faster with increasing RMA, possibly reflecting ease of processing for participants with an applicable schema. By contrast, an unexpected but nonetheless rape-myth-consistent cue such as the poster in the experimental condition, which may be interpreted as "evidence" that only certain types of women are prone to assault, is processed less quickly by the same participants. Apparently participants engaged in a more thorough encoding of the poster with increasing RMA, which translated into attitude-consistent inferences and judgments.

Additionally, a mediation analysis showed that the effect of RMA on case-related judgments in the experimental condition was partially mediated by RMA-related eye-movement differences for both cues. In line with research by Eysel and Bohner (2011), participants seemingly turned the additional information in the experimental condition into subjectively valid evidence, which might have produced the relative increase of the correlation coefficient between RMA and outcome variables in this condition. That is, both cues were interpreted in a way that was consistent with participants' rape myths. Findings from the mediation analysis support the idea that differences in correlation size between the two photograph conditions, although not significant, can be explained through RMA-dependent differences in viewing patterns of these stimuli, which in turn lead to differences in verdicts and blame attributions.

To strengthen the point that the specific viewing patterns of the presented cues in the experimental condition are in fact caused by the level of RMA, we conducted a second study. In order to manipulate participants' level of RMA experimentally, we used a social norm feedback that had been successfully employed in several studies (Bohner, Pina, Viki, & Siebler, 2010; Bohner et al., 2006; Eysel, Bohner, & Siebler, 2006).

## Study 2

The second study used a social norm feedback to temporarily influence participants' endorsement of rape myths. Social norms have been shown to strongly affect participants' level of RMA and, as a consequence, also their self-reported rape proclivity (Bohner et al., 2010, 2006; Eysel et al., 2006). Therefore, participants received feedback about the alleged responses of other students to the RMA questionnaire they just completed. We hypothesized that this manipulation would temporarily influence participants' acceptance of rape myths. Consequently, the manipulation should affect expectations participants form during reading the rape case and thus also influence their subsequent viewing patterns. Following our rationale outlined in Study 1, we hypothesized that the effects of the manipulation would pertain to the expected schematic stimulus, whereas we made no specific predictions regarding any effect of the experimental manipulation for the unexpected schematic stimulus.

<sup>4</sup> With respect to other types of eye tracking data, only the overall dwell time on the stimulus "bottle of wine" was related to participants' RMA,  $r(33) = -.42$ ,  $p < .05$ . No other types of eye tracking data such as the total number of fixations or the overall dwell time for the aforementioned areas of interest significantly related to RMA and judgements, all  $ps > .05$ .



The following hypotheses were examined in this study:

- (1) High (vs. low) RMA feedback leads to earlier fixation of the expected schematic stimulus (the bottle of wine and wine glasses).
- (2) High (vs. low) RMA feedback leads to faster processing in terms of shorter fixations of the expected schematic stimulus.

## Method

### Participants

30 students (all male, 1 psychology student) with an average age of 23.60 years ( $SD = 3.66$ ) from the University of Bielefeld took part in Study 2. Again participants were approached on campus and randomly assigned to one of two conditions (level of RMA feedback: low vs. high;  $n = 15$  per condition).

### Procedure

As in Study 1, participants assumed that they would take part in two ostensibly unrelated studies. After completing the RMA scale and other measures as in Study 1, participants received feedback about other male students' responses on the same RMA questionnaire. They were then escorted to the eye-tracking lab, where they read the rape case and viewed the photograph. Importantly, all participants saw the photograph featuring stimuli that could be interpreted in a myth-consistent way. Case-related judgments were collected as described in Study 1. Participants were then thoroughly debriefed with an emphasis on the fictitious nature of the RMA feedback.

### Material

#### RMA feedback

Participants were told that they would get to see the responses of male Bielefeld students to one of the self-report measures they had just filled out themselves. To provide an explanation for the feedback, they were informed that past test takers had often expressed a wish to know what other people thought about these topics. All participants then received feedback on the RMA questionnaire. Each of the 11 AMMSA items was presented individually on the screen and above the item wording the following text was displayed: "The mean value of male Bielefeld students is [value]. Depending on condition, 'value' was either 1 standard deviation below or 1.5 standard deviations above the mean of the item-wise descriptive statistics of Study 1. The mean of the aggregated feedback value was 1.55 in the low feedback condition and 5.43 in the high feedback condition. All other materials were identical to Study 1.

## Results

Scores for the self-report scales were computed as in Study 1. The overall case evaluation did not differ between participants who received the high ( $M_{High} = 3.63$ ) or the low ( $M_{Low} = 3.86$ ) norm feedback,  $F(1, 28) = 0.42$ ,  $p = .51$ , but showed a medium-sized relationship to participants' self-reported RMA,  $r(28) = .29$ ,  $p = .12$ .

#### RMA feedback and eye movements

Because of imprecise eye-tracking, data from two participants (one in the high, and one in the low feedback condition) were excluded. In line with Hypothesis 1, participants who had received the high norm feedback fixated the expected schematic cue earlier ( $M_{High} = 1088$  ms) than did participants who had received the low norm feedback ( $M_{Low} = 2313$  ms),  $F(1, 26) = 2.92$ ,  $p < .05$ ,  $\eta^2 = .10$ , one-tailed. Contrary to Hypothesis 2, first fixation duration of the schematic stimulus was longer in the high feedback condition

( $M_{High} = 439$  ms) than in the low feedback condition ( $M_{Low} = 284$  ms),  $F(1, 26) = 6.00$ ,  $p < .05$ ,  $\eta^2 = .19$ . A similar effect was obtained for the overall dwell time (i.e., the total time spent on an area of interest) and the total number of fixations on the schematic stimulus. Participants in the high feedback condition spent more time inspecting the alcohol cue ( $M_{High} = 1924$  ms) than did participants in the low feedback condition ( $M_{Low} = 1009$  ms),  $F(1, 26) = 10.67$ ,  $p < .01$ ,  $\eta^2 = .29$ , and fixated it more often ( $M_{Low} = 2.64$  vs.  $M_{High} = 3.64$ ),  $F(1, 26) = 5.00$ ,  $p < .05$ ,  $\eta^2 = .16$ .

The experimental manipulation had no effect on how participants viewed the unexpected stimulus (i.e., the poster depicting the nude male torso), all  $ps > .17$ , or the control stimulus (i.e., the teddy bear), all  $ps > .43$ .

## Discussion

The aim of the second study was to demonstrate malleability of eye movement patterns following a manipulation of participants' RMA. Although we found no effect of the social norm feedback on the self-reported case evaluation, we did obtain meaningful results on the more indirect eye tracking measures. Importantly, the results support our basic assumption that the effects of the manipulation are restricted to the stimulus that can be anticipated. Although we employed two stimuli that can be interpreted as myth-consistent, only the expectancy for one of them was related to participants' level of RMA. Consequently, students receiving the information that their co-students endorsed rape myths fixated only the stimulus related to RMA earlier. Therefore, this effect was specific to the expected stimulus and did not affect viewing of other stimuli. Contrary to our prediction, participants in the high feedback condition showed no increased ease of processing (i.e., decreased first fixation duration) for the alcohol cue. Indeed it took them more time to encode the expected stimulus compared to the participants in the low feedback condition. Furthermore, participants in the high feedback group paid more attention to the alcohol stimulus, which resulted in an increased dwell time of that stimulus. In sum, our experimental manipulation seems to have yielded differing expectations concerning the subsequent rape case. Surprisingly, participants showed hypervigilance but not ease of processing. However, it is important to keep in mind that in the present study the attitude-related expectancies did not come naturally to participants. One might argue that participants were in a verification mode, looking for information that might confirm or disconfirm the normative information they had just received. This conjecture might explain why participants showed hypervigilance but then took more time to encode the information (i.e., first fixation duration) and paid more attention to it (i.e., dwell time).

More importantly, we wish to highlight that the experimental norm feedback regarding RMA influenced only the processing of the stimulus that could be expected with increasing RMA. Thus, the results of Study 2 support the rationale of Study 1 in that the observed effects are a consequence of RMA and that it is necessary to differentiate between expected and unexpected stimuli.

## General discussion

The present research examined schematic effects of RMA on information processing. The studies aimed (1) to show that RMA actively guides information processing when relevant information is available, and (2) to contrast the processing of expected schematic information from that of unexpected schematic information. With regard to these aims, we presented additional case-related information visually by using photographs. Inferring information from visual stimuli represents a more active form of information processing that enabled us to avoid demand effects or influences of conversational norms (Grice, 1975), which may be associated with the use of only written

material, as in the classic vignette method. A further advantage of the use of visual stimuli is their amenability to eye-tracking methodology, which allowed us to capture parts of the encoding process, thereby illustrating when schematic processing is most probable.

Our results show that earlier and faster initial fixation as a consequence of RMA were restricted to the expected schematic stimulus, whereas encoding time for an unexpected yet potentially applicable cue was prolonged. In general, these findings are consistent with research on human gaze control during real-world scene perception where length of gaze duration on stimuli is influenced by scene semantics such that semantically informative objects (i.e., novel and unexpected stimuli) are fixated longer than uninformative (i.e. expected stimuli) objects (Henderson et al., 1999; Loftus & Mackworth, 1978; see Henderson, 2003 for a review). Importantly, there is a difference between the notion of expectancy or informativeness between these seminal studies and the current research. Whereas unexpectedness in the current studies results from an interaction of situational (i.e., the narrative of the rape case) and individual factors (i.e., participants' level of RMA), in these other studies it is the consequence of a stark violation of scene semantics (e.g., an octopus in a farm scene, Loftus & Mackworth, 1978; a microscope in a bar room scene, Henderson et al., 1999). This difference may explain why participants in the study by Loftus and Mackworth also fixated the unexpected stimulus (i.e., the octopus) earlier, whereas we – based on schema theory – predicted and found that the expected stimulus is fixated earlier. Although the poster depicting a nude male torso represents an informative cue to participants with high RMA and is thus encoded thoroughly, it does not constitute a violation of expectation leading to an earlier fixation (as possibly a nun costume in the present scenario would).

In conclusion, our results indicate that the attitude-consistent integration of additional information by participants high in RMA does not necessarily imply fast and efficient processing, especially if the additional information is unexpected. Rather, our findings emphasize that such an assumption would be overly simplistic, at least when information is not readily available in text form. As the present research demonstrated, this should not be interpreted as trivializing RMA-related effects, whether fast and schematic or not. The obtained medium to high correlations of RMA with the eye-tracking measures reflect pronounced *biased* processing that can take on different forms depending on the expectedness of schema-related stimuli; these results thus speak to the differentiated influence of rape myths on visual attention and encoding of relevant stimuli. With regard to biased processing, Krahé et al. (2007) proposed that an accountability instruction may reduce schematic effects of rape-related attitudes in rape charges. In light of the present results, we are more pessimistic with regard to such a recommendation: our data showed that both shorter and longer encoding – the latter being more likely to be facilitated by accountability – may be related to RMA and hence bias subsequent judgments, depending on the nature of the stimuli (for a related argument, see Eyssel & Böhner, 2011). Apparently, biased processing must not be equated with fast and schematic processing, suggesting that both routes – peripheral as well as more systematic processing – may lead to similar outcomes. Therefore, alternative approaches to enhancing justice in the court are warranted.

Future studies should focus on the conditions under which a schema-related stimulus becomes so highly expected as to be detected faster and encoded more efficiently.<sup>5</sup> As argued here, these schematic qualities are mainly a consequence of situational predictability and RMA as an individual difference variable. It is likewise conceivable that some cues, such as alcohol, are, via repeated learning,

well connected to violence and likewise rape (Subra, Muller, Bègue, Bushman, & Delmas, 2010). Whereas situational expectancy as a crucial determinant would point to strong context influences on the type of processing involved, schematic processing consistent over time would be expected for certain well-connected cues if type of processing is mainly dependent on associative links. To study such processing differences, it is important to complement the assessment of judgmental outcomes with methodology that enables researchers to look at the underlying perceptual processes on-line. In our view, eye-tracking is a prime candidate for such a methodology that enriches research on both RMA and schematic processing in general.

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<sup>5</sup> Importantly, and in addition, future studies should employ a set of several different stimuli. The use of just one stimulus for the expected and unexpected schematic stimulus constitutes a major limitation to the generalizability of the present findings.



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