Safety in Numbers: A Policy-Capturing Study of the Alibi Assessment Process

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Summary: A policy-capturing analysis of alibi assessments was conducted. University students (N = 65), law enforcement students (N = 21), and police officers (N = 11) were provided with 32 statements from individuals supporting a suspect's alibi (i.e., alibi corroborators) and asked to assess the believability of the alibi, the suspect's guilt, and whether they would arrest the suspect. Each statement was composed of five binary features (i.e., relationship between corroborator and accused, age of corroborator, amount of available corroborators, alibi corroborator's confidence in their account, and memorability of the target event). Results showed that there was much parity in the type of information used to assess alibis across the samples. Specifically, we found that 90% of participants' decision policies included the amount of corroborators. Participants also relied upon, albeit to a lesser extent, the suspect–corroborator relationship and the age of the corroborator when assessing the alibi. The potential implications of these findings for understanding how people assess alibi corroborators are discussed. Copyright © 2016 John Wiley & Sons, Ltd.

Police interviews with suspects and accused persons often include questions regarding their whereabouts during the material time frame—the temporal period that includes the time an offense was committed (Inbau, Reid, Buckley, & Jayne, 2013; Snook, Eastwood, Stinson, Tedeschini, & House, 2010). Asking interviewees about their movements during the material time frame gives them an opportunity to claim their innocence because they were in a location other than where the crime took place (i.e., an alibi; Allison & Brimacombe, 2010; Culhane & Hosch, 2012). If an alibi is proffered, investigators are required to assess its veracity. The outcome of the alibi assessment is consequential because it may impact an investigator's mindset regarding the level of effort that is devoted to disproving the hypothesis that the interviewee is the culprit.

The hundreds of DNA exonerations that have occurred in Canada and the USA over the past two decades suggest that the alibi assessment process is imperfect (Innocence Project, 2010; Association in Defence of the Wrongfully Convicted, 2013). The innocence of each exoneree is definitive evidence that the original alibi failed to convince investigators of the accused's innocence. In fact, because all exonerees likely produced an alibi at some point during the investigation or legal proceedings, a failure to assess alibis accurately (or investigate them fully) is arguably a major contributor to wrongful convictions (Dysart & Strange, 2012). Despite the importance of the alibi assessment process, this seemingly fundamental investigative decision process has not been researched extensively (Burke, Turtle, & Olson, 2007); it seems particularly understudied when considering the amount of research on the other contributors to miscarriages of justice (e.g., eyewitness identification and coercive interrogation practices that produce false confessions; see Cutler, 2011; Kassin et al., 2010).

Factors that predict alibi believability

Beyond attempting to offer a detailed account of one's whereabouts at a particular time, suspects and accused persons are also inherently required to provide additional evidence to corroborate their account (Kassin, 2006). As outlined by Olson and Wells (2004), corroborating evidence can be either physical (e.g., ATM receipt) or person (e.g., sworn testimony from a friend). Physical evidence can further be classified as either weak or strong, depending on how hard the evidence is to fabricate (e.g., receipt for cash purchase vs. security video). Person evidence can also be classified as weak or strong, depending on how motivated the alibi corroborator presumably would be to lie for the accused (e.g., spouse vs. stranger; also see Hosch, Culhane, Jolly, Chavez, & Shaw, 2011). Corroborating evidence is seemingly a vital component of a believable alibi because the strength of an alibi is a function of the type and amount of evidence available to support the alibi (Olson & Wells, 2004).

Several laboratory studies have examined the type of corroborating evidence that suspects tend to supply. For example, in a study by Culhane, Hosch, and Kehn (2008) that asked participants to report any person or physical evidence that could verify their innocence in a hypothetical past crime, it was found that 90% of participants produced an alibi witness (over 80% of these reported witnesses were friends or family) and 30% produced physical evidence. In a similar study by Olson and Charman (2012), which asked participants to generate alibis for a past target event, it was discovered that 30% of alibis contained corroborating physical evidence and 80% contained corroboration from motivated others (e.g., friend and relative). A more recent study also found that the majority of participants (i.e., 77%) reported being with friends or family during the target event and that the provision of corroborating physical evidence was relatively rare (i.e., 21%; Culhane et al., 2013).

Outside the laboratory setting, Dysart and Strange's (2012) survey of law enforcement officers revealed that suspects tend to offer motivated others (e.g., friend and family member) as alibi witnesses and that the provision of physical evidence was rare. Similarly, an archival study of alibi-related trial outcomes in Canada and the USA showed that person evidence came almost exclusively from motivated others and that physical evidence was present in less than 15% of the cases (Turtle & Burke, 2003).

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The preponderance of evidence thus suggests that—despite being viewed as the more persuasive form of corroboration (Dahl, Brimacombe, & Lindsay, 2009; Olson & Wells, 2004)—the provision of physical evidence in alibi statements is rare. The believability of the majority of alibis therefore seems to rest on person evidence from motivated others. The available research pertaining to the believability of person evidence reveals that at least four features have been assessed. These include (i) the relationship between the alibi provider and alibi corroborator, (ii) the age of the corroborator, (iii) the confidence of the corroborator, and (iv) the amount of corroborators available to support the alibi. For relationship, non-motivated others (e.g., a stranger) appear to be more believable than motivated others (e.g., a brother). For example, in a mock juror study, Lindsay, Lim, Marando, and Cully (1986) found that—compared with a no-defense witness control condition—an alibi provided by a stranger reduced the percentage of guilty verdicts rendered, whereas an alibi from a relative (i.e., brother-in-law) did not. Similarly, Culhane and Hosch (2004) found that mock jurors convicted defendants less frequently when a neighbor corroborated an alibi, as opposed to when a girlfriend corroborated an alibi. Using a police detective paradigm, Olson and Wells (2004) also found that participants rated alibis as more believable when the person corroborating evidence was from a stranger (i.e., grocery store cashier, bookstore clerk, and taxi driver) than when the corroboration came from a seemingly motivated other (i.e., mother, brother, and best friend). It appears that the effect of relationship on alibi believability is strong and seems to be due to the belief that motivated others are more likely to lie for the alibi provider than a stranger (see Hosch et al., 2011).

In the one study that has looked at the impact of the age of the corroborator, Dahl and Price (2012) used a police investigator paradigm to measure the believability of alibi corroboration from both a child witness (i.e., 6 years old) and an adult witness (i.e., 25 years old). They found that, regardless of relationship (i.e., son vs. neighbor), corroboration was more believable than when it came from a child witness than when it came from an adult witness. Dahl and Price argued that this effect was likely due to the belief that children are inherently more honest (e.g., lack motivation or ability to lie) than adults and, therefore, more trustworthy.

In terms of a corroborator's self-reported confidence in their testimony, Allison, Jung, Sweeney, and Culhane (2014) found that corroborators who reported being highly confident in their testimony were rated as more believable than corroborators who were less confident (i.e., 100% vs. 80% confident). However, Allison and colleagues also discovered that corroborator confidence levels did not impact the overall believability rating of the alibi itself or verdicts of mock jurors. Although the level of self-reported confidence may exert some influence on believability ratings, the effect of confidence on those ratings appears to be weaker than the effect found in other forensic domains (e.g., eyewitness testimony; see Cutler, Penrod, & Dexter, 1990). It may be the case that confidence is a relatively weak predictor of believability because those assessing alibi corroborators are more concerned with intentional deception by the corroborator than potential memory errors.

To date, no empirical research has examined the impact of amount of corroborators directly in an alibi assessment paradigm. However, a survey revealed that 18% of a sample of law enforcement officers believed that having multiple corroborators is an important element of strong alibis (Dysart & Strange, 2012). By contrast, legal scholars have argued that the quality of an alibi witness, not the quantity of them, should impact believability (Sullivan, 1971). Although having multiple alibi corroborators may be beneficial in convincing alibi assessors because of the perceived difficulty for a suspect to produce several people willing or able to lie on their behalf, this effect may be less important than providing corroborators that possess characteristics that make them believable (e.g., no personal relationship to the suspect).

The aforementioned research has provided valuable insights into the factors that impact the believability of alibi corroborators. We identify at least three areas of where the extant literature would benefit from further research. First, the *relative importance* of the factors that are considered during the alibi assessment process requires consideration; previous studies have typically examined the factors in isolation. Second, other, yet to be explored, aspects of person evidence that may impact alibi believability require consideration. Third, there is a need to use more ecologically valid samples (i.e., policing students and experienced investigators) in order to increase the applicability of the results.

Studying the alibi assessment process: a policy-capturing approach

To contribute to the aforementioned areas of potential development, we use a policy-capturing approach to study the alibi assessment process with ecologically valid populations (see Cooksey, 1996). Policy-capturing is a methodology that allows researchers to measure how each decision-maker ranks and combines information to make decisions in a given domain through the use of a regression analysis for each participant (e.g., multiple regression and logistic regression; Karren & Barringer, 2002). Each decision-maker is typically presented with many scenarios—often in the form of written vignettes—that contain the various levels of the factors (or cues) of interest. It is preferable to use a fully crossed design whereby every possible combination of the levels of the cues is included; a study with five binary cues would result in a total of 32 vignettes. Each decision-maker's responses is then regressed on the cues to determine the type of cues used to make decisions, the direction of the cue, the number of cues used, and the relative importance of each cue in an individual's decision-making process (i.e., identify their 'decision policy'; see Aiman-Smith, Scullen, & Barr, 2002, for further details of this technique). For instance, if there were 10 participants, there would be 10 separate regressions, and the outputs would be tallied to produce a summary of the decision policies across those decision-makers. Although there a number of advantages to the policy-capturing approach, a central one is the ability to simultaneously present a number of potentially important cues to participants—which match closely the complexity of real-world decision situations (see Karren & Barringer, 2002).

The current research

Using a policy-capturing approach, we chose to examine the following five factors that potentially relate to alibi corroborators: suspect–corroborator relationship; age of alibi witness; amount of available corroborators; alibi corroborator's confidence in their account; and memorability of the target event in the alibi. As reviewed earlier, the first four factors (i.e., relationship, age, amount, and confidence) have been assessed individually, and each has been shown to impact the alibi assessment process. We chose to include memorability as well because it is well established that memory is enhanced if the details to be remembered are unique and salient (e.g., Loftus, 1979; Milne & Bull, 2003). People may therefore expect alibi corroborators to be more accurate when recalling a memorable event—one that they have a reason to recall—than when recalling mundane events where they may be honestly mistaken, and rate the believability of alibis accordingly (see Sullivan, 1971).

Several empirical studies have also demonstrated that the provider–corroborator relationship is a good predictor of believability (e.g., Culhane & Hosch, 2004; Olson & Wells, 2004), and legal scholars have argued that the suspect–corroborator relationship is a key component of judging a corroborators' believability (Sullivan, 1971). We therefore hypothesize that the majority of participants will rely consistently on the suspect–corroborator relationship when making assessment decisions (i.e., contribute to participants' decision policies) and rate alibi corroborations from motivated others as less believable than non-motivated others. We also hypothesize that alibis will be rated as more believable if the alibi corroborations come from children (as opposed to adults) and when there are multiple corroborators (Dahl & Price, 2012; Dysart & Strange, 2012); however, participants will utilize these factors in their decision-making process less frequently than the provider–corroborator relationship. We also hypothesize that higher confidence levels and more salient events will be associated with higher ratings of alibi believability (Allison et al., 2014). Because it is not entirely clear to us how investigative training and experience would lead to differences in alibi assessment, and given that previous research has shown little impact of investigative experience in other forensic decision-making scenarios (e.g., deception detection, see Dahl et al., 2009), we hypothesize that decision-making policies will be comparable across the three samples.

METHOD

Participants

The university sample consisted of 65 students (22 men and 43 women) enrolled in an introductory psychology course at the University of Ontario Institute of Technology in Ontario, Canada. The mean age of the participants was 19.68 years ($SD = 3.63$, $Range = 17–44$), and the mean year of study was 1.63 ($SD = 1.01$, $Range = 1–4$). The law enforcement student sample consisted of 21 students (8 men and 13 women) enrolled in the Police Foundations program or the Police, Security, and Investigations program at Durham College in Ontario, Canada. Each of these 2-year programs includes specific courses related to conducting successful investigations, and the goal is to provide students with the necessary skills to enter a career in the field of law enforcement. The mean age of participants was 22.05 years ($SD = 3.20$, $Range = 18–28$). For the students that reported year of study, 5 (23.81%) reported being in the final semester of their first year and 10 (47.62%) reported being in the final semester of their second year. The police officer sample consisted of 11 officers (8 men and 3 women) employed within a medium-sized Canadian police organization. The mean age of participants was 42.36 years ($SD = 6.00$, $Range = 30–52$), and the mean year of experience as a police officer was 16.36 ($SD = 6.86$, $Range = 5–25$). All of the officers were currently working within the organization's Criminal Investigative Divisions (CID; e.g., Major Crime Unit, and Child Abuse and Sexual Assault Unit), and the mean year of CID experience for the sample was 6.82 ($SD = 4.35$, $Range = 1–14$).

Materials and design

In order to present the different alibi features to participants, short vignettes outlining the details of an alibi corroborator's statement were created. The vignettes consisted of the five aforementioned factors, each of which had two levels: Relationship (1 = family member vs. 2 = stranger), Age (1 = adult vs. 2 = child), Amount (1 = one vs. 2 = several), Confidence (1 = low vs. 2 = high), and Salience (1 = mundane vs. 2 = unique). To create an orthogonal or fully crossed design, 32 vignettes were created to capture every possible combination of factors. To increase variety across the vignettes, different examples of each level of the factors were created (e.g., the family member factor included brother, sister, son, and daughter; the unique event factor included funeral, birthday party, wedding, and graduation ceremony). To minimize the possibility of order effects, the order in which the factors appeared within the 32 vignettes was assigned randomly. One of the vignettes is presented here:

> Police File # 327—Statement collected from alibi corroborator (AC) and written up by Constable Lomax. Note that all names have been removed to protect the individuals involved in the crime.
>
> The AC was reasonably confident that his recollection of the time in question was correct. He claimed that he saw the suspect at the cafe where the AC frequently visits with his family during the time when the crime took place, which supports the suspect's account. Along with the AC, four other individuals were located who also support the suspect's account. He has no known relationship with the suspect. He is 6 years old.

An online study consisting of 41 separate pages was created on www.psychsurveys.org. The first page consisted of demographic questions (e.g., age and gender). The second page outlined the instructions regarding how to complete the remainder of the study. Specifically, the university and policing students were informed that they would be assuming the role of a police detective investigating 32 different

armed robbery cases. The police investigators were informed that they would be assessing the statement from an alibi corroborator from 32 different armed robbery cases. In every armed robbery case, an eyewitness from the crime scene had picked an individual out of a photo line-up, who was now a suspect, and no DNA or other physical evidence was available. The potential suspect in each case claimed to be innocent and had provided an individual—known as an alibi corroborator—who could verify his whereabouts for the time that the crime took place. Participants were also instructed to review the statement from the alibi corroborator and answer questions regarding the believability of the alibi and the suspect's guilt.

Pages three to five contained three practice scenarios to help familiarize participants with the procedure. Each of the three practice scenario pages consisted of one of the aforementioned vignettes and instructions for participants to rate, on a 9-point scale (i) the believability of the alibi (*1 = not believable at all to 9 = very believable*) and (ii) the likelihood that the suspect was guilty (*1 = definitely guilty to 9 = definitely not guilty*). Participants were also asked (iii) whether they would arrest the suspect. The sixth page informed the participants of the end of the practice scenarios and that they would now proceed to the real scenarios.

Each of the next 32 pages contained a single vignette, along with the same three dependent measure questions (note that the presentation order of the 32 vignettes were assigned randomly within the online survey). The penultimate page asked participants to describe, in as much detail as possible, how they made their decisions. The last page informed the participants that the study was now complete and thanked them for their participation.

Procedure

For the university sample, undergraduate students enrolled in an introductory psychology course registered to participate in the study through an online experiment registration system. Upon arrival at the psychology laboratory, each participant was greeted and asked to complete a consent form. They were then given instructions on how to complete the study verbally and asked if they had any questions before proceeding. Participants were taken to a private cubicle containing a desktop computer and asked to complete the study. When participants were finished the study, they were debriefed and thanked for their participation. Each student was awarded a bonus mark in his or her psychology course.

For the law enforcement student sample, an invitation regarding the study was posted on the online message board for Police Foundations and Protection, Security, and Investigations students. Interested students were asked to email the first author to receive the link to the online study. Once they contacted the first author, potential participants were emailed a link to one of the three versions of the study, an individualized access code, and basic instructions on how to complete the study. Upon completing the study, participants emailed the second author, and completion was verified by checking the individualized code. Each student was given a $10 gift card for his or her participation in the study.

For the police officers, an invitation was sent to 30 members of a CID division in a Canadian police organization via email. This invitation included a basic description of the study and instructions to click on the included link to complete the survey. A follow-up email was also sent approximately 2 weeks later. The response rate was 36.67% (11 of 30).

Coding open-ended responses
Participant's responses to the open-ended question at the end of the survey were also coded by the third author for (a) which of the five cues they mentioned relying upon when making their decisions and (b) which level of the cues they mentioned as leading to more believable alibis (e.g., child vs. adult corroborator). Each of the five cues were first coded as present or absent, and then coded for direction of the cue if it was mentioned. A research assistant, blind to the purpose of the study, also coded each participant's open-ended answer. The mean Kappa value for the coding of the open-ended responses was .75 ($SD = 0.17$), suggesting acceptable agreement between the two coders (Fleiss, 1981; Landis & Koch, 1977). Aside from the coding of direction of the saliency effect ($\kappa = .28$), all individual Kappa values were acceptable (i.e., $> .65$). Differences were resolved through discussion with the two coders and the first author.

RESULTS

Initial analyses revealed strong positive correlations between the three dependent measures for the university students (believability and guilt, $r = .74$; believability and arrest, $r = .57$; guilt and arrest, $r = .65$), police students (believability and guilt, $r = .64$; believability and arrest, $r = .48$; guilt and arrest, $r = .58$), and police officers (believability and guilt, $r = .56$; believability and arrest, $r = .52$; guilt and arrest, $r = .44$; all correlations significant at $p < .001$). Although the results for all three dependent measures are shown in Tables 1–4, to avoid redundancy in reporting and discussing the results; the remainder of the paper will focus only on the alibi believability measure. This measure was chosen as it is the one that most directly assesses the construct of interest (i.e., how people assess alibis), as it asked participants to rate the believability of the alibi itself; both the likelihood of guilt and decision to arrest may involve consideration of external factors (e.g., amount of evidence needed to arrest someone).

University student decisions

The regression analyses indicated that the university students used, on average, 1.68 cues ($SD = 0.83$, $CI = 1.47$, 1.89) when making their alibi believability ratings. The mean R^2 value for the students' final regression models was .53 ($SD = 0.25$). Looking at the regression models (i.e., decision policy) for each of the 65 university students, 4 (6.15%) of them contained no cues, 21 (32.31%) contained one cue, 32 (49.23%) contained two cues, 7 (10.77%) contained three cues, and 1 (1.54%) contained four cues. The decision policy for 57 (87.69%) of the university students had Amount as a significant predictor, 20 (30.77%) had Age, 18 (27.69%) had Relationship, 9 (13.85%) had Confidence, and 5

Table 1. Number of alibi features used in participants' decision policies as a function of dependent measure and sample

Amount of alibi features	Sample		
	University students (N=65)	Law enforcement students (N=21)	Police officers (N=11)
	Believability		
None	4 (6.15%)	4 (19.05%)	0 (0.00%)
One	21 (32.31%)	7 (33.33%)	0 (0.00%)
Two	32 (49.23%)	7 (33.33%)	5 (45.45%)
Three	7 (10.77%)	2 (9.52%)	6 (54.55%)
Four	1 (1.54%)	1 (4.76%)	0 (0.00%)
	Guilt		
None	10 (15.38%)	8 (38.10%)	3 (27.27%)
One	27 (41.54%)	8 (38.10%)	4 (36.36%)
Two	21 (32.31%)	5 (23.81%)	4 (36.36%)
Three	7 (10.77%)	0 (0.00%)	0 (0.00%)
Four	0 (0.00%)	0 (0.00%)	1 (9.09%)
	Arrest		
None	17 (26.15%)	6 (28.57%)	5 (45.45%)
One	21 (32.31%)	8 (38.10%)	3 (27.27%)
Two	23 (35.38%)	7 (33.33%)	1 (9.09%)
Three	6 (9.23%)	0 (0.00%)	2 (18.18%)
Four	0 (0.00%)	0 (0.00%)	0 (0.00%)

Note: Not a single decision policy contained five cues.

Table 2. Frequency (percentage) of participants' decision policies that contained each alibi feature for the three dependent measures

Alibi feature	Sample		
	University students (N=65)	Law enforcement students (N=21)	Police officers (N=11)
	Believability		
Amount of corroborators	57 (87.69%)	17 (80.95%)	11 (100%)
Relationship between corroborator and suspect	18 (27.69%)	7 (33.33%)	8 (72.73%)
Corroborator age	20 (30.77%)	4 (19.05%)	7 (63.64%)
Corroborator confidence in account	9 (13.85%)	2 (9.52%)	0 (0.00%)
Salience of event	5 (7.69%)	1 (4.76%)	2 (18.18%)
	Guilt		
Amount of corroborators	52 (80.00%)	12 (57.14%)	8 (72.73%)
Relationship between corroborator and suspect	12 (18.46%)	4 (19.05%)	3 (27.27%)
Corroborator age	10 (15.38%)	2 (9.52%)	0 (0.00%)
Corroborator confidence in account	7 (10.77%)	0 (0.00%)	0 (0.00%)
Salience of event	2 (3.08%)	0 (0.00%)	1 (9.09%)
	Arrest		
Amount of corroborators	47 (72.31%)	15 (71.43%)	6 (54.55%)
Relationship between corroborator and suspect	11 (16.92%)	4 (19.05%)	3 (27.27%)
Corroborator age	8 (12.31%)	2 (9.52%)	2 (18.18%)
Corroborator confidence in account	9 (13.85%)	0 (0.00%)	0 (0.00%)
Salience of event	8 (12.31%)	1 (4.76%)	0 (0.00%)

(7.69%) had Salience. Amount was the strongest predictor in 50 (76.92%) of the university students' decision policies, followed by Relationship (6 students; 9.23%), Age and Confidence (2 students each; 3.08%), and Salience (1 student, 1.54%). See Tables 1–3 for similar results using Guilt and Arrest judgments.

In terms of direction of the effect, in every case where Amount was a significant predictor, participants associated several corroborators with increased believability. For 18 of the 20 (90.00%) cases where Age was significant, participants rated adult corroborators as more believable than young corroborators. For 13 of 18 (72.22%) cases where Relationship was significant, participants rated alibis containing non-motivated corroborators as more believable than those containing motivated corroborators. For both Confidence and Salience, highly confident corroborators (eight out of nine cases; 88.89%) and mundane situations (four out of five cases; 80%) almost always led to higher believability ratings (also see Table 4 for directionality results of Guilt and Arrest measures).

Coding of the participants' responses to the open-ended question revealed the majority of university students reported using the Amount, Relationship, and Age in their decision-making process (see Table 5). Less than half of the participants reported using Salience and Confidence to make their decisions. For Amount and Relationship, all participants who mentioned the direction of the relationship said that they gave higher believability ratings when several corroborators were present in the vignette and when the corroborator was not related to the suspect. Of the 36 participants who explicitly mentioned the direction of the relationship for Age, 30 (83.33%) reported giving higher believability ratings for adult corroborators.

Law enforcement student decisions

The law enforcement students' decision policies for rating alibi believability contained, on average, 1.48 cues (SD = 1.08, CI = 0.99, 1.97). The mean R^2 value for the students' final regression models was .45 (SD = 0.30). Looking at the decision policies for each of the 21 law enforcement students, 4 (19.05%) of them did not contain any cues, 7 (33.33%) contained one cue, 7 (33.33%) contained two cues, 2 (9.52%) contained three cues, and 1 (4.76%) contained four cues. The decision policy for 17 (80.95%) of the law enforcement students had Amount as a significant predictor, 7 (33.33%) had Relationship, 4 (19.05%) had Age, 2 (9.52%) had Confidence, and 1 (4.76%) had Salience. Amount was the strongest predictor for 15 of the law enforcement students' models (71.43%), followed by Relationship and Age (one student each; 4.76%). In terms of direction of the effect, participants always gave higher believability ratings for several corroborators (Amount), non-motivated corroborators

Table 3. Strongest alibi feature in participants' decision policies as a function of dependent measure and sample

Alibi feature	Sample		
	University students (N = 65)	Law enforcement students (N = 21)	Police officers (N = 11)
	Believability		
Amount of corroborators	50 (76.92%)	15 (71.43%)	8 (72.73%)
Relationship between corroborator and suspect	6 (9.23%)	1 (4.76%)	2 (18.18%)
Corroborator age	2 (3.08%)	1 (4.76%)	1 (9.09%)
Corroborator confidence in account	2 (3.08%)	0 (0.00%)	0 (0.00%)
Salience of event	1 (1.54%)	0 (0.00%)	0 (0.00%)
	Guilt		
Amount of corroborators	49 (75.38%)	11 (52.38%)	7 (72.73%)
Relationship between corroborator and suspect	3 (4.62%)	0 (0.00%)	1 (9.09%)
Corroborator age	1 (1.54%)	2 (9.52%)	0 (0.00%)
Corroborator confidence in account	2 (3.08%)	0 (0.00%)	0 (0.00%)
Salience of event	0 (0.00%)	0 (0.00%)	0 (0.00%)
	Arrest		
Amount of corroborators	42 (64.62%)	13 (61.90%)	6 (54.55%)
Relationship between corroborator and suspect	5 (3.08%)	1 (4.76%)	0 (0.00%)
Corroborator age	0 (0.00%)	1 (4.76%)	0 (0.00%)
Corroborator confidence in account	1 (1.54%)	0 (0.00%)	0 (0.00%)
Salience of event	0 (0.00%)	0 (0.00%)	0 (0.00%)

(Relationship), adult corroborators (Age), highly confident corroborators (Confidence), and mundane situations (Salience). See Tables 1–4 for similar results using Guilt and Arrest judgments.

As can be seen in Table 5, the majority of law enforcement students reportedly used Amount, Relationship, and Age to make their decisions. Salience and Confidence were reportedly used by less than half of the participants. For Amount, Relationship, and Age, all participants who explicitly mentioned the direction of the relationship reported that they assigned higher believability ratings when several corroborators were present in the vignette, when the corroborator was unrelated to the suspect, and when the corroborator was an adult.

Police officer decisions

The police officers' decision policies for rating alibi believability contained, on average, 2.55 cues ($SD = 0.52$,

$CI = 2.20$, 2.90). The mean R^2 value for the police officers' final regression models was .74 ($SD = 0.14$). Five (45.45%) of the 11 decision policies contained two cues and 6 (54.55%) contained three cues. The decision policy for 11 (100%) of the police officers had Amount as a significant predictor, 8 (72.73%) had Relationship, 7 (63.64%) had Age, and 2 (18.18%) had Salience. Amount was the strongest predictor for eight of the police officers' models (72.73%), followed by Relationship (two officers; 18.18%) and Age (one officer; 9.09%). See Tables 1–3 for similar results using Guilt and Arrest judgments.

In terms of direction of the cues, in each case where Amount and Relationship were significant, participants rated several corroborators (Amount) and non-motivated corroborators (Relationship) as leading to more believable alibis. In six of the seven (85.71%) cases where Age was significant, participants rated adult corroborators as more believable than young corroborators. In one of the two (50.00%) cases where Salience was significant, salient situations led to higher believability ratings (also see Table 4 for directionality results of Guilt and Arrest measures).

As can be seen in Table 5, the majority of police officers reported using the Amount, Relationship, and Age factors to make decisions. Less than half of the participants reported using Salience and Confidence to judge believability. All participants who explicitly mentioned the direction of the relationship for Amount, Relationship, Age, and Confidence reported that they gave higher believability ratings when several corroborators were present in the vignette, when the corroborator was not related to the suspect, when the corroborator was an adult, and when the corroborator was highly confident.

DISCUSSION

We sought to measure the relative impact of five factors associated with corroborating person evidence (Age, Relationship, Amount, Salience, and Confidence) on assessments of alibi veracity. Our results showed that having multiple individuals available to corroborate a suspect's account was the most important element of a believable alibi. Having the corroboration provided by a stranger and an adult was, albeit to a lesser extent, also associated with alibi believability. We also found that the confidence level of the corroborator and saliency of the event tended to be ignored. Although police officers' decision policies contained more information and the officers appeared to have a greater insight into their own decision policy, the decision policies for the three groups of participants were relatively similar. Our results both confirm and contradict past findings in the alibi assessment area and contribute new knowledge to this growing area of research.

Contrary to our expectations about the strongest predictor, the number of corroborators (as revealed in the alibi corroborator's statement) was the most influential piece of information. Collapsing across the three samples, we found that almost 90% of participants relied upon the number of corroborators to judge the believability of an alibi, and it was the strongest predictor in decision policies for approximately

Table 4. The direction of the alibi feature as a function of dependent measure and sample

Alibi feature direction	Sample		
	University students (N = 65)	Law enforcement students (N = 21)	Police officers (N = 11)
	Believability		
Amount of corroborators			
Several corroborators	57 (100%)	17 (100%)	11 (100%)
One corroborator	0 (0.00%)	0 (0.00%)	0 (0.00%)
Relationship between corroborator and suspect			
Stranger	13 (72.22%)	7 (100%)	8 (100%)
Family member	5 (27.78%)	0 (0.00%)	0 (0.00%)
Corroborator age			
Child	2 (10.00%)	0 (100%)	1 (14.29%)
Adult	18 (90.00%)	4 (0.00%)	6 (85.71%)
Corroborator confidence in account			
High	8 (88.89%)	2 (100%)	0 (0.00%)
Low	1 (11.11%)	0 (0.00%)	0 (0.00%)
Salience of event			
Unique	1 (20%)	1 (100%)	1 (50.00%)
Mundane	4 (80%)	0 (0.00%)	1 (50.00%)
	Guilt		
Amount of corroborators			
Several corroborators	51 (98.08%)	12 (100%)	8 (100%)
One corroborator	1 (1.92%)	0 (0.00%)	0 (0.00%)
Relationship between corroborator and suspect			
Stranger	7 (58.33%)	4 (100%)	3 (100%)
Family member	5 (41.67%)	0 (0.00%)	0 (0.00%)
Corroborator age			
Child	0 (0.00%)	1 (50.00%)	0 (0.00%)
Adult	10 (100%)	1 (50.00%)	0 (0.00%)
Corroborator confidence in account			
High	5 (71.43%)	0 (0.00%)	0 (0.00%)
Low	2 (28.57%)	0 (0.00%)	0 (0.00%)
Salience of event			
Unique	0 (0.00%)	0 (0.00%)	1 (100%)
Mundane	2 (100%)	0 (0.00%)	0 (0.00%)
	Arrest		
Amount of corroborators			
Several corroborators	46 (97.87%)	15 (100%)	6 (100%)
One corroborator	1 (2.13%)	0 (0.00%)	0 (0.00%)
Relationship between corroborator and suspect			
Stranger	9 (81.82%)	4 (100%)	3 (100%)
Family member	2 (18.18%)	0 (0.00%)	0 (0.00%)
Corroborator age			
Child	0 (0.00%)	0 (0.00%)	0 (0.00%)
Adult	8 (100%)	2 (100%)	2 (100%)
Corroborator confidence in account			
High	5 (55.56%)	0 (0.00%)	0 (0.00%)
Low	4 (44.44%)	0 (0.00%)	0 (0.00%)
Salience of event			
Unique	0 (0.00%)	0 (0.00%)	0 (0.00%)
Mundane	8 (100%)	1 (100%)	0 (0.00%)

Note: For each participant's decision policy, alibi feature directionality was coded according to whether it increased alibi believability, decreased likelihood of guilt, and decreased willingness to arrest. For example, if a decision policy contained Amount on the alibi believability measure, and 'several corroborators' was associated with higher believability ratings and 'one corroborator' was associated with lower believability ratings, it was coded as several corroborators. See the corresponding cell in Table 2 for the denominator used to calculate the percentage occurrence.

75% of participants. As put simply by one participant, 'the more ACs, the better the alibi was'. Although we hypothesized that having several corroborators would be associated with an increase in the believability of an alibi, the almost exclusive reliance on the number of corroborators was somewhat surprising. Although at least one past study has shown that having multiple corroborators is an important element of a believable alibi (Dysart & Strange, 2012), others have

Table 5. Frequency (percentage) of participants' open-ended responses that contained each alibi feature

	Sample		
Alibi feature	University students (*N* = 65)	Law enforcement students (*N* = 21)	Police officers (*N* = 11)
Amount of corroborators	58 (89.23%)	16 (76.19%)	8 (72.73%)
Relationship between corroborator and suspect	54 (83.08%)	17 (80.95%)	8 (72.73%)
Corroborator age	54 (83.08%)	16 (76.19%)	7 (63.64%)
Corroborator confidence in account	18 (27.69%)	3 (14.29%)	3 (27.27%)
Salience of event	26 (40.00%)	5 (23.81%)	0 (0.00%)

Note: One police officer did not respond to the open-ended invitation.

argued that the quantity of alibi witnesses is not as important as the quality of the alibi (Sullivan, 1971), and there are instances where individuals have been convicted despite having a large group of alibi corroborators (Culhane & Hosch, 2004; Innocence Project, 2010). One possible explanation for our finding is that people struggle to reason that several corroborators could be mistaken about seeing the suspect during the material time frame. Alternatively, people may find it very unlikely that multiple corroborators would all independently be willing and/or able to fabricate similar statements. Regardless of the whether it is due to assumptions about memory or deception—or some a combination of both—having several alibi corroborators may be more important than previously thought in terms of providing a believable alibi.

In line with our hypothesis, the relationship between the suspect and the corroborator was contained in many decision policies. Specifically, non-motivated alibi corroborators (i.e., strangers) were related to higher believability rating than motivated corroborators (i.e., family members). This finding was particularly strong for the police officers, where almost 75% of them used this feature of the alibi corroborator's statement; approximately 30% of students' decision policies contained this feature. The finding that strangers who provide corroborating testimony are much more believable than family members or close friends is consistent with past research that has used both investigator and jury paradigms (e.g., Culhane & Hosch, 2004; Olson & Wells, 2004). As suggested in the open-ended responses, this effect may have been due to a presumed willingness to lie for a family member. For instance, examples of participant's answers include the following: 'most of the other ACs were related to the suspect so I know they would be lying for their own family member'; 'I feel if the AC is related to the suspect the more likely it is that he or she will be covering up the suspect'; and 'If the AC was family, I inherently did not trust them as much, as families will lie to protect one of their own' (also see Hosch et al., 2011). Although the corroborator's relationship with the suspect was present in many decision strategies —and almost exclusively in the expected direction when

present—these results also suggest that it is not as strong a predictor as previously believed.

Many decision policies also contained the age of the corroborating witness; the presence of age in the policies ranged from approximately 30% for law enforcement students to 65% for police officers. More interestingly, however, is the finding that 90% of participants who used this feature viewed adult corroborators as more believable than child corroborators. This finding was unexpected because it is in direct contrast to Dahl and Price's (2012) finding that corroboration from a child was more credible than an adult. As outlined by Dahl and Price, differences between child and adult witnesses fall broadly along two dimensions: perceived honesty (whereby children are typically seen less likely to lie) and perceived cognitive competency (whereby children are typically seen as having less ability to perceive and report events accurately). Although the reasoning behind participant responses was not assessed in their study, Dahl and Price reasoned that honesty in an alibi witness is more important than cognitive competency. Our results suggest that alibi assessors may not be employing this reasoning.

An explanation for the discrepancy between our results and Dahl and Price's (2012) results can perhaps be found in the participants' open-ended responses. Several participants mentioned that children are inherently more likely to be honest. For instance, some comments were as follows: 'children as AC are less likely to think of lying…are more likely to speak the truth about what they see' and 'children, while we could expect them to be honest'. In addition, many participants were concerned with the reliability of their memory: 'children aren't so perceptive of both time and location of things'; 'if the person was younger, then they may not have an awareness of time'; and 'the younger the AC made it harder to believe because children tend to…not fully remember events properly'. Beyond the inherent honesty and cognitive competency dimensions, however, participants in our study appeared to be concerned about the potential for younger witnesses to be swayed easily by those involved in the situation—particularly when they were related. For instance, some participants' comments were that 'children are often easily convinced to lie for their parents, but could also be swayed by a stranger'; 'children can easily be manipulated to say anything especially if it's to protect parents'; and 'I strongly believe that kids, especially that young, can be manipulated into saying anything'. Our findings, therefore, suggest that there may be a third dimension related to believability—the increased vulnerability of younger witnesses to outside influences. Although more research on this feature is needed, the relationship between the age of the corroborator and the believability of their testimony appears less clear than thought originally.

The confidence of the corroborator and saliency of the event did not have a substantive impact on decisions; approximately 10% of participants used either of these features. Our finding that confidence was largely unrelated to believability ratings runs counter to most eyewitness research findings where the confidence of an eyewitness is a major contributor to believability ratings (Cutler et al., 1990). However, it is consistent with the Allison et al. (2014) finding that confidence was related to perceptions of

the corroborator but failed to have an effect on the overall rating of alibi believability. The fact that confidence did not reliably predict believability ratings may be due to the fact that alibis, and those that provide and support them, are often treated with a high level of skepticism (see Olson & Wells, 2004). Moreover, the subjective ratings of confidence on the part of the corroborator appear to be relatively less important than objective facts of the case (e.g., was the corroborator related to the suspect and was the corroborator the only person willing to support the alibi).

The infrequent use of saliency—and in the unexpected direction when it was used—may arise from misconceptions about how memory works. For instance, research showed that people often have the erroneous belief that human memory functions like a video camera whereby memories can be recalled and reviewed verbatim at a later date (Simons & Chabris, 2011). An alternative explanation is that participants were concerned with the elements of the alibi that made it more or less likely to be intentionally true (e.g., family member lying for suspect and multiple independent witnesses corroborating account) rather than an unintentional memory error (e.g., alibi witness confusing the date and date that they saw the suspect).

The broad pattern of results was similar across the three different samples (i.e., three different levels of investigative experience/knowledge) with respect to the relative importance of the five features of an alibi corroborator's statement. However, two important differences emerged between the police officers and the students. First, the police officers' decision policies contained almost one additional feature than the students' decision policies—which corresponded to the much higher usage of the relationship and age factors by the police officers. Second, the police officers were much more accurate in terms of reporting the features of the alibi corroborator's statement that they used to reach their decisions. For example, approximately 80% of the students reported using age and relationship; however, results of the policy-capturing analysis showed that only around a third of participants' decision policies contained these features. Such a finding suggests that police officers, perhaps because of their direct investigative experience with the alibi assessment process, both incorporate more information into their decisions and have more insight into how they actually make such decisions. It is also an illustration of the care needed when interpreting peoples' self-reported decision strategies, as previous research has shown consistently that people are not always accurate judges of their own decision process and decision accuracy levels (e.g., Eastwood & Snook, 2010).

There was a strong positive correlation between the three dependent measures for all three samples, and similar trends across the measures can also be seen throughout the data presented in Tables 1–4 (e.g., Amount was clearly the strongest predictor regardless of sample or dependent measure). The one major difference that occurred across measures, however, was that fewer features were contained in the decision policies for the guilt and arrest measures as compared with the believability measure—suggesting that participants were relying more on the features contained in the vignettes when judging alibi believability as compared with likelihood of guilt and whether they would arrest the suspect. Based on

the participants' open-ended responses, this difference appears to be due to a perceived need for more external information before making guilt and arrest decisions. For example, some participants indicated the following: 'It was difficult to make the decisions as there was not enough information available to formulate grounds for an arrest'; 'It is difficult to make your decision of guilt based on eyewitness testimony alone'; and 'the information provided is not enough to decide whether or not to arrest somebody'. By contrast, alibi believability related only the content of the information provided in the vignette, and therefore, participants could make these judgments independent of the context of the overall investigation. Given that the goal of the paper was to measure the alibi assessment process, alibi believability would arguably be the most direct measure of this construct, which is why we chose to focus on it. Future research may also want to assess the impact of alibis—varying in believability—in investigations that differ in terms of external cases details (e.g., strong vs. weak physical evidence against a suspect).

There are at least five aspects of our study that limit the generalizability of our results. First, our vignettes have low ecological validity because they are unable to present many non-verbal cues present in real-world situations that may moderate assessment decisions. Second, we only used a single crime type (i.e., armed robbery) and single type of evidence of guilt (i.e., eyewitness person evidence)—the use of different crime types and evidence may produce different results. Third, the sample sizes were relatively small, particularly for the police officer sample. Having said that, one benefit of the policy-capturing approach is that each participant makes many decisions, and therefore, meaningful results can be obtained from a smaller sample (Aiman-Smith et al., 2002). Furthermore, the same broad pattern of results was observed across the three samples, which strengthens the generalizability of the findings. Fourth, we did not directly measure the amount of investigative knowledge in our participants, and therefore, we cannot state with certainty that meaningful differences exist between the samples. Lastly, the length of the task may have led to fatigue and boredom on the part of participants, particularly toward the end of the survey. However, the 32 vignettes used falls well below the recommended threshold for policy-capturing studies of 50–80 (see Aiman-Smith et al., 2002), and the order of vignettes was randomized so there should not be any systematic effects of fatigue or boredom on the results.

Past research on the creation of alibis has shown that, when asked to provide corroborating evidence, people struggle to produce anything beyond a single motivated other. For example, Culhane et al. (2008) found that only 25% of their sample could provide at least two alibi witness, and only 15% of the alibi witnesses provided would be considered non-motivated (also see Culhane et al., 2013, for similar results). However, given our findings related to the factors of amount and relationship, this type of alibi corroboration is what leads an alibi to be viewed with disbelief. Of particular concern is that innocent individuals may find themselves providing an alibi that has a low probability of being believed. At the very least, our findings suggest that police officers should be made aware of the difficulty of being able to create a highly believable alibi to ensure that the wrong

assumptions are not made at the outset of an investigation (see, for example, Olson & Wells, 2004).

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