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Individual differences in eyewitness memory and suggestibility: examining relations between acquiescence, dissociation and resistance to misleading information

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Abstract

The purpose of this study was to investigate relations between acquiescence, dissociation, and resistance to misleading information. A total of 111 participants took part in a series of staged events and then completed both the Dissociative Experiences Scale (DES) and the Minnesota Multiphasic Personality Inventory (MMPI-2). The participants returned to the lab 1 week later and were questioned about the details of their experiences during the previous session. As predicted, acquiescence as measured by the True Response Inconsistency Scale (TRIN scale) of the MMPI-2 was found to be significantly related to errors on misleading questions and repeated questions, but was not related to errors on non-suggestive specific and open questions. Scoring on the DES was found not to be related to acquiescence as measured by the TRIN scale, or errors on misleading, specific, or repeated questions. However, pathological dissociation was found to be related to both errors on misleading questions and indiscriminant variable responding as measured by the Variable Response Inconsistency Scale (VRIN scale) of the MMPI-2. These findings add to our developing understanding of factors that contribute to suggestibility in the interrogative context.
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1. Introduction

In the 1980s, Gudjonsson and his colleagues published several studies reporting relations between interrogative suggestibility as measured by the Gudjonsson Scale of Suggestibility (GSS; Gudjonsson, 1984) and a variety of individual difference factors, such as intelligence (Gudjons-

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son, 1988), social desirability (Gudjonsson, 1983), memory (Gudjonsson, 1987), acquiescence (Gudjonsson, 1986, Gudjonsson & Clare, 1995), and compliance (Gudjonsson, 1989a: see Singh & Gudjonsson, 1992, for a review). Evidence of a relationship between the GSS and these various individual difference factors provided support for Gudjonsson's theoretical model of interrogative suggestibility (Gudjonsson & Clark, 1986; Gudjonsson, 1987, 1989b). Up to that point in time, few other investigators working in the area of eyewitness memory and suggestibility were studying individual differences. However, over the past decade, more attention has been given to an individual differences approach to understanding suggestibility. Recently, investigators have revealed relations between suggestibility and factors such as dissociation (Eisen & Carlson, 1998; Hyman & Billings, 1998; Paddock, Joseph, Chan, Terranova, Manning, & Loftus, 1998; Qin, 1999; Winograd, Peluso, & Glover, 1998), visualization (Hyman & Billings, 1998; Qin, 1999; Winograd et al., 1998), intellectual ability (Clare & Gudjonsson, 1995; Singh & Gudjonsson, 1992), hypnotizability (Barnier & McConkey, 1992, Linton & Sheehan, 1994), and field dependence (Durso, Reardon, & Jolly 1985; Singh & Gudjonsson, 1992; see Eisen, Winograd, & Qin, 2001, for a recent review of individual difference factors related to suggestibility).

The use of an individual differences approach to understanding suggestibility makes considerable sense. As Underwood (1975) noted, any theoretical process will necessarily have a predicted tie with performance. Following this logic, he went on to propose that a prediction concerning individual differences in performance provides a critical test of any given aspect of a theory. However, the fact that suggestibility is used to explain such a wide variety of phenomena, presents a major stumbling block to using an individual differences approach to develop a theory of this construct.

1.1. Defining suggestibility

The term 'suggestibility' is frequently used to explain a wide array of diverse phenomena, from hypnotic responsivity to simple gullibility (see Eysenck & Fureanaux, 1945; Roediger, 1996; Schooler & Loftus, 1993, for reviews). In the domain of eyewitness memory research, the term 'suggestibility' is generally employed to describe one's susceptibility (or resistance) to misleading information (Schooler & Loftus, 1993). Although, research paradigms designed to examine suggestibility effects vary greatly in regard to how this construct is measured, most all approaches involve a single common element; the presentation of misleading information. The most common paradigms involve the presentation of some information (e.g. viewing some type of visual presentation, reading a narrative, or experiencing a staged event) and then being questioned about this information; either immediately following the experience or after some delay. Misinformation is either presented as part of the post-event questioning, or at some point prior to the post-event interview.

1.1.1. Two types of suggestibility

In their review of the literature on individual differences in eyewitness accuracy and suggestibility, Schooler and Loftus (1993) took an important step towards defining this construct more narrowly by proposing a useful distinction between two general types of susceptibility to misinformation: immediate misinformation acceptance and delayed retrieval errors. Delayed retrieval errors result when misinformation presented to a subject is incorporated into subsequent

memory reports. This is examined in research paradigms where the misinformation is presented in a separate context, at some point subsequent to the event, yet prior to the post-event questioning. The term 'delayed' is used to indicate that the misinformation is incorporated into one's memory, as evidenced by reports made sometime after it was imparted to the subject. Studies that employ various versions of this paradigm are designed to induce feelings of familiarity in the absence of clear source information. Thus, the incorporation of the misleading post-event information in this type of paradigm is best understood to be the result of source monitoring errors (see Johnson, Hashtroudi, & Lindsay, 1993, for a review).

Studies designed to assess one's immediate acceptance of misinformation do not necessarily involve source confusions and/or memory distortion. Rather, these studies are designed to assess how an individual's 'memory report' might be adversely affected by excessively biased and/or suggestive questioning techniques often employed in forensic investigations. This type of suggestibility is assessed in paradigms that involve a one-time presentation of misinformation in the form of a misleading question. In these studies, the subject typically takes part in a staged event, and sometime subsequent to the event (minutes, hours, days, or weeks later), they are interviewed in a highly suggestive manner with the use of misleading questions. Schooler and Loftus (1993) note that immediate misinformation acceptance errors are evidenced by one's agreement with inaccurate presuppositions contained in misleading questions. The term "immediate" does not imply that the memory test is administered instantly after the presentation of the target stimuli. Rather, the term "immediate" refers to the fact that the subject is being presented with the misinformation for the first time, and is now being asked to either accept or reject the inaccurate presuppositions contained in the questions at that moment (immediately). Interrogative suggestibility can be considered a type of immediate acceptance of misinformation, as the GSS tests how people respond to the pressures of being asked misleading questions and receiving negative feedback about their responses in a closed social interaction.

According to Gudjonsson's theory of interrogative suggestibility (Gudjonsson & Clark, 1986), misleading questions presented in an interrogative context can lead to increased guessing behavior, and result in affirmative response biases. Gudjonsson proposed that acquiescent response bias could account for a significant portion of the variance in one's interrogative suggestibility.

1.2. Acquiescence

The construct of acquiescence has been important to researchers interested in examining all types of self-report data for over 50 years (Couch & Keniston, 1960; Johnson & Torcivia, 1968; Rorer, 1965; Winkler, Kanouse, & Ware, 1982). Acquiescence has always been considered an important source of response bias (Block, 1965; Bock, Van Pelt, & Dicken, 1969; Cronbach, 1946, 1950; McGee, 1962; Nemeth, 1995; Peabody, 1961; Webb, Campbell, Schwartz, Sechrest, & Grove, 1981; but see Rorer, 1965). However, like suggestibility, the term acquiescence is used somewhat inconsistently in the published literature, and as a result, this construct has a bit of a long and checkered past. For many years, researchers in the area of social psychology considered acquiescence to be a personality style (Couch & Keniston, 1960; Miller, Doob, Butler, & Marlowe, 1965). Measures designed to assess this trait were focused on social desirability and other social concerns (Heal & Siegelman, 1995; Lenski & Legget, 1960; Moum, 1988; see Knowles and Nathan, 1997 for a recent review). More recently, acquiescence has been found to be more of a

cognitive style than a personality factor (Jackson, 1967; Knowles & Nathan, 1997; Krosnick, 1991). In accordance with Cronbach's most widely accepted operational definition of acquiescence, this style is best measured by scales that provide pairs of items that are similar in content if answered in the opposite direction (Tellegen, 1988). Acquiescent responding would be evidenced by the uncritical acceptance of the items, leading to high rates of double agreement with the reversed pairs.

2. Relations between acquiescence and suggestibility

Three studies have examined relations between acquiescence and suggestibility in the past. Tousignant (1984) examined the relationship between acquiescence as measured by performance on the R scale of the MMPI (AKA, the Edwards Acquiescence Scale; Edwards & Abbott, 1969) and delayed misinformation retrieval errors produced during a classic misinformation task. In this study, participants viewed a slide presentation of a purse snatching and then were given a questionnaire about the details of the slides. Half of the subjects were misled by a question that inaccurately referred to certain items in the sequence, while the other subjects received no misinformation. Finally, all the subjects were given a true/false recognition test about the slide presentation. Tousignant reported that acquiescence as measured by the Edwards Acquiescence Scale was positively related to delayed retrieval errors for the misled subjects on the true/false recognition task. As noted earlier, this approach to assessing acquiescence has lost favor in recent years. Currently, with the MMPI-2, acquiescence is measured with the True Response Inconsistency Scale (TRIN), which is designed to assess indiscriminant affirmative responding to items of opposing content (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989).

Gudjonsson (1986) and Gudjonsson and Clare (1995) examined the relationship between acquiescence and interrogative suggestibility as measured by the Gudjonsson Scale of Suggestibility (GSS). As noted earlier, the GSS provides a rather different measure of suggestibility than the approach used by Tousignant. Tousignant was examining how the presentation of misinformation might lead to source misattributions and result in delayed retrieval errors. The GSS, however, is designed to assess how one might accept misinformation at the time of questioning, independent of any actual memory changes that may or may not occur subsequent to the questioning (immediate misinformation acceptance). In each of Gudjonsson's studies, acquiescence was measured by a 24-item questionnaire on attitudes towards doctors developed by Winkler et al. (1982) that included 12 pairs of logically opposite items. It was predicted that acquiescence as measured by a pattern of indiscriminate agreement with these inconsistent items should be positively related to the immediate acceptance of misinformation on the GSS. Gudjonsson reported a modest relationship between acquiescence as measured by this 24-item scale and performance on the GSS in both studies, noting that in each instance the relationship was strongest after negative feedback was given to the subjects. The use of this 24-item scale to measure acquiescence seems somewhat problematic. Due to the brevity of the scale, participants were likely to notice that they were being asked the same questions repeatedly in opposite ways. Therefore, this brief measure of acquiescence may not have provided an entirely adequate assessment of the construct.

In his theory of interrogative suggestibility, Gudjonsson proposed that acquiescence should be greatest when people are uncertain about their memory and are pressed to answer questions about the details of the experience (Gudjonsson, 1987, 1989b; Gudjonsson & Clark, 1986). One individual difference factor that has been linked to memory problems and increased suggestibility is dissociation.

2.1. Dissociation

Dissociation is frequently cited as being related to the development of false memories (see Brown, Scheflin, & Hammond, 1997, for a review). Various representative definitions of dissociation include, "the lack of the normal integration of thoughts, feelings, and experiences into the stream of consciousness and memory" (Bernstein & Putnam, 1986, p. 727), and "the disruption of the usually integrated functions of memory, identity, or perception of the environment" (American Psychiatric Association, 1994, p. 477). This construct is most commonly assessed with the use of the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). The DES measures mild to severe experiences of amnesia, depersonalization, derealization, absorption, and imaginative involvement. These experiences can all be conceptualized as forms of cognitive avoidance, because they all serve to distance an individual from their immediate or past experiences (Carlson, 1997).

Putnam (1997) notes that dissociative persons have less confidence in their memory, and that this lack of confidence can make them more vulnerable to the suggestive effects of misinformation. According to Putnam, discontinuities in memory associated with pathological dissociation leave the individual open to plausible suggestions on how to fill the gaps in their autobiographical memory.

Recently, a handful of studies have reported a positive relationship between dissociation and suggestibility as assessed in a variety of different paradigms (see Eisen et al., 2001; Eisen & Lynn, 2001, for reviews). Hyman and Billings (1998) reported a moderately strong relationship between scoring on the DES and delayed retrieval errors evidenced in a memory implantation paradigm ($r = 0.48$). Whereas, Qin (1999) reported a more modest, yet still statistically significant relationship between scoring on the DES and false memory formation on a similar task ($r = 0.23$). Using an imagination inflation paradigm, Heaps and Nash (1999) reported a positive relationship between scoring on the DES and enhanced certainty for imagined events that did not occur in reality ($r = 0.34$). Similarly, Paddock et al. (1998) also reported correlations (range $= 0.20$–0.35) between enhanced confidence for imagined non-events and the nine individual items that comprise the dissociability factor of the DES. Winograd et al. (1998) found that the DES was also positively related to false recognition errors (remember judgments for critical lures) on the Deese-Roediger/McDermott list-learning paradigm ($r = 0.34$). However, other investigators have failed to find a relationship between these measures (Eisen, Cardeneas, Kistorian, Yu, & Tirtibudi, 1999; Platt, Lacey, Iobst, & Finkelman, 1998; Qin, 1999; Wilkinson & Hyman, 1998). Two different studies obtained evidence for a relationship between DES scores and the immediate acceptance of misinformation as measured by scoring on the GSS (Merckelbach, Muris, Rassin, & Horselenberg, 2000; Wolfradt & Meyer, 1998). Wolfradt and Meyer (1998) reported a surprisingly large correlation between the DES and GSS scores ($r = 0.53$). Whereas Merckelbach et al. (2000) reported a more modest correlation between the two measures ($r = 0.29$). Eisen and

Carlson (1998) also examined the relationship between dissociation and the immediate acceptance of misleading information using a slightly different approach. In this study, participants took part in a staged event and then returned one week later for a structured interview that included highly suggestive and non-suggestive questions about the event. Eisen and Carlson found a modest relationship between scoring on the DES and errors on misleading questions ($r = 0.23$), which is more in line with the findings of Merckelbach and his colleagues than those of Wolfradt and Meyer.

The relationship between dissociation and the acceptance of misinformation found in these studies is frequently attributed to deficits in source monitoring and memory problems evidenced in highly dissociative individuals. However, studies that have examined this relationship more directly through the employment of commonly used source-monitoring tasks have failed to find a relationship between measures of dissociation and source monitoring (Koppenhaver, Kumar, & Pekala, 1997; van den Hout, Merkelbach, & Pool, 1996). Similarly, dissociation has not been found to be related to errors on specific non-suggestive questions (Eisen & Carlson, 1998), or autobiographical memory errors for a notable media event (Platt et al., 1998). Taken together, studies examining the relationship between dissociation (usually measured by scoring on the DES) and suggestibility as assessed with a variety of different paradigms indicate that dissociation only seems to be related to memory errors when misinformation is explicitly provided. Further, in general, this relationship seems most robust in studies designed to examine delayed retrieval errors.

Winograd (1999) raised the question of whether an acquiescent response set could be responsible for both elevated scores on the DES and increased response bias on measures of suggestibility. Alternatively, other types of response bias, such as indiscriminant variable responding, could affect the relationship between these constructs. If this were true, the relationship between dissociation and suggestibility could be an artifact related to the way the constructs are assessed, rather than being related to deficits in source monitoring and memory problems that are commonly associated with each of these variables.

This study was designed to examine relations between acquiescence, dissociation, and the immediate acceptance of misleading information (suggestibility). To accomplish this task, we improved on methods used in previous studies to see if a more current and well-established measure of acquiescence would be related to this type of suggestibility. We hypothesized that acquiescence as measured by the TRIN scale of the MMPI-2 would be positively related to the immediate acceptance of misinformation as evidenced by errors on misleading questions. Further, we attempted to replicate previous findings reported by Eisen and Carlson (1998) demonstrating a relationship between dissociation as measured by the DES and errors on misleading questions. In addition, by administering measures of acquiescence, dissociation, and suggestibility within the same protocol, we examined the possibility that an acquiescent response set could be responsible for both higher scores on the DES as well as an affirmative response bias on measures of suggestibility. If acquiescence as measured by the TRIN scale was related to both scoring on the DES and errors on misleading questions, then the relationship between dissociation and suggestibility could merely be an artifact of the way the constructs were measured. Finally, we examined the relationship between indiscriminant variable responding as measured by the Variable Response Inconsistency Scale (VRIN scale) of the MMPI-2 and both errors on misleading questions and dissociation as measured by the DES.

3. Methods

3.1. Participants

Participants were 111 undergraduate college students (71 female, 40 male) enrolled in introductory psychology classes at California State University at Los Angeles. Students participated in this study to earn course credit through the Psychology Department's subject pool. Participants' ages ranged from 16 to 49 ($M = 21.8$, S.D. = 5.2). The ethnic background of the participants varied greatly with 58.5% identifying themselves as Hispanic, 16.2% Asian, 9% Anglo/European, and 7.2% African American. The remaining 9.1% of the participants came from mixed backgrounds that did not fit any of the fore mentioned categories.

3.2. Procedures

Students were asked to come to a room in the Psychology Department and participate in an experiment. They were unaware of the purpose of the study. Participants each took part in a series of staged events that included a computer-administered measure of sustained attention, the White Bear task (Wegnar, Scheider, Carter, & White, 1987), the White Bear Thought Suppression inventory (WBTSI; Wegnar & Zanakos, 1994), and the Deese-Roediger McDermott list-learning paradigm (D/RM task; Roediger & McDermott, 1995).[1] These measures were administered in counterbalanced order. Following this session, students completed the MMPI-2 and DES at home, and were asked to return one week later.

During the second session, participants were administered an unexpected measure of event-memory related to the details of their experiences in the previous session (to be referred to from this point on as the Post-Event Memory Questionnaire). The post-event memory questionnaire was administered by a different experimenter and in a different room than the subjects visited in the previous session. The post-event memory questionnaire consisted of 56 items roughly balanced for equal numbers of specific and misleading questions keyed for yes and no responses (Appendix). Due to inconsistencies in the procedure and concerns over the wording of some items, 10 of the original 56 questions were eliminated.

Both sessions were videotaped to assess the reliability of the coding responses. The answers to each item were transcribed verbatim from the videotapes and two research assistants scored each questionnaire for reliability purposes. Participants' answers on the questions were coded as correct, incorrect, uncertain, or unscorable. Discrepancies were settled by discussion. Inter-rater agreement was well over 90% overall, and near perfect for most items. Following the procedures, all students were debriefed as to the nature of the study.

[1] Results of the computer-administered measure of sustained attention, the white bear task, the WBTSI, and the Deese-Roediger McDermott list learning paradigm are not reported here. Due to technical problems, 84 of the 99 CPT protocols were damaged. Data on the white bear and DRM task are reported elsewhere. Individual differences in suggestibility.

3.3. Measures

3.3.1. Minnesota Multiphasic Personality Inventory (MMPI-2: Butcher et al., 1989)

The MMPI-2 is a personality questionnaire that is primarily used to diagnose psychopathology in adults. In this study, the MMPI-2 was employed to make use of the True Response Inconsistency Scale (TRIN) and the Variable Response Inconsistency Scale (VRIN). The TRIN scale is a validity scale of the MMPI-2 that is used to distinguish individuals who give indiscriminate positive or negative responses, by either responding to all items with true (acquiescence), or false (non-acquiescence) responses. The TRIN scale is made up of 23 pairs of items that are exclusively opposing in content. Inconsistency is measured by examining each item pair for either two true or two false responses. A TRIN raw score is computed by taking the number of pairs of items with two false responses and subtracting that from the number of pairs of items with two true responses. A constant value of nine is added to the total, resulting in a TRIN score ranging from 0 to 23. A higher TRIN score measures a participant's tendency to give true responses indiscriminately (acquiescence), and a lower TRIN score indicates a participant's tendency to give false responses indiscriminately (non-acquiescence).

The Variable Response Inconsistency Scale (VRIN) is designed to identify individuals who indiscriminately respond inconsistently to items on the MMPI-2. The VRIN scale is made up of 67 item pairs that are either similar or opposing in content. VRIN scores are computed by simply adding the number of item pairs with inconsistent responses.

3.3.2. The Dissociative Experiences Scale (Bernstein & Putnam, 1986)

The DES is a 28 item self-report scale that measures mild to severe experiences of amnesia, depersonalization, derealization, absorption, and imaginative involvement. Recent studies have shown that a subset of eight DES items reflects a pathological form of dissociation that is taxonomic (or typological) in nature, rather than being continuous (Waller, Putnam, & Carlson, 1996;

Table 1
Means and standard deviations for all measures

	n	*M*	S.D.
Proportion errors on all misleading questions	111	0.26[a]	0.25
Proportion errors on all specific questions	111	0.11[a]	0.11
Proportion errors on open questions	111	0.18[a]	0.14
Proportion errors on all repeated questions	111	0.20[a]	0.15
Proportion errors on the four specific repeated questions	111	0.18[a]	0.19
Proportion errors on the two misleading repeated questions	111	0.25[a]	0.25
TRIN total	99	8.81	2.25
VRIN total	99	8.40	4.10
DES total score	99	21.73	14.16
DES-T	99	16.22	16.78

[a] Proportion error scores were calculated for open questions, specific questions, and misleading questions by summing the total errors within each question group and then dividing that total by the number of valid items answered within each category. This process yields a proportion score ranging from 0–1.

Waller & Ross, 1997). These eight items make up the DES-Taxon (DES-T) subscale. High DES-T scores are found almost exclusively among those with trauma related or Dissociative disorders.

3.3.3. Post-Event Questionnaire (PEQ)

The PEQ is a 56-item memory questionnaire designed for this study comprised of questions related to the staged events that occurred during the first session. The PEQ was composed of eight open questions, 24 specific questions and 24 misleading questions (Appendix). The misleading and specific questions were equally balanced for yes and no keyed responses. Six of the 56 questions were repeated items (asked twice within the questionnaire). Four of the repeated items were specific non-suggestive questions (two keyed to yes and two keyed to no), while two were misleading (one keyed to yes and one keyed to no). The misleading questions all stated facts contrary to the actual experience of the participants. An example of a misleading question keyed to a no response would be, ''You were asked to remember lists of numbers weren't you?'', when in fact no such task was asked of the participants. Specific questions were designed to be clear, direct, and non-suggestive. Due to inconsistencies in the procedure, eight of the original 56 misleading questions were dropped.

4. Results

Answers to the PEQ were coded as correct, incorrect, uncertain, or unscorable. Unscorable responses were then coded as missing data. To examine error rates for the various question categories, the correct and uncertain responses were collapsed. This resulted in the formation of a new dichotomous variable (memory error vs. no memory error). Proportion error scores were then calculated for open, specific, misleading, and repeated questions by summing the total errors within each question group, and then dividing that sum by the number of valid items answered within each category. Raw scores on the DES ($M = 23.49$, S.D. $= 16.30$) were examined to identify outliers (scores greater than 2 standard deviations above the sample mean). Four outliers were identified that were more than 32.6 points over the sample mean ($\geqslant 56.1$). These four extreme scores were dropped from the analyses. Table 1 gives the means and standard deviations for each of the measures employed.

Pearson correlations were calculated to examine relations between proportion error rates for each question category of the PEQ, and total raw scores for the TRIN, VRIN, DES, and DES-T scales (Table 2). As predicted, acquiescence as measured by the TRIN scale of the MMPI-2 was positively related to errors on the misleading questions, $r\ (99) = 0.30$, $P = 0.003$. TRIN scale scores were also positively related to errors on repeated questions $r(99) = 0.24$, $P = 0.2$. However, acquiescence as measured by the TRIN scale was not significantly related to errors on the open or specific questions.

A moderately strong relationship was revealed between errors on misleading and repeated questions $r(111) = 0.55$, $P < 0.0001$, and this relationship remained strong even after the misleading repeated items were dropped from the analyses, and only errors on the sub-group of four non-suggestive specific repeated questions were considered $r(111) = 0.59$, $P < 0.0001$). However, errors on the specific questions were only modestly related to errors on misleading, $r(111) = .25$, $P = 0.08$, and repeated questions, $r(111) = 0.32$, $P = 0.01$.

Table 2
Pearson correlations for all measures

	TRIN Total	VRIN Total	Average Errors on Misleading Questions	Average Errors on Specific Questions	Average Errors on Open Questions	Errors on all Repeated Questions	Errors on Specific Repeated Questions only	Errors on Misleading Repeated Questions only	DES	DES-T
TRIN Total	–									
VRIN Total	0.04	–								
Average Errors on Misleading Questions	0.30**	0.04	–							
Average Errors on Specific Questions	−0.01	0.10	0.25**	–						
Average Errors on Open Questions	0.04	0.06	0.14	0.10	–					
Average Errors on all Repeated Questions	0.24*	0.04	0.55**	0.32**	0.05	–				
Average Errors on Specific Repeated Questions	0.16	−0.02	0.59**	0.16	0.06	−0.04	–			
Average Errors on Misleading Repeated Questions	0.17	0.09	0.08	0.33*	−0.01	0.12	0.13	–		
DES Total Score	−0.02	0.19[a]	0.13	0.06	0.02	0.03	−01.04	0.12	–	
DES-T Taxon	−0.04	0.31**	0.18[a]	0.04	0.10	0.06	−0.02	0.13	0.87**	–

*$P < 0.05$. **$P < 0.01$.

[a] $P < 0.05$ (one-tailed analysis).

Dissociation as measured by overall scoring on the DES was not related to any of our indices of event-memory or suggestibility. However, pathological dissociation as measured by the DES-T sub-scale of the DES was marginally related to errors on misleading questions $r(99) = 0.18$, $P = 0.08$. Consistent with our apriori directional hypothesis, a one-tailed test yielded a significant finding ($P = 0.4$).

No relationship was revealed between acquiescence as measured by TRIN and either DES or DES-T scores. Whereas, pathological dissociation as measured by the DES-T scale was related to inconsistent variable responding as measured by the VRIN scale of the MMPI-2, $r(99) = 0.31$, $P = 0.002$. However, the correlation between overall DES scoring and VRIN did not reach statistical significance $r(99) = 0.19$, $P = 0.8$.

Secondary analyses were conducted to examine the role acquiescent and/or variable response sets might play in the relationship between suggestibility and pathological dissociation. To accomplish this task, partial correlations were calculated to examine relations between errors on misleading questions and DES-T scores while statistically controlling for the effects of TRIN, and then both TRIN and VRIN together. These analyses resulted in no significant change in the relationship between errors on misleading questions and DES-T scores when controlling for TRIN $r(88) = 0.17$, $P < 0.05$ (one tailed), or TRIN and VRIN together, $r(87) = 0.18$, $P < 0.05$ (one tailed).

5. Discussion

This study was designed to examine the relationship between acquiescence as measured by the TRIN scale of the MMPI-2 and the immediate acceptance of misleading information. As predicted, errors on misleading questions were positively related to scores on the TRIN scale of the MMPI-2. Specifically, participants who displayed higher levels of indiscriminant affirmative responding to item pairs of opposing content on the MMPI-2 were also more likely to agree with counterfactual propositions contained in misleading questions. This finding replicates previous studies by Gudjonsson and his colleagues that also found a relationship between interrogative suggestibility and acquiescence (Gudjonsson, 1986; Gudjonsson & Clare, 1995). Taken together, these studies indicate that acquiescence accounts for about 10% of the variance in individuals' immediate acceptance of misleading information.

Acquiescence as measured by the TRIN scale was also related to errors on repeated questions. Similar to the presentation of misinformation, repeating a question within an interview instills a lack of certainty in the individual, which should engender acquiescent responding in those individuals who are prone to this style. Repetition may convey the implicit message that their previous answer was incorrect, and needs to be changed (see Poole & White, 1991, for a review of the effects of repeated questioning). Repeating questions within an interview provides an analogue to shift scores on the GSS, where participants are explicitly told that some of their previous answers were incorrect. It is important to note that in the current study, negative feedback is not explicitly provided to participants as it is during the administration of the GSS.

TRIN scores were not related to errors on open or specific questions, as participants displayed high rates of accuracy, and showed no evidence of an affirmative response bias when asked about simple factual details of the experience in a non-suggestive manner. Errors were only related to

acquiescent responding when the questions were either repeated, or presupposed details that were contrary to the participant's actual experience. These data do not support the position that a generalized acquiescent response tendency will lead to arbitrary agreement with any question posed to individuals. Rather, as predicted by Gudjonsson's theory of interrogative suggestibility (Gudjonsson, 1989b; Gudjonsson & Clark, 1986), this tendency was only evident when uncertainty was introduced through the presentation of misinformation and/or repeatedly asking the same questions.

5.1. Relations between errors on misleading, specific, and repeated questions

These data indicate that different mechanisms may be involved in the creation of errors on misleading questions and errors on specific questions. For example, as noted earlier, acquiescent responding accounted for approximately 10% of the variance of the errors on misleading questions, while errors on specific questions were not at all related to acquiescent responding. Further, errors on specific and misleading questions were only modestly related.

Interestingly, errors on misleading items seemed to share some important commonalities with errors on repeated questions. As noted above, errors on misleading items and repeated items were each related to acquiescence as measured by TRIN scores. Errors on misleading and repeated items were also strongly related, and this relationship remained strong even after the misleading repeated items were dropped from the analyses, and only errors on the sub-group of four repeated non-suggestive specific questions were considered.

5.2. Dissociation and suggestibility

This study failed to replicate Eisen and Carlson's (1998) report of a significant relationship between DES scoring and errors on misleading questions. In this study, overall scoring on the DES was not related to errors on misleading questions. However, consistent with Eisen and Carlson's findings, errors on misleading questions were modestly related to pathological dissociation as measured by DES-T scores. Individuals who endorse the items that make up the Taxon sub-scale of the DES tend to report very serious dissociative pathology and should be prone to more severe memory problems as well as difficulties with source monitoring (Putnam, 1995). It may be that these highly dissociative individuals are less sure about their memories and somewhat more vulnerable to being misled by highly suggestive questioning techniques. However, as Eisen and Carlson (1998) noted, a modest correlation between DES-T scores and errors on misleading questions that accounts for around 3–5% of the variance in this relationship may in fact be statistically significant, but it seems to lack clinical or practical significance.

With the exception of the moderately strong relationship between the DES and GSS scores reported by Wolfradt and Meyer (1998), the data across studies indicates that the relationship between errors on misleading questions and scoring on the DES is consistently quite modest (r's range from 0.17 to 0.28). The story is a bit different when one looks at the relationship between dissociation and errors on paradigms designed to induce delayed misinformation retrieval errors. As noted earlier, studies using memory implantation and imagination inflation paradigms have consistently found a moderately strong relationship between dissociation as measured by the DES and suggestibility (Heaps & Nash, 1999; Hyman & Billings, 1998; Paddock et al., 1998; Qin, 1999).

5.3. DES scores and response sets

No relation between elevations on the TRIN scale and scoring on the DES was revealed. This finding indicates that DES scores are most likely not inflated by an acquiescent response bias. Also, the relationship between errors on misleading questions and DES-T scores did not change at all when statistically controlling for the effect of acquiescence as measured by TRIN, or when partialling out the effects of both TRIN and VRIN together. Therefore, it is unlikely that the relationship between dissociation and suggestibility revealed in previous studies, and to some extent in this effort, could be accounted for by acquiescent or indiscriminant response biases.

Interestingly, rather than being related to acquiescent responding, these data indicate that scoring on the DES was actually related to indiscriminant variable responding as measured by the VRIN scale. The VRIN scale measures inconsistent responses to matched item pairs with similar content. Individuals with a variable response style tend to provide inconsistent answers to similar questions. One possibility is that dissociative individuals were more prone to 'space out' during the lengthy administration of the MMPI-2, leading to inconsistent and contradictory answers. These data provide important information on why some highly dissociative people might contradict themselves during lengthy interrogations, even in the absence of repetition, coercion, or the provision of misinformation.

5.4. Should acquiescence be related to all types of suggestibility?

Gudjonsson noted that the tendency to arbitrarily respond in an affirmative manner is greatest when people are asked closed yes/no type questions in an interrogative context (Gudjonsson & Clark, 1986). Logically, the tendency to answer questions affirmatively regardless of content should lead to an increased vulnerability to accepting the counterfactual presuppositions embedded in misleading questions. However, it is not at all clear how an acquiescent response bias would be related to source monitoring errors that would result in actual changes in one's memory records (i.e. delayed misinformation retrieval errors). In fact, there is no good reason to believe that indiscriminant positive responding would be related to the incorporation of misinformation into subsequent memory reports (unless the affirmative response bias was accompanied by excessive gullibility). More likely, acquiescence should only be related to response biases on forced-choice recognition tasks (i.e. immediate acceptance of misinformation) that do not necessarily involve accompanying changes in memory records.

The immediate acceptance of misinformation as assessed by errors on misleading questions is very close to interrogative suggestibility as assessed by the GSS. This method is roughly equivalent to using the yield 1 scores on the GSS (prior to offering negative feedback). However, the application of negative feedback, and resulting shift scores available on the GSS add a dimension to interrogative suggestibility that distinguishes this construct from typical assessments of the immediate acceptance of misinformation. In the future it would be interesting to see if pathological dissociation leads to greater shift scores on the GSS after the administration of negative feedback. According to Putnam (1995), pathological dissociators do tend to doubt their own memories more so than non-dissociate individuals. This increased level of uncertainty should make them more vulnerable to shift their answers. If this were true, one would predict that DES-T scores would be marginally related to yield 1 scores on the GSS, but more strongly related to shift and yield 2 scores.

5.5. Caveats

Some important limits to this study should be noted. Because some questions on the post event memory questionnaire were dropped due to lack of clarity and inconsistencies in the procedures, the group of misleading questions was not balanced for items keyed to yes and no (10 Misleading questions keyed to yes and 6 Misleading questions keyed to no). It would have been more desirable to have balanced groups of items to control for affirmative or negative response biases. Also, when assessing relations between pathological dissociation and suggestibility, it would be more desirable to work with a clinical population of individuals with dissociative disorders, rather than inferring about the effects if pathological dissociation based on DES-T scores from a college student population.

6. Conclusions

This study replicates and extends Gudjonsson's work showing a relationship between suggestibility as measured by errors on misleading questions and acquiescent responding. In addition, the absence of a relationship between TRIN and DES scores indicates that it is unlikely that the relationship between dissociation and suggestibility revealed in previous studies could be accounted for by an acquiescent response bias. Also, new data linking pathological dissociation to variable/indiscriminant responding can potentially inform our understanding of why people may respond inconsistently to questions asked during lengthy interrogations in the absence of repetition, coercion, or the provision of misinformation. In this study, variable responding was assessed by analyzing responses offered during the administration of a very long personality test (500+ questions), whereas our actual memory interview was rather brief (56 questions). Future research should examine the link between variable/indiscriminant responding, dissociation, and errors and/or contradictions made during very lengthy memory interviews. Very long memory interviews may provide a better real life analogue to lengthy interrogations used in the real world, and should create a clearer picture of the relations between dissociation, variable/indiscriminant responding and interrogative suggestibility.

More research is needed to clarify relations between various individual difference factors such as dissociation, acquiescence and indiscriminant variable responding, and different types of suggestibility (e.g. interrogative suggestibility as measured by the GSS, delayed retrieval errors as evidenced in memory implantation, imagination inflation, or classical misinformation paradigms, and more typical demonstrations of one's immediate acceptance of misinformation as measured in this study). This type of individual differences approach has great potential to contribute to theory development in eyewitness memory and suggestibility research.

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Appendix

Questions from the Post Event Memory questionnaire listed by category: (1) open questions, (2) misleading questions keyed to no, (3) misleading questions keyed to yes, (4) specific questions keyed to no, (5) specific questions keyed to yes, (6) repeated specific items, and (7) repeated misleading items.

The numbers to the left of each item indicate the actual order the questions were asked to the participants.

Open questions

(1) What sex was the experimenter you met with last week?

(2) What was the experimenter's name?

(4) What was that person wearing?

(6) How long did the experimental procedures take that day?

(8) What was the message repeating over and over on the computer screen while you were sitting at the desk in that room?

(21) What color were the walls in that room?

(25) What color were the chairs in that room?

(27) What color was the experimenter's shirt?

Misleading questions (keyed to no)

(16) They only keep red pens in that office. I hate those red pens. You had to use one, didn't you?

(29) They always leave that radio on and it bothers the students who come here for the research. The experimenter turned the music off right after you came in the room didn't he/she?

(35) There are only two chairs in that room, aren't there?

(37) The experimenter had a stopwatch around their neck, right?

(39) There's a pencil sharpener on the wall in that room isn't there?

(48) You were asked to remember lists of numbers weren't you? (if no: "oh, I was going to ask you what they were! If yes: what were they?").

Misleading questions (keyed to yes)

(12) He/she didn't actually ask you to write anything down did he/she?

(13) There isn't a phone in that room is there?

(15) There were no books on the shelves were there?

(24) We used to have some real cool pictures in there. There aren't any pictures in that room are there?

(28) There was no clock in that room was there?

(32) There aren't any trashcans in that room are there?

(41) There's no lamp in that room is there?

(42) He/she didn't have you sign anything did he/she?

(44) There were no flowers in the room were there?

(46) There were no stuffed animals or toys in the room were there?

(50) The experimenter never actually shook you hand, did they?

Specific questions (keyed to no)

(10) Is there a file cabinet in there?

(11) Were there two computers in that room?

(31) Was there a fan in the room?

(43) Did the experimenter ask you to draw anything?

(45) Was the experimenter wearing a red shirt?

(47) Did the experimenter tell you to try to remember everything that occurred because we would test your memory the following week?

(49) Did the experimenter tell you to try not to think of a pink elephant?

(51) Did the experimenter ask you to remember anything for this week?

(54) Were any of the windows open?

(55) The computer in that room is always freezing up. Did it freeze while you were working on it?

Specific Questions (Keyed to Yes)

(7)Was there a radio in that room?

(9) Were there bookshelves in that room?

(14) Were you asked to read anything?

(17) Were you asked to remember a list of words related to food or candy?

(30) There's only one desk in that room, right?

(33) Were the windows all closed?

(36) Did the experimenter use a clipboard?

(38) Was there a mirror in the room?

(40) Did the experimenter leave the room during any of the procedures?

Repeated specific items

(19) Were the bookshelves empty?

(34) Were there books in the room?

(53) Did the experimenter stay in the room the entire time while you were here last week?

(56) Were there any pictures on the wall?

Repeated misleading items

(20) He/she asked you to read from a book, right? (If yes: what did they ask you to read, from the book? If no: oh, I was going to ask you what it was?).

(52) There was no mirror in the room was there?

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