

**RESEARCH ARTICLE**

# An initial investigation into the nature and function of rapport in investigative interviews

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**Summary**

Research on investigative interviewing has highlighted the role of rapport in nonconfrontational, evidence-based interviewing procedures, but questions remain about the nature and function of rapport in such interviews. Across three samples drawn from multiple previous studies involving similar methodologies, we addressed four issues: a potential role of working alliance as a rapport component, differences among different sources of rapport data, interrelationships among rapport components, and cultural/ethnic moderation. Rapport was coded from videos of introductory segments of interviews concerning a mock theft involving interviewees of different cultures/ethnicities. The rapport components were intercorrelated, converged on a single factor, and were associated with interviewer but not interviewee self-assessments of rapport. Rapport differentially predicted the informational elements interviewees produced: working alliance predicted relevant details and plausibility, but coordination predicted irrelevant details, with some culture/ethnicity moderation. We discussed these findings in relation to future theory and research on rapport in investigative interviews.

**KEYWORDS**

culture, ethnicity, investigative interviews, rapport, veracity

Decades of research on rapport have documented its importance in many contexts such as genuine vs. fake mother-infant interactions (Bernieri, Reznick, & Rosenthal, 1988), cooperative vs. adversarial interactions (Bernieri, Davis, Rosenthal, & Knee, 1994; Bernieri & Gillis, 1995; Bernieri, Gillis, Davis, & Grahe, 1996; Gillis, Bernieri, & Wooten, 1995), and self-disclosure induction conditions (Vacharkulksemsuk & Fredrickson, 2012). Recent research has extended this knowledge in the area of investigative interviewing (see Meissner, Kelly, & Woestehoff, 2015, for a review). For example, rapport has been associated with positive interview outcomes (Walsh & Bull, 2010), the disclosure of meaningful and complete information earlier in an interview (Goodman-Delahunty, Martschuk, & Dhimi, 2014), reduction of counter-interrogation tactics (Alison et al., 2014), and more accurate information in eye-witness testimony (Kieckhafer, Vallano, & Schreiber Compo, 2013; Vallano & Schreiber Compo, 2011). Experiments have shown

rapport to have both direct and mediational effects on informational elements produced in investigative interviews (Hwang & Matsumoto, 2020; Matsumoto & Hwang, 2018b, 2019b) and as effective in interviews with suspects and witnesses (Vallano & Schreiber Compo, 2015). These findings position the concept of rapport as an important factor in ethical, non-confrontational, evidence-based interviewing procedures.

Despite acknowledging its importance, relatively little is known about the nature and function of rapport itself. Questions exist concerning its basic behavioral elements in interactions, higher-order components, optimal sources and methods of assessment, and cross-cultural applicability, among others. This paper addresses some of these issues vis-à-vis investigative interviews in three samples aggregated across multiple previous studies. We begin with a brief review of previous studies that have examined the nature and function of rapport.

## 1 | PRIOR RESEARCH ON THE NATURE AND FUNCTION OF RAPPORT

Most research examining the nature and function of rapport appeared over two decades ago (Bernieri, 1988; Bernieri et al., 1994; Bernieri & Gillis, 1995; Bernieri et al., 1988, Studies 1 and 2; Grahe & Bernieri, 1999, 2002, Studies 1, 2, and 3; Trout & Rosenfeld, 1980; Vacharkulksemsuk & Fredrickson, 2012). Across these studies, rapport was assessed using different methodologies including third-party observer judgments, interactant self-reports, or coding of behavioral cues considered relevant to rapport. We describe these three types of studies below.

### 1.1 | Third-party judgments

Many studies involved third-party judgments of rapport upon viewing an interaction to identify components of rapport (Bernieri, 1988; Bernieri et al., 1994; Bernieri & Gillis, 1995; Bernieri et al., 1996, Studies 1 and 2; Bernieri et al., 1988, Study 1; Gillis et al., 1995; Grahe & Bernieri, 1999, 2002, Studies 1, 2, and 3). Across these studies the following categories were rated: Simultaneous Movement, Tempo Similarity, Coordination and Dance-Like Smoothness, Behavior Matching, Coordination and Smoothness, and Posture Similarity (e.g., Bernieri, 1988; Bernieri et al., 1994; Bernieri et al., 1988, both studies); in those studies rated categories were highly correlated and global synchrony scores were computed. Other studies obtained ratings to items such as “Do the interactants like each other?”, “Are they enjoying what they are doing?”, or an overall rating of “interactant rapport” (Bernieri et al., 1996; Bernieri & Gillis, 1995; Gillis et al., 1995; Grahe & Bernieri, 1999, 2002). One study obtained ratings of warmth, activity, anger, enthusiasm, frustration, happiness, passivity, boredom, engagement and vocal activity (Bernieri et al., 1988, Study 2). These items essentially assessed the degree of positivity or pleasantness in the interactions.

### 1.2 | Self-report ratings

Several prior studies involved self-reported ratings of rapport by one or both interactants (Bernieri, 1988; Bernieri et al., 1994; Bernieri et al., 1996; Bernieri & Gillis, 1995; Gillis et al., 1995; Grahe & Bernieri, 1999, 2002; Vacharkulksemsuk & Fredrickson, 2012). Across the Bernieri studies, ratings included items such as enjoyment, enjoyment of role, liking of partner, happiness, satisfaction, friendliness, excitement, interest, enthusiasm, motivation, attentive, easy-going, cooperative, humorous, anger, disgust, frustration, boredom, tense, nervous, self-conscious, controlling, dominant, forceful, talkative, tiredness, and sexuality (Bernieri, 1988); and well-coordinated, boring, cooperative, harmonious, unsatisfying, uncomfortably paced, cold, awkward, engrossing, unfocused, involving, intense, unfriendly, active, positive, dull, worthwhile, slow, smooth, bored, cooperative, satisfied, comfortable, awkward, engrossed, involved, friendly, active, and positive (Bernieri et al., 1994; Bernieri et al., 1996; Bernieri & Gillis, 1995; Gillis et al., 1995; Grahe & Bernieri, 1999, 2002). Vacharkulksemsuk

and Fredrickson (2012) included a measure of high quality connections (Dutton & Heaphy, 2003), positive regard, felt mutuality, and subjective vitality.

Despite the many items used, Bernieri et al. (1994) reported that interactants self-evaluated rapport along one dimension even when 29 items were rated. They concluded that self-reports of rapport were unidimensional (Bernieri et al., 1996), and measured a subjective degree of positivity or pleasantness on the part of the interactants.

### 1.3 | Behavioral coding

Some prior studies utilized observer coding of specific behavior considered to signal rapport (Table 2 in Bernieri et al., 1994; Bernieri & Gillis, 1995; Appendix A in Bernieri et al., 1996; Gillis et al., 1995; Table 2 in Grahe & Bernieri, 1999; Appendix in Grahe & Bernieri, 2002; Vacharkulksemsuk & Fredrickson, 2012). Such behavior included gestures, adaptors, back-channel responses, expressivity, mutual eye contact, forward lean, mutual silence, nervousness, posture orientation, proximity, smiling, synchrony, attractiveness, similarity of appearance, posture shifts, posture mimicry, pointing, interruptions, enjoyment, simultaneous movement, tempo similarity, coordination and smoothness.

A meta-analysis of the behavior associated with rapport indicated moderate to large positive associations between rapport impressions and forward trunk lean, smiling, nodding, direct body orientation, uncrossed arms, direct gaze and posture mirroring (Tickle-Degnen & Rosenthal, 1990). In this analysis rapport was operationalized as “the degree to which a partner's nonverbal behavior was related to a participant's favorable impression or feeling of positivity” (p. 290); thus the criterion variable assessing rapport was positivity. These studies led to the conclusion that rapport is encoded within the expressive behavior of the interactants (Bernieri et al., 1996; Tickle-Degnen & Rosenthal, 1987, 1990).

### 1.4 | Previous attempts to explicate rapport components

Prior reviews of the literature described above have suggested the existence of several, over-arching components of rapport. Two decades ago, Tickle-Degnen and Rosenthal (1987, 1990) proposed a theoretical construct of rapport based on expressive behavior, defining rapport as a composite of coordination, mutual attentiveness, and positivity, each encoded in the behavioral flow of an interaction. Bernieri and others (Bernieri, 1988; Bernieri et al., 1994) suggested that the core rapport components were behavioral, interactional, and movement synchrony.

While these conceptualizations were likely appropriate in the context of cooperative interactions, they may not have been entirely relevant for investigative interviews, which are often adversarial. One reason is that previous research described rapport essentially as the degree of pleasantness or positivity between interactants, or focused on concepts related to synchrony or coordination. While positivity and synchrony are advantageous to developing and maintaining rapport (perhaps especially

towards the earlier part of an interaction; Tickle-Degnen & Rosenthal, 1990), adversarial investigative interviews may be effective even without much positivity or coordination. On one hand, witnesses, sources, or suspects can be pleasant and talk freely in a coordinated fashion with an interviewer, but much of what is provided may be deceptive or extraneous. On the other hand, interviewees who are reluctant, hesitant, or resistant may provide valuable information, admissions, or confessions. Thus, rapport conceptualizations focusing on positivity or coordination may miss something important in such contexts.

To address this limitation, Kleinman (2006) suggested the concept of *operational accord* to describe effective interactions in investigative interviews. This concept referred to both interactants having some degree of shared understanding of the goals of the interview and a willingness to cooperate to achieve those goals. Operational accord also implied that information disclosure can occur with minimal rapport, where interviewees have made a decision to respond truthfully because of internal factors (i.e., their own cognitive or emotional states) and not because of the interaction quality. Relatedly, Abbe and Brandon (2013) described the concept of *working alliance*, which expanded on operational accord to include a shared understanding among interactants concerning the task at hand, goal of the interaction, and bond between the interactants. Although these aspects of rapport are likely important in cooperative interactions, they may be especially important in adversarial interactions such as investigative interviews and may occur with or without positivity or pleasantness.<sup>1</sup>

Duke (2013) went beyond the conceptual reviews above by empirically examining the nature of rapport in investigative interviews. One hundred eighty seven observers rated two interviews on 63 rapport-relevant items generated from a literature review. Exploratory and confirmatory factor analyses identified five constructs: Attentiveness, Trust/Respect, Expertise, Cultural Similarity, and Connected flow, the first three referring to interviewers, the latter two referring to interactions. Duke, Wood, Bollin, Scullin, and LaBianca (2018) subsequently conducted two validation studies of a self-report questionnaire assessing interviewees' rapport experiences centered on the same five constructs.

## 2 | GAPS IN THE LITERATURE

Despite the importance of rapport and the wealth of information acquired to date, many questions remain. We address four here. First, although the conceptual reviews above suggested the relative importance of operational accord or working alliance (hereafter working alliance) in adversarial investigative interviews, no study has yet examined whether it is associated with effective outcomes in such interviews above and beyond other rapport components. We address this possibility.

Second, questions exist concerning which source of rapport data is most relevant to investigative interviews. Bernieri and colleagues reported that the concept of rapport is different than personality or individual difference variables because rapport exists in the interaction between individuals, not in any one person (Bernieri et al., 1996). Also, self-report rapport ratings by individuals in an interaction have tended to be unreliable (Abbe & Brandon, 2013; Bernieri, 1988;

Bernieri et al., 1994; Bernieri & Gillis, 1995; Tickle-Degnen & Rosenthal, 1990). Studies have reported no correlations between interviewers' and interviewees' self-reported rapport, or between interviewees' self-reported rapport and their own information production (Hwang & Matsumoto, 2020; Matsumoto & Hwang, 2019b). Although many approaches to coding rapport in investigative interviews have been utilized (e.g., Alison et al., 2014; Alison, Alison, Noone, Elntib, & Christiansen, 2013; Brimbal, Dianiska, Swanner, & Meissner, 2019; Driskell, Blickensderfer, & Salas, 2013; Holmberg & Madsen, 2014; Houston, Russano, & Ricks, 2017), they generally focus on rapport assessment of either the interviewer or interviewee. No study has examined the association between both interactants and third-party ratings of rapport in an investigative interview context; we do so below.

Third, although reviews (Abbe & Brandon, 2013; Kleinman, 2006) have identified Mutual Attention, Coordination, or Working Alliance as conceptual components of rapport, no study has examined how these components interact to comprise rapport (with the exception of Duke et al., 2018, which included a multidimensional assessment of rapport but only on interviewees). Questions exist about whether these concepts all assess rapport as well as concerning their interrelations and underlying structure (i.e., are they orthogonal, assessing multiple aspects of rapport or are they interrelated, contributing to an overall concept of rapport?). Previous reviews have indicated that no single behavior assesses rapport and that most behavior assesses multiple aspects of rapport (Tickle-Degnen & Rosenthal, 1990), suggesting that different rapport components may in fact contribute to a single, global rapport concept and be so intertwined to be indistinguishable. We examine this question here.

Fourth, questions exist concerning the conceptual equivalence of rapport across cultures or ethnicities. Many investigative interviews occur not only with interviewees from diverse cultural, ethnic, and linguistic backgrounds but also around the world in diverse contexts. Anecdotally, many investigators comment on the importance of rapport in such interviews, suggesting similarity in the function if not concept of rapport across cultures. But given documented cultural differences in relationship formation (Keller, 2019), communication styles (Hall, 1966), expressivity (Matsumoto & Hwang, 2019a), trust (Van de Vliert & Kong, 2019) and many other processes related to interaction, there are many reasons to believe that the concept of rapport as well as the ways to establish, maintain, and repair rapport may be different across cultures. Most prior research has not examined such possibilities (with the exception of Bernieri & Gillis, 1995); thus, there is an empirical need to examine the equivalence of rapport across cultures; we do so below.

## 3 | OVERVIEW AND HYPOTHESES

We address the questions above in a merged analysis across three samples drawn from multiple previous studies involving very similar methodologies. We conducted new third-party coding of rapport on their archival records (in one sample we repurposed existing third-party coded rapport data); all analyses and findings are new to the literature. We deemed third-party coding of rapport important because

rapport can be considered a quality of the interaction, not an individual difference variable, and because of previous conflictual findings with self-reported rapport. All studies involved mock crime experiments in which an investigative interview occurred with interviewees who either told the truth or lied about a theft and in which three informational elements (Relevant Details, Irrelevant Details, and Plausibility) were coded from their responses to an initial question concerning the theft. Sample 1 involved U.S. born-and-raised Americans; Samples 2 and 3 involved European Americans and Chinese and Hispanic immigrants. We examined the following research questions and hypotheses:

**RQ1:** What are the interrelations and factor structure of rapport components? H1a: Mutual Attention, Coordination, Working Alliance, and Overall Rapport will be highly intercorrelated with each other; H1b: Dimension reduction analyses will produce a single factor underlying the components; H1c: Culture/ethnicity will moderate the effects above.

**RQ2:** What are the associations among different sources of rapport? H2: Third-party coding of rapport will be independent of rapport self-assessed by interviewers and interviewees.

**RQ3:** Does third-party coding of rapport predict information production, and what is the relative contribution of Working Alliance? H3a: Third-party rapport coding will predict informational elements produced by interviewees; H3b: Working Alliance will contribute independently to the prediction of informational elements produced after controlling for the contributions of other rapport components; H3c: Culture/ethnicity will moderate these effects.

## 4 | METHODS

### 4.1 | Samples

For the current study, data were merged from multiple previous mock theft experiments that used similar procedures. Sample 1 included participants from two previously reported experiments involving Veracity (truth and lie) and social influence tactics (high vs. low authority or high vs. low liking) as independent variables (Hwang & Matsumoto, 2020; Matsumoto & Hwang, 2019b); here, the social influence factors were ignored. A community sample of U.S. born-and-raised individuals participated ( $N = 220$ ;  $ns = 114$  females, 106 males; mean age = 35.61).<sup>2</sup>

Sample 2 included participants of three cultures/ethnicities (Matsumoto & Hwang, 2018b) in a study that examined the effect of veracity, a social influence tactic (reciprocity), and culture/ethnicity as independent variables; the social influence factor was ignored here. Participants were a community sample ( $N = 181$ ) comprised of European Americans born and raised in the United States ( $n = 72$ , mean age = 43.15); Hispanic immigrants born and raised in Central or South America or whose parents were born in those countries, and whose first language was Spanish ( $n = 48$ , mean age = 32.12); and Chinese immigrants born and raised in the People's Republic of China, Hong Kong, or Taiwan or whose parents were born and raised in those

countries, and whose first language was Mandarin or Cantonese ( $n = 61$ , mean age = 27.16).

Sample 3 included participants of three cultures/ethnicities in a study that examined the effect of veracity and culture/ethnicity as factors (Matsumoto & Hwang, 2015, 2018a; Matsumoto et al., 2015). A community sample of  $N = 132$  (mean age = 28.92) included European Americans ( $n = 37$ ), Chinese immigrants ( $n = 48$ ), and Hispanic immigrants ( $n = 47$ ) (same inclusion criteria as above).

### 4.2 | Procedures

Procedures were the same for all studies and samples, with minor differences. In all studies, participants were randomly assigned to either steal a check and lie about it or not steal it and tell the truth. At the start of the experiment, participants engaged in an initial, screening interview about their intentions, after which they gained access to a room in which the theft could occur. After exiting that room and waiting, participants were escorted to a separate room in which a second, longer investigative interview occurred.<sup>3</sup> These investigative interviews began by asking interviewees to write a statement about what they did in the previous room. Interviewers left during this time; thus, interviewees wrote these statements alone. When interviewers returned, the interview proper began following a standard protocol (i.e., questions did not vary between conditions), beginning with questions about interviewees' backgrounds (the segment on which rapport coding occurred). They were then asked an open-ended question to describe what they did in the room in which the theft could have occurred (same prompt as their written statement). Follow up questions were asked thereafter.<sup>4</sup>

There were consequences to being believed and manipulation checks verified that participants were emotionally elevated during the experiment (differentially for truth-tellers and liars) and that the stakes were perceived on a moderate-high level in all studies (for more information see Hwang & Matsumoto, 2020; Matsumoto & Hwang, 2015, 2018b, 2019b).

In Sample 1 only, interviewers self-assessed rapport twice, once after the initial screening interview prior to participants' gaining access to the room in which the theft could occur, and again after the investigative interview was completed. Participants rated rapport once, after the investigative interview was completed. These ratings were made using 11-point scales anchored 0, None at all, 5, A Moderate Amount, and 10, Maximum Amount. Multiple interviewers were employed and their ratings were standardized for analyses.

### 4.3 | Informational elements

In Samples 1 and 2, three informational elements (Relevant Details, Irrelevant Details, and Plausibility) were previously coded from the interviewees' responses to the initial, open-ended question in the interview and served as dependent variables. Reliabilities were high and acceptable (as reported in Hwang & Matsumoto, 2020; Matsumoto & Hwang,

2018b, 2019b). For Sample 3, two coders newly coded the informational elements provided by interviewees in both interviews and written statements using the same coding procedures. Reliabilities were high and acceptable,  $r_s = 0.95, 0.92,$  and  $0.85$  for Relevant details, Irrelevant details, and Plausibility, respectively.

#### 4.4 | Third-party rapport coding

Rapport was coded from videos of the brief segment of the investigative interviews from the beginning of that interview until interviewees were asked the initial, open-ended question; this video sample did not overlap with that used for coding informational elements. Videos included frontal views of interviewees' whole bodies and partial side views of the interviewers, who maintained a standard posture throughout all interviews. The following rapport components were coded: Mutual Attentiveness (MA), which referred to the how attentive, involved, and engaged interactants were with each other; Coordination (CO), which referred to the degree of synchrony, complementarity, or convergence between the interactants and their communicative behaviors; and Working Alliance (WA), which referred to the degree of mutual respect interactants gave to each other and their communicative requests, and to which both recognized that the goal of the interview was to extract information (regardless of the veracity of that information). Although this operationalization of WA made associations with any information production more likely, the coding descriptions of information (described above) allowed for examinations of the association between WA and the specific type of information provided (i.e., relevant or irrelevant details and plausibility). Coders were also informed that positivity could augment WA codes (i.e., evidence of positivity could be used as a basis to raise codes) but that positivity itself was not sufficient evidence for WA.

Pilot work had indicated that naïve coders had difficulty differentiating among various, specific elements of the rapport components (e.g., the differences among attentiveness, involvement, and engagement). Thus, coders made single-item ratings on each of the three major components (i.e., MA, CO, and WA), using 11-point scales labeled 0, No evidence at all; 1, Scant evidence; 5, Moderate amount of evidence; and 10, Maximum amount of evidence; they also rated Overall Rapport using the same scale. When coding, coders were given the above descriptions of each component.

For Sample 1, rapport was newly coded by one coder blind to all conditions and hypotheses coded all cases. Reliability was assessed in stages and in different ways. Two additional coders coded  $n = 61$  cases at the beginning, middle, and end of the coding period and ICCs were high and acceptable for all four codes,  $0.87, 0.90, 0.90,$  and  $0.92,$  respectively. One of the additional coders also coded an additional  $n = 90$  cases throughout the coding period and reliabilities were high and acceptable for those as well,  $r(90) = 0.73, 0.80, 0.87, 0.85,$  respectively. No coder coded the informational elements produced by the interviewees and all were blind to conditions. For analyses, codes were averaged when two or more coders' data were available ( $n = 151$  of the total cases).

For Sample 2, rapport was previously coded in the same manner as in Sample 1 using the same four components. Coding was done by a different team of coders from those in Sample 1 and reliabilities were high and acceptable (Matsumoto & Hwang, 2018b).

For Sample 3, rapport was newly coded using the same four components as in Samples 1 and 2. To establish reliability, three coders coded a subsample of  $n = 20$  cases, ICCs =  $0.66, 0.62, 0.65,$  and  $0.70$  for MA, CO, WA, and OR, respectively. Two coders then coded the remaining cases. For analyses, codes were averaged across coders.

One reliability coder was constant across all samples. To establish consistency in this coders' codes, we computed reliabilities for this coder, weighted for sample size. Reliabilities were high and comparable across all samples,  $r_{\text{weighted}} = 0.81, 0.81, 0.92,$  and  $0.85$  for MA, CO, WA, and OR, respectively.

## 5 | RESULTS

### 5.1 | Preliminary analyses

Here we report analyses across all samples ( $N = 529$ ); we also provide analyses separately by sample in Supporting Information. We computed descriptive statistics for each of the four coded rapport components and their intercorrelations (Table 1). Because there were significant mean level differences for each of the four rapport components across samples,  $F(2, 544) = 31.46, p < .001, \eta_p^2 = 0.104;$   $F(2, 544) = 5.43, p = .005, \eta_p^2 = 0.020;$   $F(2, 544) = 18.31, p < .001, \eta_p^2 = 0.063;$  and  $F(2, 544) = 18.50, p < .001, \eta_p^2 = 0.064,$  for MA, CO, WA, and OR, respectively, we computed pooled, within-group intercorrelations among the rapport codes.

### 5.2 | RQ1

To examine a possible latent structure underlying the rapport codes, we computed a principal components analysis (PCA). A single factor structure was produced using Kaiser criterion accounting for 76.28% of the total variance (Table 2; factor loadings ranged from 0.76 to 0.95). Recomputation of the PCA without Overall Rapport also produced a single factor structure.

**TABLE 1** Descriptives (means and SDs) for all coded rapport components and intercorrelations

Rapport category	M (SD)	Coordination	Working alliance	Overall rapport
Mutual attentiveness	6.86 (1.35)	0.60**	0.59**	0.71**
Coordination	6.31 (1.43)		0.73**	0.82**
Working alliance	5.99 (1.64)			0.88**
Overall rapport	5.81 (1.62)			

\*\* $p < .01.$

To examine possible cultural/ethnic moderation of the factor structure, we computed PCAs separately for each of the three culture/ethnicities pooled across samples 2 and 3. (PCA on Sample 2 only was previously reported in Matsumoto & Hwang, 2018b, and demonstrated a single factor solution.). Separate analyses were preferable to a multi-group Confirmatory Factor Analysis when examining structural equivalence in multiple cultural samples (van de Vijver & Leung, 2011; van de Vijver & Poortinga, 2002). All analyses produced a single factor structure that was highly similar across culture/ethnic groups (Table 2). Thus, Hypotheses H1a and H1b were supported; Hypothesis H1c, however, was not: the latent structure was consistent across culture/ethnicities.

### 5.3 | RQ2

We computed Pearson *r*s between coded rapport and the interactants' self-report rapport ratings (recall these data were available only in Sample 1). Coded rapport correlated with interviewer but not interviewee ratings (Table 3). Correlations with the interviewers' mean ratings were all significant but essentially of mid-range value between the correlations for interviewers' first and second ratings. Thus, Hypothesis H2 was partially supported; third-party codes were associated with interviewers' but not interviewees' ratings.

### 5.4 | RQ3

The existence of a single latent construct did not preclude the possibility that the coded rapport components differentially predicted informational elements; that is, although the PCAs indicated that the rapport components shared substantial variance, their intercorrelations indicated that there were also non-negligible portions of variance that were unique to each component. Thus, we computed correlations between

the coded rapport components and the informational elements from both the interview and written statement. Coded rapport was positively related to most informational elements (Table 4).

We then computed hierarchical multiple regressions using informational elements as dependents, including sample (deviation coded into two variables) on the first step to control their effects, and rapport components (not including Overall Rapport) as predictors on the second step using simultaneous entry. Overall models were significant for all informational elements with the exception of Irrelevant Details in the written statements (Table 5); thus, Hypothesis 3a was supported. Because results from regressions may overfit data, and because standardized regression coefficients do not account for multicollinearity, we then computed relative weights analyses (RWA) (Johnson, 2000; Tonidandel & LeBreton, 2015), as well as their statistical significance using confidence intervals (Tonidandel, LeBreton, & Johnson, 2009). RWA also allowed for planned comparisons between WA and the other two components (MA and CO). We utilized residualized RWA in order to control for the effects of sample (LeBreton, Tonidandel, & Krasikova, 2013).

In the interviews, WA predicted Relevant details and Plausibility as hypothesized, contributing approximately 60% and 70% to the overall prediction, respectively. The contribution of WA was significantly greater than that of MA for Relevant details, and greater than both MA and CO for Plausibility. Interestingly, CO predicted Irrelevant details, contributing approximately 66% to its prediction, and its contribution was significantly larger than that of WA. CO also contributed to Relevant Details, but to a lesser degree than WA.

For the written statements, WA again predicted Relevant details and Plausibility as hypothesized, contributing above 56% to the overall predictions for both. Also, the contribution of WA was significantly greater than that of MA for both. Thus, Hypothesis H3b was supported for Relevant Details and Plausibility.

The residualized RWA analyses also provided the opportunity to test for ethnicity, gender, and veracity condition pairwise differences on all coefficients, using confidence intervals to determine significance. For ethnicity, we compared European Americans versus Chinese, European Americans versus Hispanics, and Chinese versus Hispanics, in each of the six analyses (two sources  $\times$  three informational elements) and for all three rapport components. The only significant finding was on CO in the Relevant Details in the interviews, where European Americans had a larger coefficient (RW = 0.04, RS-RW = 53.98%) than Hispanics (RW = 0.003, WS-RW = 10.21%).

**TABLE 2** Results of PCAs

Sample	Component 1 eigenvalue	% of variance
All	3.05	76.28%
European Americans	3.10	77.59%
Hispanic Immigrants	2.66	66.50%
Chinese Immigrants	2.96	74.04%

**TABLE 3** Associations among different sources of rapport, sample 1

Self-report rapport ratings	Coded rapport components			
	Mutual attentiveness	Coordination	Working alliance	Overall rapport
Interviewer rapport rating 1	0.09	0.25**	0.30**	0.27**
Interviewer rapport rating 2	0.52**	0.60**	0.57**	0.59**
Interviewee rapport	-0.05	-0.02	-0.06	-0.03
Mean of interviewer rapport ratings 1 and 2	0.36**	0.44**	0.38**	0.42**

\*\* $p < .01$ .

**TABLE 4** Correlations between coded rapport and informational elements

Source	Informational element	Mutual attentiveness	Coordination	Working alliance	Overall rapport
Interview	Relevant details	0.18**	0.23**	0.20**	0.18**
	Irrelevant details	0.24**	0.24**	0.10*	0.15**
	Plausibility	0.09*	0.13**	0.18**	0.14**
Written statement	Relevant details	0.18**	0.27**	0.30**	0.27**
	Irrelevant details	0.16**	0.14**	0.05	0.11*
	Plausibility	0.09*	0.13**	0.18**	0.14**

\* $p < .05$ . \*\* $p < .01$ .

**TABLE 5** Results of multiple regressions on informational elements using coded rapport components as predictors and relative weights analyses

Source	Informational element	$R^2$	Rapport component	$\beta$	RW	RS-RW	WA v others
Interview	Relevant details	0.07**	MA	-0.04	0.01	8.67	WA > MA
			CO	0.08	0.02*	32.18	
			WA	0.22**	0.04*	59.14	
	Irrelevant details	0.04**	MA	0.04	0.01	19.18	CO > WA
			CO	0.22**	0.03*	65.87	
			WA	-0.05	0.01	14.95	
	Plausibility	0.04**	MA	-0.04	0.004	7.96	WA > MA, CO
			CO	0.002	0.01	21.30	
			WA	0.23**	0.03*	70.74	
Written statement	Relevant details	0.10**	MA	-0.05	0.01	9.12	WA > MA
			CO	0.13	0.04*	39.62	
			WA	0.22*	0.05*	61.26	
	Irrelevant details	0.02	MA	0.06	0.01	28.81	
			CO	0.20*	0.01	51.08	
			WA	-0.18*	0.003	20.01	
	Plausibility	0.08**	MA	-0.002	0.01	12.37	WA > MA
			CO	0.04	0.02*	31.25	
			WA	0.25**	0.04*	56.37	

Note: CO, coordination; MA, mutual attentiveness; RW, raw relative weight; RS-RW, RW rescaled as a percentage of predicted variance in the dependent variable attributed to each predictor; WA, working alliance.

\* $p < .05$ . \*\* $p < .01$ .

For veracity condition, the only significant finding was on WA in the Relevant Details in the interviews, where its coefficient in the truth condition (RW = 0.05, RS-RW = 54.87%) was larger than in the lie condition (RW = 0.003, RS-RW = 40.59%). No other comparison was significant.

No significant differences between coefficients were found between genders.

## 5.5 | Post-hoc analyses: Ethnicity, gender and veracity condition differences in rapport codes mean levels

We computed three-way Ethnicity (3) by Gender (2) by Veracity Condition (2) ANOVAs on each rapport component from the interviews

only ( $N$  in this analysis = 404). As would be expected, Veracity condition main effects were significant on CO, WA, and OR,  $F(1, 402) = 5.18, p = .023, \eta_p^2 = 0.013$ ;  $F(1, 402) = 5.98, p = .015, \eta_p^2 = 0.015$ ; and  $F(1, 402) = 5.87, p = .016, \eta_p^2 = 0.014$ , respectively. In each case, codes in the truth condition were higher than the lie condition (CO:  $M_{\text{truth}} = 6.33, SE = 0.10$ ;  $M_{\text{lie}} = 6.00, SE = 0.10$ ), (WA:  $M_{\text{truth}} = 6.25, SE = 0.12$ ;  $M_{\text{lie}} = 5.84, SE = 0.12$ ), (OR:  $M_{\text{truth}} = 5.00, SE = 0.12$ ;  $M_{\text{lie}} = 5.60, SE = 0.11$ ).

On MA, the Ethnicity main effect was significant,  $F(2, 402) = 22.10, p < .001, \eta_p^2 = 0.099$ . Pairwise tests using Scheffe corrections indicated that both Chinese ( $M = 6.83, SE = 0.13$ ) and European Americans ( $M = 7.06, SE = 0.09$ ) had significantly higher MA scores than Hispanics ( $M = 6.02, SE = 0.13$ ). The Ethnicity by Veracity condition interaction was also significant,  $F(2, 402) = 3.47, p = .032, \eta_p^2 = 0.017$ . Simple effects of Ethnicity with Scheffe corrected

pairwise tests separately for truth and lie conditions produced the same findings as the main effect, indicating differences in degree not direction.

The Ethnicity main effect was also significant on CO and OR,  $F(2, 402) = 4.57, p = .011, \eta_p^2 = 0.022$ ;  $F(2, 402) = 3.10, p = .046, \eta_p^2 = 0.015$ . Pairwise tests with Scheffe corrections indicated that European Americans ( $M = 6.43, SE = 0.09$ ) had higher scores than Hispanic immigrants ( $M = 5.96, SE = 0.14$ ),  $p = .022$  on CO, and that Chinese immigrants ( $M = 5.95, SE = 0.16$ ) had significantly higher scores than Hispanic immigrants ( $M = 5/49, SE = 0.16$ ),  $p = .040$  on OR.

The Gender main effect was significant on WA,  $F(1, 402) = 3.86, p = .050, \eta_p^2 = 0.010$ , indicating that female interviewees ( $M = 6.21, SE = 0.12$ ) had significantly higher scores than males ( $M = 5.88, SE = 0.12$ ).

## 6 | DISCUSSION

The four coded rapport components were highly intercorrelated and converged on a single factor for the entire sample and across all cultures/ethnicities. Coded rapport was associated with interviewer but not interviewee self-assessments of rapport and with informational elements produced by interviewees. WA uniquely predicted relevant details and plausibility in both interviews and written statements, while CO contributed more greatly to irrelevant details. Culture/ethnicity moderated the association between rapport and information produced, but only on the effects of WA on relevant details in interviews.

WA uniquely predicted relevant details and plausibility, providing evidence for its importance in investigative interviews. Although its coding procedures suggested that this component may be associated with any type of information production, that it was the major contributor to predictions of relevant but not irrelevant information suggested that its relative contribution to interview outcomes was larger than that of other rapport components. Also, the operationalization of WA did not focus on positivity and positivity itself was not sufficient evidence for coding WA. In our anecdotal observations, many interactions in which interviewees provided relevant details were not overtly positive, but instead marked with seriousness. These findings reinforced the potential utility and importance of this component and downplayed the role of positivity in adversarial investigative interviews, as suggested previously (Abbe & Brandon, 2013; Kleinman, 2006).

The interpretations immediately above were qualified by culture/ethnic differences on the effect of WA on relevant details in the interviews, where WA was a larger predictor for European American interviewees compared to Hispanic immigrants. This finding may have been associated with ethnic differences in mean levels of the rapport components reported in the post-hoc analyses, where Hispanics had lower scores on MA, CO, and OR than one or both of the other ethnic groups. These findings may have been related to cultural differences in high- versus low-context cultures (Hall, 1966, 1973, 1976). American culture is relatively lower context-based, focusing more on direct exchange of verbal information, whereas Hispanic and Chinese cultures are relatively higher context-based, in which verbal exchange

may be facilitated by contextual and nonverbal cues (e.g., more eye contact, direct orientations). Cultural differences in values associated with gaze (Matsumoto & Hwang, 2016; McCarthy, Lee, Itakura, & Muir, 2006), which may have been evidenced by the relatively lower MA scores with Hispanic interviewees, may have played a role in affecting these outcomes. Future studies should replicate and follow these effects.

The results for relevant details and plausibility were fairly similar between oral interviews and written statements across samples, which suggested that rapport facilitated information production across different modalities. Rapport may have been associated with putting interviewees' minds at ease and reductions in obstacles to self-disclosure, consistent with previous literature (reviewed above), regardless of how self-disclosure occurs or even if an interviewer is present. This possibility may have practical ramifications, as investigators may consider different modalities in soliciting information.

The only difference between interviews and written statements concerned the effects of CO on irrelevant details in the interviews. This suggested that in-person interactions may exert different effects on interviewees to produce more and different types of information (see Matsumoto & Hwang, 2019b, for direct analyses comparing the amount of information produced in interviews and written statements). CO may have facilitated interviewees to talk more about extraneous issues; thus, although CO may not be a key factor in predicting relevant details it may be important in contributing to overall rapport.

The associations between rapport components and information in the interviews and written statements raised questions concerning their interpretations. Methodologically, rapport was coded after the written statements and before interviewees' responses to the open-ended question in the interview, consistent with previous studies demonstrating that observers can reliably judge rapport from thin slices of behavior (Grahe & Bernieri, 1999). Despite this timing, we believe that associations involving rapport codes with informational elements produced in the written statements were relevant to analyze because interviewers and interviewees had already interacted earlier in the experiment, as well as briefly in asking for the written statement. Thus, the timing of the rapport codes reflected a point in time in the flow of the interaction; rapport established between the interviewers and interviewees from the start of the experiment may have facilitated information produced in the written statements prior to the investigative interview (akin to an understanding of the context-dependence of rapport; see Tickle-Degnen & Rosenthal, 1990).

Caution should be exercised, however, in causal interpretations of such associations, because associations between third-party rapport codes and data obtained prior to them (Interviewer Rapport Rating 1 in Sample 1, informational elements from the written statements) could not be used as a basis for making causal inferences about the effects of third-party codes. Similar concerns, however, can be raised concerning any "effects" of rapport on informational elements produced afterwards, because temporal priority in and of itself does not allow for causal inferences; rapport was not experimentally manipulated, and both sets of data may have been products of other

variables, such as some other quality of the interaction or of internal factors in the interviewees. The potential effects of rapport should be followed in the future, especially in studies manipulating rapport at multiple times in the flow of an interview and its effects on interview outcomes.

Another interpretational issue was related to the size of the associations between rapport and the information produced. Although effects were significant, their relatively small magnitudes suggested that a component of rapport not coded in these studies may have been more relevant to an understanding of rapport in adversarial interactions. Or, something other than rapport may have accounted for the differential production of informational elements. Other research has suggested the importance of concepts such as trust (Brimbal, Kleinman, Oleszkiewicz, & Meissner, 2019; Duke, 2013; Duke et al., 2018), and the relative contributions of such concepts to the production of information or development of rapport, especially in culturally diverse samples, should be examined.

All coded rapport components were highly intercorrelated and loaded on a single factor for all samples. On one hand, one would expect that the measurement procedure utilized in these studies—single item assessments of four components—did not lend itself to producing different factors in reduction analyses, especially given the intercorrelations and that coders rated all videos within studies. The use of single item assessments for the components may itself have been the reason why a single factor was produced in all analyses, and future studies should examine multiple item assessments of the components and their underlying structure to ensure that the current findings were not a function of the single item assessments. On the other hand, these findings were consistent with previous theory and research (reviewed above) suggesting conceptual and methodological overlap among the components as well as behavioral elements of rapport; the production of multiple factors from limited items is not entirely unheard of; and differential findings for the components in predicting information, and across culture/ethnicities, suggested that the codes were sufficiently separated conceptually. That is, although the codes were intercorrelated, there was still sufficient unique variance in each component to make independent contributions to associations with informational elements, which is what we found.

Our data supported concerns about the appropriate source of rapport data, as third-party codes were associated with one (interviewer) source but not another (interviewee). These findings may have occurred because interviewees were cognitively and emotionally loaded, whereas interviewers may have had more clinical, detached observations of the interactions. If interviewers themselves had been similarly loaded, needing to think about question flow and content and the nature of the interactions on the fly, third-party codes may not have been associated with interviewers' codes. Additional loads on interviewers may produce more noise in thinking about interactions, which may affect rapport assessments. Relatedly, interviewers with different occupational backgrounds and experiences may differ in their perceptions of rapport (e.g., see Risan, Binder, & Milne, 2016). The findings need to be replicated in future studies that assess

multiple sources of rapport in less restricted contexts with more diverse types of interviewers.

Post-hoc analyses indicated that females had higher scores than males on WA in the interviews, which was interesting given that all interviewers were males. Future studies should involve both male and female interviewers and interviewees to examine possible gender interaction effects on rapport (although also note there were no gender differences in coefficients for any rapport component predicting information).

The results may have been limited by the measurement model in other ways than those described above. For example, the findings may have been artifacts of the small number of variables; a larger number may produce greater separation among components. A broader range of components and/or behavioral elements (e.g., using the scales produced by Duke, 2013; Duke et al., 2018) may produce different factor structures and should be followed in the future, especially across more cultures, ethnicities, and language groups, and including culture-specific aspects of rapport. All interactions were coded by U.S. coders in the United States and used a U.S.-based coding system based on U.S.-based theory and research, which may have restricted coder interpretations of the components; that culture/ethnicity mean differences in rapport ratings emerged also lent some credence to this suggestion (e.g., the influence of accents by the immigrant samples on ratings of rapport is unknown). Future research should examine the possibility that culturally different coders may produce different codes given the same measurement model. Also, we did not assess positivity separately from WA and future research should do so.

The nature of the immigrant samples also limited the findings. Although manipulation checks documented that those samples were culturally different than the European Americans, all experimental procedures were administered in English and the participants had already been in the United States and had presumably acculturated to some degree. Culture/ethnic samples obtained in other nation cultures may produce different data. Future studies need to examine the concept and measurement models of rapport across cultural groups with greater cultural distance.

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#### CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

#### DATA AVAILABILITY STATEMENT

Raw data for analyses reported above will be kept for a minimum of five years, per guidelines established by the American Psychological Association, and are available to reasonable requests to the authors during this time.

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## ENDNOTES

- <sup>1</sup> Relatedly, there is a large clinical literature on the concept of “therapeutic alliance,” which has been found to have consistent, positive associations with process and outcome measures in meta-analyses of psychotherapy studies (Martin, Garske, & Davis, 2000). Moreover, a number of scales have been developed to assess therapeutic alliance (Horvath & Greenberg, 1989; Luborsky et al., 1996; Luborsky, Crits-Christoph, Alexander, Margolis, & Cohen, 1983; see review in Summers & Barber, 2003). But there are also critical differences in the contexts in which psychotherapy and investigative interviews occur. In the former, clients generally voluntarily engage the services of the therapist, and know that therapists engage with the purpose of improving the situation of clients; this is not necessarily the case in investigative interviews.
- <sup>2</sup> Total N differs from Ns reported in the previous two reports because of differences in technological issues and missing data.
- <sup>3</sup> Interviewers in all studies were professional, male actors, all ages 30–60, some of whom were former law enforcement officers or had previous experience in a security-related field. They were trained to deliver interviews in a standard manner, following an interview protocol. As a manipulation check, assistants listened to the interviews to ensure that the interviewers did not deviate from the protocols. All cases included in analyses reported in all studies below did not include deviations from protocol, and were filtered for participants' understanding and other types of interviewer contamination.
- <sup>4</sup> Despite the fact that obtaining a written statement at the conclusion of an investigative interview is a common practice, we requested the written statement from interviewees at the beginning of the investigative interview for several reasons. Doing so preliminarily locks interviewees' statements to an initial position, which allows investigators to analyze the statement prior to conducting the interview proper as an initial way to identify areas of concern for follow up; thus, obtaining a statement up front can be used as an investigative tool, and is increasingly used as such. Also, a statement obtained at the beginning of the interview is not contaminated by whatever happens in the interview, and in any case does not preclude the possibility of obtaining another, potentially revised, statement at the end, which would reflect changes in interviewees' positions resulting from the interview. There were also methodological advantages as well, as the written statement allowed for a second presentation of the interviewees' statements about what had happened.

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## SUPPORTING INFORMATION

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