Detecting smugglers:

Identifying strategies and behaviours in individuals in possession of illicit objects

Samantha Mann¹

Haneen Deeb

Aldert Vrij

Lorraine Hope

Lavinia Pontigia

Department of Psychology, University of Portsmouth (UK)

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Abstract

Behaviour Detection Officers' task is to spot potential criminals in public spaces, but scientific research concerning what to look for is scarce. In two experiments, 52 (Experiment 1A) and 60 (Experiment 2A) participants carried out a mission involving a ferry-crossing. Half were asked to smuggle an object; the other half were non-smugglers. In Experiment 2A, two confederates appeared to approach as if looking for someone on the ferry. Smugglers, more than non-smugglers, reported afterwards to have felt nervous, self-conscious and conspicuous and to attempt behavioural control during the ferry-crossing. The secretly videotaped ferry-crossings were shown to 104 (Experiment 1B) and 120 (Experiment 2B) observers, tasked to identify the smugglers. Although they reported paying attention mostly to signs of nervousness, lie detection accuracy rate was poor (48% in Experiment 1 and 39.2%

Correspondence concerning this article should be addressed to: Dr Samantha Mann, University of Portsmouth, Department of Psychology, King Henry Building, King Henry 1 Street, Portsmouth, PO1 2DY, UK, or via e-mail: samantha.mann@port.ac.uk.

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in Experiment 2), because their perceptions of nervousness did not match the experiences of nervousness reported by the (non)smugglers.

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A rise in security threats has resulted in Behaviour Detection Officers (BDOs) being deployed in public spaces around the world. The presence of BDOs is typically not made public and BDOs often operate in an undercover capacity. Their task is to spot potential criminals in public spaces such as airports, train stations, ferries, shopping malls, music venues and sports stadiums. The US Government Accountability Office (2017) reviewed the evidence behind a program used by the US Transportation Security Administration (TSA) for spotting possible criminals at US airports. This review concluded that the TSA has no evidence that most of the indicators used to identify potential criminals at airports are actually effective for that purpose. Practitioners often erroneously associate signs of nervousness with deception (Strömwall, Granhag, & Hartwig, 2004; Vrij & Granhag, 2007; Vrij, Hartwig, & Granhag, 2019) but research suggests such signs are not diagnostic of deceit (DePaulo et al., 2003).

The problem faced by agencies who wish to deploy BDOs is that scientific research relevant to this specific domain is virtually non-existent (Meijer, Verschuere, & Merckelbach, 2018; Ormerod & Dando, 2015; Wijn, van der Kleij, Kallen, Stekkinger, & de Vries, 2017). In contexts where BDOs are active (e.g. transportation hubs, busy public locations or high profile events), they have little choice other than to observe someone's behaviour. We are not aware of any published peer-reviewed research on what behaviours BDOs are trained to look for or what behaviours may be informative with respect to potential wrongdoing in this context (Vrij, Hartwig, & Granhag, 2019). Nonverbal behaviour has been typically examined

in interview contexts where interviewees sit down and talk to interviewers (Vrij, Hartwig, & Granhag, 2019). This does not resemble the contexts in which BDOs are deployed. The work by Wijn and colleagues most closely resemble BDO activities (Wijn, van der Kley, Kallen, Stekkinger, & de Vries, 2017). In their two experiments, participants carried either a legal or illegal package from one point to another. These missions were videotaped and shown to observers. However, most participants carried out their mission while being instructed to conduct a mental task (e.g., to memorise a locker number) which made the task for participants somewhat unnatural. In addition, they measured participants' psychological processes (anxiety, self-focus, inhibitory control and perception that one's state is salient to others) but not participants' strategies, self-reported experiences and behaviours, as we did in our experiments. More research has been carried out observing people in the build-up phase prior to committing a criminal act (e.g., baggage thefts in a large crowd of people, Koller, Wetter, & Hofer, 2015; aggressive acts on streets, Troscianko et al., 2004). That research, in which participants carried out actions (e.g., finding a theft target), is not comparable to our research in which participants merely were instructed to stay unnoticed while smuggling an object during a ferry crossing.

We conducted two experiments in which participants carried out a mission involving a ferry-crossing. In each study half of the participants were asked to smuggle an illicit object; the other half were non-smugglers. We investigated participants' psychological processes (feeling nervous, attempting to control behaviour, feeling self-conscious, feeling conspicuous), their strategies to avoid detection (e.g., avoided thinking about the task) and their self-reported experiences and behaviours (e.g., trying to blend in) during the task (Experiment 1A). We also examined whether the personality trait neuroticism affected the results. We secretly videotaped the participants on the ferry and showed these videotapes to observers to test their ability to detect illicit activity (Experiment 1B). Experiments 2A and

2B were similar to Experiments 1A and 1B. The main difference was that in Experiment 2A, two confederates approached each participant as if they were looking for someone on the ferry. We tested whether this intervention improved observers' ability to detect illicit activity.

Deception research has shown that, compared to truth tellers, liars (i) are more nervous, (ii) seek to avoid displaying behaviours that raise suspicion, and (iii) are more conscious of themselves and their own behaviour (Vrij, 2008; Vrij, Hartwig, & Granhag, 2019). We expect that smugglers experience similar psychological processes as liars, despite at least one important difference between liars and smugglers (Wijn et al., 2017). During an interaction (such as an interview), liars are aware that they are being observed and scrutinised, which is not necessarily the case for smugglers. However, smugglers are likely vulnerable to the spotlight effect – a tendency to believe they are being noticed more than they really are (Gilovich, Medvec, & Savitsky, 2000). The spotlight effect is underpinned by people's tendency to self-focus (Brown & Stopa, 2007) and overestimate the extent to which they are likely to be the focus of another person's attention (Gilovich et al., 2000). This self-focus and subsequent spotlight effect becomes stronger when someone carries out activities they would rather keep to themselves (Gilovich, Savitsky, & Medvec, 1998) or activities they think may attract the attention of others (Gilovich et al., 2000). Given these tendencies, we predicted that smugglers, compared to non-smugglers, would report that they were more nervous (Hypothesis 1), had a stronger tendency to control their behaviour (Hypothesis 2) and felt more self-conscious (Hypothesis 3). We also predicted that smugglers, more than non-smugglers, would report feeling more conspicuous which would be characterised as the spotlight effect; Hypothesis 4).

Individual differences may exist in such psychological processes. For instance, individuals high in neuroticism are more likely than average to experience feelings such as anxiety, nervousness, sadness and tension (John, Naumann, & Soto, 2008). They are likely to

experience such feelings regardless the situation. If so, experiencing anxiety or nervousness would be positively correlated with neuroticism in both smuggling and non-smuggling conditions (Hypothesis 5).

Smugglers were also questioned about the strategies and behaviours they used to attempt to avoid detection. Would there be a dominant strategy and dominant set of behaviours? Or would it widely differ amongst smugglers? The former outcome would make the task for BDOs easier than the latter, because in the latter situation there is no specific strategy or behaviour for BDOs to rely upon. We report these findings in an exploratory analysis together with their relationship with neuroticism.

Experiment 1A: Method

Participants

Participants were recruited via the university intranet. Fifty-two students and staff (23 male and 29 female) took part in the Experiment. Their average age was $M = 27.01$ years ($SD = 9.88$).

Design

Every participant smuggled an object on one of their two ferry crossings. Smuggling was thus a within-subject variable. Half of the participants smuggled on the first ferry route (Route A) and half of the participants on the second ferry route (Route B). Smuggling Route was thus a between-subject variable. Participants were videotaped only on ferry route A.

To test Hypotheses 1 to 3, a mixed design MANOVA was conducted with Smuggling (Yes or No) as the within-subject variable, Smuggling Route (A or B) as the between-subject variable, and nervousness, behavioural control and self-consciousness as the dependent variables. To test Hypothesis 4, a McNemar test was conducted to compare the proportion of participants who reported that they felt conspicuous when they were smuggling and not smuggling. To test Hypothesis 5, two-tailed Pearson correlational analyses were conducted

between the personality trait neuroticism and self-reported level of nervousness for the two smuggling conditions separately.

In the exploratory analyses, frequency coding was carried out on the strategies the participants reported when they smuggled. Finally, McNemar tests were conducted to compare the proportion of participants' self-reported experiences and behaviours when they were smuggling and not smuggling.

Procedure

The Experiment was advertised on the University intranet. Participants were informed that the Experiment would involve taking part in a mission around City X, which may involve smuggling something, and would also require a short boat trip to City Y. Twenty-seven participants smuggled on the way to City Y (Smuggling Route A). The remainder ($n = 25$) smuggled on the return journey having been given the impression on the way over that they would not be smuggling at all (Smuggling Route B). In other words, we used a within-subjects design in which each participant was smuggling once during the return trip on the ferry.

Participants took part individually. On arrival at their designated session, the experimenter told the participant that their mission today would be to travel over to City Y and back to the department and that they may or may not be asked to smuggle something during this mission. Participants were further told that they may be filmed at some point in the mission, and that they would need to use a ferry to reach City Y.

Each participant then completed a pre-interview questionnaire, which asked for participant age and gender. Participants were also asked to complete the Big Five Inventory (Goldberg, 1990; John & Srivastava, 1999; McCrae & Costa, 1987), where participants rated 44 items on 5-point scales (John, Donahue, & Kentle, 1991). We only report the findings

related to neuroticism. The findings related to the other personality traits, which overwhelmingly showed non-significant results, appear in the Supplementary Materials.

Participants were then given the instructions for their mission. They were randomly allocated to smuggling routes A or B. The experimenter instructed Smuggling Route A participants to walk from the Department to the ferry (approximately a 10-min walk), where they were scheduled to take the (specific time) crossing (they were given a map with instructions of how to get there). They were given a mobile phone so that they could stay in contact with the experimenter. Participants were also given a laptop in a discreet black laptop bag. They were told that the laptop contained photos of a sensitive nature, and could result in the dismissal of a staff member if leaked. They were asked to smuggle the laptop with them and to deliver it to a specific contact on the other side of the ferry crossing. Information was then given about how to meet the contact, whose location depended on the weather conditions of the day. Participants were instructed to give the laptop to the contact and that they would then be provided with instructions for their return. Participants were informed that there would be people on the ferry on the lookout for someone smuggling a laptop. They were told that those people did not know who they are looking for but would be looking out for someone who was behaving suspiciously. Participants were advised to blend into the crowd and not appear in any way suspicious.

Participants allocated to Smuggling Route B were also given a mobile phone but not the laptop. They were told they would not be smuggling anything with them and were simply instructed to take the ferry to City Y and meet the contact person.

Once participants were clear about their instructions, they then set off on the mission, with (Smuggling Route A) or without (Smuggling Route B) the laptop, a map and instructions of the meeting place, and a mobile phone for contacting the experimenter in an emergency. The experimenter then informed three confederates that the participant was en route, and gave

a brief description of what they were wearing so that the confederates could identify them.

The experimenter was also able to track the participant via the 'Find my Friends' app on the mobile phone they had been given so that the experimenter could check where the participant was and update the confederates.

Confederate 1 was dressed as a cyclist with bike and helmet with a mounted Go-Pro camera. Confederate 2 was dressed in everyday clothes and posed as the cyclist's friend. Confederates 1 and 2 waited at the ferry terminal in the queue for the ferry, casually talking amongst themselves and once they had identified the participant, followed them onto the ferry. The confederates sat close to wherever the participant chose to sit and surreptitiously filmed the participant via the helmet-mounted camera (the helmet was placed on the cyclist's lap). Tape was placed over the camera light to ensure the participant did not notice that the device was recording. All participants were filmed only on the way to City Y (Smuggle Route A), hence half of participants were recorded whilst smuggling ($n = 26$) and half when not smuggling ($n = 26$). Confederates 1 and 2 returned on a different ferry to the participant so as not to alert suspicion. Confederates 1 and 2 did well in remaining undetected. Although 20 of 52 participants mentioned noticing them (not surprisingly since they sat close to the participants), only seven participants realised that they were being filmed.

Once the participant arrived at the meeting place, Confederate 3 approached him/her. Confederate 3 told participants in Smuggling Route A that the mission was completed, took the laptop from them and informed them that they should return to the department using the ferry again. Participants in Smuggling Route B were now given a laptop and similar instructions as participants in Smuggling Route A were given by the experimenter prior to their smuggle mission. The only difference in their mission was that they had to deliver the laptop to the experimenter in the department (rather than to a contact at the ferry terminal). None of the participants were filmed on Smuggle Route B.

Participants returned to the department where they were met by the experimenter, who then interviewed them about their strategies, experiences and behaviours during the mission (see Appendix 1 for question schedule). Interviews were audio-recorded.

Participants then completed a post-interview questionnaire about their mission in which they were asked to indicate for both the trip to and from City Y how nervous they were, the extent to which they tried to control their behaviour and how self-conscious they were of their behaviour while completing their mission. Answers were given on 7-point Likert scales ranging from [1] not at all to [7] extremely. Participants were then debriefed, paid £20 and thanked for their participation. Each session took 1.5 to 2 hours.

Coding

After the interviews were transcribed, the transcripts were examined and a bottom-up form of coding was carried out whereby similar comments made were grouped together and categorised accordingly. Broadly speaking these pertained to use devices, emotions, non-verbal behaviours the participants claimed to have exhibited or avoided, how they felt about their task and how they adapted to their surroundings and other people. For example, comments referring to whether the participant was actively looking at other people, or avoiding eye contact with everyone; whether they chose seating based on avoiding people, or chose a seat to admire the view; whether they switched on a device as a tactic, or for other reasons (checking emails or social media) were all grouped together. This resulted in 42 codes to interview content that did not specifically relate to the smuggling or non-smuggling elements of the mission (e.g., whether they altered their route to or from the ferry to avoid being followed), 82 codes that related to the smuggling boat trip and 60 codes pertaining to the non-smuggling boat trip. We included in the analyses only experiences and behaviours that were reported by 20% or more of smugglers (i.e., by at least 10 smugglers). There were 16 reported experiences / behaviours that met these criteria. We also included four

experiences / behaviours that were reported by fewer than 10 smugglers, but that were reported significantly more by one group than by the other group (all four were reported more by smugglers than non-smugglers). Once the 20 coding categories were identified, all of the interviews were then coded for the presence or absence of these categories.

A second coder, blind to the actual status (smuggler or non-smuggler) of the participant, coded the interviews of a random sample of 15 participants. The inter-rater reliability between the two coders was very good, with Kappa's ranging from .86 to 1.00, see Table 3.

The first coder identified twelve strategies the participants said they had carried out to stay unnoticed while smuggling. These were based on the information the participant provided in the interview whereby he or she claimed to have deliberately carried out a behaviour or tactic in order to avoid detection, for example listening to music or looking bored. A second coder also coded these strategies in the interviews of a random sample of 15 participants. The inter-rater reliability between the two coders was very good, with Kappa's ranging from .86 to 1.00, see Table 2.

Experiment 1A: Results

Hypotheses-testing

A mixed design MANOVA was conducted with Smuggling (Yes or No) as the within-subject variable, Smuggling Route (A or B) as the between-subject variable, and nervousness, behavioural control and self-consciousness as the dependent variables. At a multivariate level, a significant main effect for Smuggling emerged, Wilk's $\Lambda = .45$, $F(3, 48) = 19.48$, $p < .001$, $\eta_p^2 = .55$. The Smuggle Route main effect, Wilk's $\Lambda = .87$, $F(3, 48) = 2.49$, $p = .071$, $\eta_p^2 = .14$, and the Smuggling x Smuggling Route interaction effect, Wilk's $\Lambda = .95$, $F(3, 48) = 0.83$, $p = .486$, $\eta_p^2 = .05$, were not significant. At a univariate level, significant main effects for Smuggling emerged for all three dependent variables, with participants reporting feeling more

nervous, attempting more behavioural control and experiencing increased self-consciousness when smuggling than when not smuggling, see Table 1. These results support Hypotheses 1 to 3. The d -values show that although all three effects were substantial, the difference in nervousness was somewhat less pronounced than the differences in behavioural control and self-consciousness¹.

Table 1 about here

To test Hypothesis 4, a McNemar test was conducted to compare the proportion of participants who reported that they felt conspicuous when they were smuggling and not smuggling. A total of nine (out of 52) participants reported to have felt conspicuous on both the smuggling and non-smuggling routes. A further 22 participants reported to have felt conspicuous only when smuggling, whereas four participants reported to have felt conspicuous only when not smuggling. This difference is significant, $X^2(1, N = 52) = 11.12$, $p < .001$, odds ratio = 5.50, which supports Hypothesis 4.

To test Hypothesis 5, two-tailed Pearson correlational analyses were conducted between the personality trait neuroticism and self-reported level of nervousness for the two smuggling conditions separately. Neuroticism was positively correlated with nervousness in the smuggling, $r(52) = .41$, $p = .002$ and non-smuggling $r(52) = .29$, $p = .040$ conditions, supporting Hypothesis 5.

Exploratory Analyses

A total of 12 different strategies were reported across participants when they smuggled the laptop. The most frequently mentioned strategies were *tried to act normal* ($n = 31$), *chose relevant seating position* ($n = 21$), *used phone functions* ($n = 14$), *looked around and at people* ($n = 13$), and *avoided thinking about the task* ($n = 13$).

Table 2 about here

McNemar tests were conducted to compare the proportion of participants' self-reported experiences and behaviours when they were smuggling and not smuggling. Table 3 shows that more experiences and behaviours were reported when smuggling than when not smuggling. In particular, the proportions of smugglers who reported (i) trying to blend in, (ii) worrying about being approached, (iii) not feeling anxious, (iv) looking out for certain types of people, (v) avoiding looking at people, (vi) seat selection being motivated by the task, (vii) sitting in a hidden location, (viii) focusing on surroundings, (ix) listening to music and (x) using their phone for calling, texting etc. were significantly higher than the proportions of non-smugglers reporting the same behaviours.

Table 3 about here

Experiment 1A: Discussion

As we predicted in Hypotheses 1 to 3, when smuggling, participants reported feeling more nervous and self-conscious and believed they tried to control their behaviour more than when not smuggling. In addition, more participants experienced feeling conspicuous when smuggling than when not smuggling, which suggests the presence of the spotlight effect amongst smugglers (Hypothesis 4). These findings replicate those of Wijn and colleagues (2017, Study 2), who also measured these psychological processes. Self-reported nervousness correlated with neuroticism such that higher scores on neuroticism correlated with greater nervousness – for both smugglers and non-smugglers, supporting Hypothesis 5.

The difference in self-reported nervousness between smuggling and not smuggling events was large (with Cohen's $d = 0.73$), but the differences in self-reported feelings of self-consciousness ($d = 1.02$) and controlling behaviour ($d = 0.95$) between smuggling and not smuggling events were similar. This may come as a surprise to many, because people – laypersons and professionals alike - typically mostly associate nervousness with lying (Strömwall, Granhag, & Hartwig, 2004; Vrij, Akehurst, & Knight, 2006; Vrij & Granhag, 2007).

Observers therefore may not look for all diagnostic cues that smugglers display if they employ a lie detection strategy based on nervousness when they attempt to detect smugglers. Also, when employing such a strategy, individuals who score high on neuroticism may have an increased chance of being suspected of smuggling, regardless of whether they are actually smuggling or not. We examined this in Experiment 1B.

Participants mentioned twelve different strategies they attempted to deploy to avoid detection when smuggling. This high number of reported strategies suggest variability in how individuals might attempt to evade detection in this context. The most frequently mentioned strategy was 'trying to act normal'. This is actually difficult to achieve. People are typically not aware of their normal behaviours, many of which occur at an unconscious level (DePaulo & Kirkendol, 1989; Vrij, 2008). When people start thinking about behaving normally, they may become self-conscious and their behaviour may become unnatural, similar to what happens when some people have their photograph taken (DePaulo & Kirkendol, 1989). Since people typically do not know how they behave normally, they tend to do something else which is likely to include trying to avoid behaviours that they believe come across as suspicious and display behaviours they believe make an honest impression (Hocking & Leathers, 1980; Mann et al., 2012; Vrij, Hartwig, & Granhag, 2019).

Feeling like a normal commuter or student was the most frequent reported feeling when smuggling (26 out of 52 participants mentioned it). If they actually had achieved behaving like a normal commuter or student, they would be successful smugglers, something we examined in Experiment 1B. Almost half of participants (24 out of 52) reported that they avoided looking at people when smuggling. This was the most frequently reported behaviour and participants achieved this in different ways, for instance, by focusing on their surroundings, listening to music or using a phone.

The large number of different strategies, experiences and behaviours reported by the smugglers suggests that typical smuggling behaviour is not readily quantified. This inevitably makes the task of detecting smugglers more difficult, because it would appear there is not a specific target behaviour or demeanour which might be used consistently to identify them.

Experiment 1B

In Experiment 1B we showed the videotaped ferry crossings of the participants in Experiment 1A to a sample of naïve observers to examine their ability to distinguish smugglers from non-smugglers. Lie detection research consistently demonstrates poor ability to detect deceit amongst observers when they rely on the behaviour or speech of a target. A comprehensive meta-analysis, including 206 documents and almost 25,000 observers (Bond & DePaulo, 2006), showed that, on average, 54% of observer judgments were correct, a performance rate just better than chance (50%). Lie detection research typically distinguishes between contexts in which the observers can only see the target person (resembling the task for BDOs), can only hear the target person, or can see and hear the target person. Bond and DePaulo's (2006) meta-analysis showed that when observers could only see the target person, they performed worse (52% accuracy) than when they could only hear the target person (63%), with an accuracy rate between those two scores (56%) when they could both see and hear the target person. Since the observers in Experiment 1B could only see the target person (reflecting the situation BDOs typically face), we predicted accuracy rates around chance level (Hypothesis 6).

We asked the observers to complete a questionnaire about their impressions of the target persons in terms of whether they perceived that they were feeling nervous, controlling their behaviour and feeling self-conscious. As people overwhelmingly associate nervousness with lying (Strömwall, Granhag, & Hartwig, 2004), we predicted that an observer's decision to judge the target person as a smuggler (yes or no) would be positively correlated with

perceiving the target person as being nervous or showing nervous behaviours (Hypothesis 7). If the observers' impressions of the target persons feeling nervous, controlling their behaviour and feeling self-conscious were to be accurate and match the target persons' actual experiences, smugglers should be judged as feeling more nervous, controlling their behaviour more and feeling more self-conscious than non-smugglers. However, such a match assumes an accurate insight from observers in target persons' experiences. Such insight is generally thought to be poor, which also explains the typically low accuracy in lie detection found in deception studies (Granhag & Hartwig, 2008).

Finally, we explored the relationship between observers' judgement of the smuggle status of the target person (smuggler or non-smuggler) with the self-reported level of neuroticism of the target persons. Neuroticism was associated with feeling nervous in Experiment 1A, and since people associate nervousness with lying, neuroticism could be positively correlated with the observers' decision to judge him/her as a smuggler. However, observers' poor insight into target persons' experiences raises doubts about such a positive relationship.

Experiment 1B: Method

Participants

Participants were recruited via the university intranet on the proviso that they had not taken part in Experiment 1A. One hundred and four students and staff took part in the Experiment of whom 38 were male and 66 female. Participant age ranged between 18 and 60 years ($M = 27.28$ years, $SD = 9.97$).

Design

One factor was introduced in Experiment 1B: The veracity status of the target person to be judged by the observers (smuggler or non-smuggler). Accuracy rates (whether or not the

observer judged the veracity status of the target person correctly) were calculated. Whether these accuracy scores differed from chance was examined with binomial tests (Hypothesis 6).

In addition, a MANOVA was carried out with the target person's veracity status (Smuggler or non-smuggler) as the independent variable and the perception of the target individual's behaviour in terms of feeling nervous, controlling behaviour and feeling self-conscious as the dependent variables.

To test Hypothesis 7, Spearman correlations were carried out between the decision to judge the target person as a smuggler (yes or no) and the perception of the target individual's behaviour in terms of feeling nervous, controlling behaviour and feeling self-conscious. A binary logistic regression (forced entry method) was conducted to determine the extent to which perceived behaviours predicted smuggling. Finally, Spearman correlations were carried out between the target persons' self-reported level of neuroticism in Experiment 1A and the observers' (i) decision whether or not to judge the target person as a smuggler in Experiment 1B and (ii) accuracy in that decision.

Procedure

Preparation of Stimulus Material. The video footage of all 52 target participants in Experiment 1A (Smuggling Route A) was edited so that it started from when a clear view was obtained of the participant and ended as s/he left to disembark the ferry. All other passengers' faces were pixelated out by a technical expert so as to render them unrecognisable. The quality of the video footage did vary somewhat, depending on how close the confederates were discreetly able to get to the participant. The length of the video clips varied between approximately one and a half to seven minutes, dependent on how long it took the participant to settle and the confederates to get a good shot, with an average length of about five minutes.

Smuggling Detection Task. The Experiment was advertised on the University intranet under the heading 'spotting a smuggler – smuggle detection task – could you do the

job of a customs officer?’ Participant observers were informed that the Experiment would involve watching a digital recording and answering some questions about the person in that particular clip, which would take up to 20 minutes and for which they would be paid £5. After signing the consent form and completing some basic demographic and motivation-related questionnaires, observers received information about the task. They were informed that they would see a secretly recorded video clip of someone who had taken part in a previous Experiment where some people (but not others) had been asked to smuggle an illicit object on board a ferry. Observers were informed that their task was to detect whether the target individual was engaged in smuggling and answer a number of questions about their behaviour.

Each observer watched one video clip of one target person and each target person was seen by two observers. Thus, in total 104 observers were recruited to watch the 52 target persons. As 26 target persons were smuggling and 26 were not in Smuggling Route A, 52 observers watched a smuggler and 52 observers watched a non-smuggler.

Before the task commenced, observers completed questions concerning gender and age, level of motivation to do well in the task (on a 5-point scale ranging from [1] not at all motivated to [5] very motivated) and expected level of performance (on a 5-point scale ranging from [1] not at all well to [5] very well). They were then invited to look at the post-task questions in the questionnaire before watching the clip so that they were aware of what they were to be asked about the clip. After watching the video clip, observers completed the post-task questionnaire where they were asked to indicate whether or not the target person was engaged in smuggling (dichotomous response option: yes or no). Observers were also asked to rate their impression of the target in terms of nervousness, controlling behaviour and feeling self-conscious on 11 items/dimensions using a 7-point Likert scales; see Table 4.

After completing the post-task section of the questionnaire, participants were informed whether or not they were accurate in their judgement, debriefed, thanked and paid £5.

Experiment 1B: Results

Pre-task Questionnaire Measures

On the 5-point scales, participants reported that they were generally motivated to perform well on the task ($M = 4.41$, $SD = 0.57$, 95% CI [4.30, 4.52]) and that they believed they would perform well on the task ($M = 3.67$, $SD = 0.65$, 95% CI [3.55, 3.80]).

Hypotheses-testing

Accuracy. Fifty participants (48%) were accurate in determining the smuggling status of the target person (smuggler or non-smuggler). A binomial test indicated that this proportion was not significantly different from chance, $p = .769$, which supports Hypothesis 6. Of the 52 participants who observed smugglers, 22 of them (42.3%) made accurate decisions, which does not significantly differ from chance, $p = .332$. Similarly, of the 52 participants who observed non-smugglers, 28 (53.8%) made accurate decisions, which also does not significantly differ from chance, $p = .678$. A one-sample chi-square test revealed that there was not a significant association between accuracy and smuggling status, $\chi^2(1, N = 104) = 0.72$, $p = .396$.

A MANOVA was carried out with the target person's veracity status (smuggler or non-smuggler) as the independent variable and the perception of the target individual's behaviour in terms of feeling nervous, controlling behaviour and feeling self-conscious as the dependent variables (see Table 4). The multivariate analysis was not significant, Wilk's $\Lambda = .91$, $F(11, 92) = 0.79$, $p = .645$, $\eta_p^2 = .09$. Even at a univariate level none of the eleven effects were significant, all F 's < 3.69 , all p 's $> .057$. In other words, although participants in Experiment 1A reported being more nervous, controlling their behaviour more and to be more

self-conscious when smuggling, smugglers were not perceived as exhibiting these behaviours according to the observers.

Reasons for Decision-making. The finding that observers did not perceive smugglers as more nervous, controlling their behaviour more or being more self-conscious, does not rule out that their decision making was still associated with their perceptions of these issues, as we predicted in Hypothesis 7. Spearman correlations were carried out between the decision to judge the target person as a smuggler (yes or no) and the eleven items listed in Table 4. The decision that the target person was smuggling was positively correlated with the impression that s/he was nervous (nervous, fidgety, tense, and displaying a tense posture), controlling their behaviour (trying to avoid being noticed) and self-conscious (the target was aware of people around and self-conscious). The results for nervousness are the most pronounced: All four items related to nervousness were significant and resulted in the four strongest correlations (with the item 'nervous' obtaining the strongest correlation of all 11 items).

A binary logistic regression (forced entry method) was conducted to determine the extent to which perceived behaviours predicted smuggling judgement. The model was statistically significant, $\chi^2(11, N = 104) = 72.67, p < .001$, and explained 67% (Nagelkerke R^2) of the variance. Targets who were rated as nervous, $B = 1.28$, Wald's $\chi^2(1) = 11.17, p = .001$, were 3.60 times more likely to be classified as smugglers than non-smugglers, 95% CI [1.70, 7.64]. Also, targets who were perceived to be fidgety, $B = 0.57$, Wald's $\chi^2(1) = 5.31, p = .021$, were 1.76 times more likely to be classified as smugglers than non-smugglers, 95% CI [1.09, 2.84]. Similarly, targets who tried to avoid being noticed, $B = 0.63$, Wald's $\chi^2(1) = 6.69, p = .010$, were 1.88 times more likely to be judged as smugglers, 95% CI [1.17, 3.03]. This supports Hypothesis 7.

Table 4 about here

Spearman correlations were carried out between the target persons' self-reported level of neuroticism in Experiment 1A and the observers' (i) decision whether or not to judge the target person as a smuggler in Experiment 1B and (ii) accuracy in that decision. The two correlations were not significant, $r(104) = .22, p = .111$ and $r(104) = -.01, p = .930$.

Experiment 1B: Discussion

Observers were unable to distinguish smugglers from non-smugglers above the level of chance. This finding is consistent with lie detection research (Bond & DePaulo, 2006) and was also found by Wijn et al. (2017, see also Meijer, Verschuere and Merckelbach, 2017). It shows that judging deception based on someone's behaviour is error-prone. Despite being inaccurate, observers had clear views about who they thought was smuggling and who they thought was not. The data suggest that targets were most likely to be identified as smugglers if they appeared to be controlling their behaviour or self-conscious, but particularly if they appeared nervous. The observers' perceptions of target persons' nervousness did not seem to match with the target persons' self-reported levels of nervousness or neuroticism in Experiment 1A. This finding is advantageous for individuals scoring high on neuroticism. Although they consider themselves to be more nervous than average individuals, they are not perceived as smugglers more than average individuals.

Methodological consideration

In a typical lie detection Experiment, close-ups of target persons are provided such that behaviours such as eye movements, hand/finger movements or facial expressions can be observed (Vrij, 2008). The quality of much of our video footage was not sufficient enough for this type of coding (see the supplementary materials) as we were recording covertly and could not record target persons in close-up formats. However, in real life BDOs often are not in a position to observe targets at a close-up range either so this feature does not necessarily impact on the applicability of our findings

Experiment 2

The findings of Studies 1A and 1B combined show the limitation of the ‘liars are nervous and can thus be detected by examining signs of nervousness’ approach, which is popular amongst practitioners (Vrij, Hartwig, & Granhag, 2019; Vrij, Akehurst, & Knight, 2006; Vrij & Granhag, 2007). Participants reported that they felt more nervous when smuggling than when not smuggling (Experiment 1A) and observers said they paid attention to signs of nervousness (Experiment 1B). Yet, reporting feelings of nervousness when smuggling (Experiment 1A) was unrelated to being judged as a smuggler and observers were unable to identify the smugglers above chance levels (Experiment 1B). Either smugglers in Experiment 1A did not display overt signs of nervousness or the observers in Experiment 1B looked at the wrong signs when paying attention for signs of nervousness. Whatever the reason, paying attention to alleged signs of nervousness proved ineffective for the detection of smugglers.

Realising the difficulty in accurately detecting lies, deception researchers started to examine whether differences between truth tellers and liars could be enhanced or elicited through the use of specific protocols (Vrij & Granhag, 2012). Further, realising the error-proneness of lie detection based on relying on signs of nervousness, research has started to focus on signs other than those signalling to nervousness, such as differences in strategies to appear convincing employed by truth tellers and liars. Various interview protocols are now available using strategic questioning techniques that facilitate lie detection. Examples are Assessment Criteria Indicative of Deception (Colwell, Hiscock-Anisman, & Fede, 2013), Cognitive Credibility Assessment (Vrij, Fisher, & Blank, 2017), the Strategic Use of Evidence (Hartwig, Granhag, & Luke, 2014), and the Verifiability Approach (Nahari, 2018). These protocols focus on speech related differences between truth tellers and liars and are therefore unsuitable for BDOs, but we believe that a similar approach, using interventions that

enhance differences in reactions between smugglers and non-smugglers, is required to provide BDOs with an opportunity to detect smugglers in public spaces.

One observation made in Experiment 1A provides a potential opportunity for such an intervention: Participants reported feeling more conspicuous when smuggling than non-smuggling. Therefore, one possible intervention might be to capitalise on this feeling of ‘standing out’ reported by smugglers. In Experiment 2A we introduced such an intervention by introducing two confederates who gave the impression of looking for someone. From an applied perspective, this may reflect what might happen in the real world in a search for someone. From a psychological perspective, such an intervention probably disrupts the usual schema of a boat trip and may result in the smuggler thinking that the spotlight is indeed on him or her. As a result, as in Experiment 1A, we expected smugglers, compared to non-smugglers, to report feeling more nervous, controlling their behaviour more, feeling more self-conscious and feeling more conspicuous (Hypothesis 1).

Experiment 2B was a lie detection Experiment using videos of smuggling and non-smuggling targets who experienced the disruptive intervention in Experiment 2A. Based on the findings of Studies 1A and 1B but also on the finding that liars typically believe that nervous behaviours look suspicious and therefore try to avoid displaying signs of nervousness (Hocking & Leathers, 1980; Vrij, 2008; Vrij, Hartwig & Granhag, 2019), we did not expect them to be perceived being more nervous. However, if smugglers felt more conspicuous than non-smugglers, they may have been more motivated than non-smugglers to ‘act normal’. Increased efforts to act normal often result in rigid displays of behaviour (DePaulo & Kirkendol, 1989), which may become apparent to observers (Hypothesis 2). Such behavioural displays may be perceived as suspicious by observers, which would mean that they will be able to distinguish truth tellers from liars above chance level (Hypothesis 3). As in Experiment 1B we predicted that an observer’s decision to judge the target person as a

smuggler (yes or no) would be positively correlated with perceiving the target person as being nervous or showing nervous behaviours (Hypothesis 4).

Experiment 2A: Method

Participants

Sixty participants (19 males and 41 females), who did not take part in Studies 1A and 1B, took part in the Experiment as smugglers or non-smugglers. Their average age was $M = 25.02$ ($SD = 7.96$).

Design

One factor was manipulated in Experiment 2A: Smuggling. Half of the participants did smuggle, whereas the other half did not. Smuggling was thus a between-subjects factor.

To test Hypothesis 1, a MANOVA was carried out with Smuggling (Yes or No) as between-subjects factor and the self-reported nervousness, behavioural control, self-consciousness and feeling conspicuous as the dependent variables. In an exploratory analysis, a multivariate analysis of variance was carried out with Smuggling (Yes or No) as between-subjects factor and the two variables fidgeting and gaze behaviour as the dependent variables.

Procedure

The Experiment was advertised on the University intranet. Participants were informed that the Experiment would involve taking part in a mission around City X, which may involve smuggling something, and would also require a short boat trip to City Y. Thirty participants smuggled on the way to City Y (smugglers). The remainder ($n = 30$) made the same trip but were not asked to smuggle anything (non-smugglers).

Participants took part individually. On arrival at their designated session, the experimenter told the participants that their mission today would be to travel over to City Y and back to the department and that they may or may not be asked to smuggle something during this mission. Participants were further told that they may be filmed at some point in the

mission, and that they would need to use a ferry to reach City Y. Their age and gender were recorded.

The mission as well as the instructions given to the participants were almost identical to the mission and instructions of Experiment 1A. The only difference was what participants were asked to smuggle. Instead of a laptop containing incriminating files (Experiment 1A), smuggling participants were given some currency to smuggle in an envelope, the contents of which they were shown (Russian, Korean and Egyptian currency). Once participants set off on the mission, the experimenter informed five confederates that the participant was en route and gave a brief description of what they were wearing so that the confederates could identify them. The participants were given a mobile phone to contact the experimenter if needed. Through the 'Find my Friends' app on the mobile phone the experimenter could check where the participant was and update the confederates.

The roles of Confederates 1 and 2 was identical as in Experiment 1A. They filmed the participants on the way to City Y. The mean for noticing being filmed was $M = 3.63$ ($SD = 2.58$) on a 7-point Likert scale, with no difference between smugglers and non-smugglers, $F(1, 58) = .81, p = .373, d = .23, 95\%CI [-.28, .74]$. Once filming had commenced, Confederates 3 and 4 were introduced. They were dressed in every day clothes. They entered the area where the participant was and conspicuously looked around as if searching for someone, occasionally referring to their mobile phones as if they are trying to find a person matching a picture on their phones. Then they obviously 'notice' the participant and have a brief discussion amongst themselves. Then whilst Confederate 3 stayed in place, Confederate 4 walked closer to the participant as if s/he was about to approach him/her, but instead walked on past and then stopped as if to take a look from another angle. The confederates stayed in this position for up to about a minute before walking away from this area together.

Confederates 3 and 4 were instructed that if the participant got up and moved during this intervention they should not pursue him/her.

As in Experiment 1A, when the participant arrived at the meeting place, another confederate (in this Experiment Confederate 5) approached him/her. Confederate 5 told participants in the Smuggling group that the mission was completed, took the currency from them and informed them that they should return to the department using the ferry again. Participants in the Non-Smuggling group were also told that their mission was over and to return to the experimenter. No participants were filmed on the return trip.

Participants returned to the department where they completed a post-interview questionnaire about their mission in which they were asked to indicate for the trip to City Y how nervous they were, the extent to which they tried to control their behaviour, how self-conscious they were of their behaviour and how conspicuous they felt. Answers to these questions were given on 7-point Likert scales ranging from [1] not at all to [7] extremely. They were also asked whether they noticed someone filming them on the way to City Y on a Likert scale ranging from [1] not at all to [7] I am certain. Finally they were asked to what extent they thought they had (1) fidgeted (defined as ‘moved about in your seat, touched your face or hair, jiggled feet, fiddled with your belongings etc.’) and (2) looked at other people and made eye contact with them while travelling to City Y. Answers were given on 7-point Likert scales ranging from [1] not at all to [7] a lot. We chose fidgeting and gaze behaviour because these are the two behaviours people mostly associated with nervousness (Vrij, 2008). Participants were then debriefed, paid £20, and thanked for their participation. Each session took 1.5 to 2 hours.

Experiment 2A: Results

Hypotheses-testing

A MANOVA with Smuggling (Yes or No) as between-subjects factor and the four variables listed in Table 5 as the dependent variables revealed a significant multivariate effect, Wilk's $\Lambda = 0.81$, $F(4, 55) = 3.13$, $p = .022$, $\eta_p^2 = .19$. Univariate analyses revealed that smugglers reported, significantly more than non-smugglers, that they were nervous, controlled their behaviour, were self-conscious and felt conspicuous, supporting Hypothesis 1, see Table 5.

Exploratory Analyses

A multivariate analysis of variance with Smuggling (Yes or No) as between-subjects factor and the two variables fidgeting and gaze behaviour as the dependent variables revealed no significant multivariate effect, Wilk's $\Lambda = 0.96$, $F(2, 57) = 1.05$, $p = .355$, $\eta_p^2 = .04$. Neither of the two univariate effects were significant either, both F 's < 1.85 , both p 's $> .179$. In other words, in terms of self-reported fidgeting and gaze behaviour, smugglers and non-smugglers reported having behaved similarly.

Table 5 about here

Experiment 2B: Method

Participants

A total of 120 participants took part (24 males, 96 females) on the proviso that they had not taken part in Studies 1A, 1B and 2A. Their average age was $M = 25.28$ ($SD = 10.43$).

Design

One factor was introduced in Experiment 2B: The veracity status of the target person to be judged by the observers (smuggler or non-smuggler). Accuracy scores (whether or not the observer judged the status of the target person correctly) were calculated. The same analyses were carried out as in Experiment 1B.

Procedure

Preparation of Stimulus Material. The video footage of all 60 target participants in Experiment 2A on their way to City Y was edited so that it started from when a clear view was obtained of the participant and ended as s/he left to disembark the ferry. All other passengers' faces were pixelated out by a technical expert so as to render them unrecognisable. The quality of the video footage did vary somewhat, depending on how close the confederates were discreetly able to get to the participant. The length of the video clips varied between approximately one and a half to seven minutes, dependent on how long it took the participant to settle and the confederates to get a good shot, with an average length of about five minutes.

Smuggling Detection Task. The same recruitment procedure was used as in Experiment 1B. After signing their consent, participants were given written information explaining about the footage they were about to witness, including about the two people who would approach and stand by the target person. Participants were then given a questionnaire asking them about their gender and age, level of motivation to do well in the task (on a 5-point scale ranging from [1] not at all motivated to [5] very motivated) and expected level of performance (on a 5-point scale ranging from [1] not at all well to [5] very well). Each observer watched one video clip of one target person and each target person was seen by two observers. Thus, in total 120 observers were recruited to watch the 60 target persons. As 30 target persons were smuggling and 30 were not, 60 observers watched a smuggler and 60 observers watched a non-smuggler. Participants were invited to look at the post-task questions in the questionnaire before watching the clip so that they were aware of what they were to be asked about the clip. After watching the video clip, the observer completed the post-task questionnaire. The observer was asked whether or not the person was smuggling (dichotomous scale: yes or no). Observers were also asked to rate their impression of the target in terms of nervousness, controlling behaviour and feeling self-conscious on 11

items/dimensions using a 7-point Likert scales ranging from [1] definitely not to [7] definitely; see Table 6.

After completing the post-task section of the questionnaire, participants were informed whether or not they were accurate in their judgement, debriefed, thanked and paid £5.

Experiment 2B: Results

Pre-task Questionnaire Measures

On the 5-point scales, participants reported that they were generally motivated to perform well on the task ($M = 4.28$, $SD = 0.66$) and that they believed they would perform well on the task ($M = 3.71$, $SD = 0.83$).

Hypotheses-testing

Accuracy. Forty-seven participants (39.2%) were accurate in determining the smuggling status of the target person (smuggler or non-smuggler). A binomial test indicated that this proportion was significantly below chance level, $p = .017$. Of the 60 participants who observed smugglers, 22 of them (36.7%) made accurate decisions, which was significantly below chance level, $p = .038$. Of the 60 participants who observed non-smugglers, 25 (41.67%) made accurate decisions, which does not significantly differ from chance, $p = .199$. A one-sample chi-square test revealed that there was not a significant association between accuracy and smuggling status, $\chi^2(1, N = 160) = 0.32$, $p = .575$. Thus, this finding does not support Hypothesis 3.

A MANOVA was conducted with Smuggling (Yes or No) as between-subjects factor and the 15 impressions of the target person listed in Table 6 as dependent variables. At a multivariate level, a significant main effect for Smuggling emerged, Wilk's $\Lambda = .79$, $F(15, 104) = 1.81$, $p < .042$, $\eta_p^2 = .21$. At a univariate level, five significant findings emerged, presented in bold in Table 6. All four variables related to nervousness were significant. Smugglers were perceived to be less nervous, less tense and having a less tense posture than

non-smugglers and were also seen as less fidgety than non-smugglers. In other words, although smugglers reported being more nervous than non-smugglers (Table 5), they were perceived as less tense by observers (Table 6). The fifth significant univariate effect indicated that the non-smugglers were seen as more self-conscious when they were approached by the confederates than the smugglers. As smugglers did not make the impression of controlling themselves more than non-smugglers, Hypothesis 2 was rejected.

Reasons for Decision-making. Spearman correlations were conducted between observers' decision to judge the target as a smuggler (or not) and their impressions of the target. The decision that the target person was smuggling was positively correlated with the impression that s/he was nervous, trying to avoid being noticed and being self-conscious, see Table 7.

A binary logistic regression was conducted using a forced entry method to test the probability of these items predicting smuggling judgement. The model was statistically significant, $\chi^2(15, N = 120) = 82.05, p < .001$, and explained 66% (Nagelkerke R^2) of the variance. Targets who were rated as nervous, $B = 0.71$, Wald's $\chi^2(1) = 5.51, p = .019$, were 2.02 times more likely to be classified as smugglers than non-smugglers, 95% CI [1.12, 3.65]. Also, targets who were viewed as self-conscious, $B = 0.61$, Wald's $\chi^2(1) = 6.10, p = .014$, were 1.85 times more likely to be classified as smugglers, 95% CI [1.14, 3.00]. This supports Hypothesis 4.

Table 7 about here

Experiment 2 Discussion

Although smugglers, more than non-smugglers, reported that they were nervous, controlling their behaviour, self-conscious and felt conspicuous, they did not make such impressions on observers. In fact, the opposite occurred and smugglers were perceived as less nervous and less self-conscious than non-smugglers. Observers' accuracy rate in

discriminating between truth tellers and liars was below chance level. This could have been the result of smugglers appearing less nervous than non-smugglers, because observers' decision to judge a target as a smuggler was mostly based on the nervous impression the target made. The findings in Experiment 2 thus highlight the problems associated with relying on signs of nervousness when attempting to detect deceit.

That smugglers were detected below chance level rather than (as predicted) above the level of chance, could have been caused by our intervention. We hypothesised that it would prompt smugglers to display signs of controlling their behaviour. This did not happen according to the observers. However, the finding that smugglers came across as less nervous than non-smugglers despite reporting to have felt more nervous, suggests that smugglers may have displayed some kind of behavioural control. That is, they may have suppressed displaying nervous behaviours without showing, to our observers at least, overt signs of controlling their behaviour.

General Discussion

In two studies, we examined smugglers' psychological processes, strategies, experiences and behaviours and observers' ability to detect their duplicitous activities. Smugglers reported different psychological processes than non-smugglers and, specifically, reported having been more nervous, that they tried to control their behaviour more, were more self-conscious and felt more conspicuous. Despite this, observers were not able to detect smugglers above chance levels. The main obstacle for observers was that they apparently mainly relied on their impressions of the target being nervous, but that these impressions were not related to the actual levels of nervousness the targets reported. The discrepancy between actual nervousness reported by targets and their nervousness perceived by observers was most striking in Experiment 2 where smugglers came across as being less nervous than non-

smugglers despite reporting that they had been more nervous than non-smugglers while completing the task.

The two studies thus highlight the problems of relying on signs of nervousness when attempting to detect deceit, an important finding given the reliance of practitioners on signs of nervousness. It further suggests that any type of intervention that highlights that someone is being observed and hence perhaps feeling threatened could be problematic. It may result in increased feelings of nervousness in both smugglers and non-smugglers, but smugglers may be more likely than non-smugglers to suppress their overt signs of feeling nervous and, consequently, come across as being less nervous than non-smugglers. This merits further attention in research using an experimental design that includes a control condition in which no intervention takes place. This also merits further research into more subtle interventions aimed at giving smugglers but not non-smugglers the impression of being observed. If non-smugglers do not think that they are observed, there is no reason for them to feel nervous and to come across as nervous to observers. The spotlight effect experienced by smugglers should make it, in theory, possible to design such a more subtle intervention.

Methodological considerations

Three methodological issues merit discussion. First, the stakes (positive consequences to succeed and negative consequences of getting caught) in our studies were clearly not as high as in real life. Ethical constraints in laboratory studies prevent researchers from introducing high or personally consequential stakes in research of this type. Different levels of stakes may affect smugglers' experiences and behaviours. For example, although smugglers felt clearly more nervous than non-smugglers in our studies (medium effect sizes in both studies ($d = .73$ in Experiment 1 and $d = .62$ in Experiment 2)), they may feel even more nervous in real life when the stakes are higher, because stakes and feeling nervous are positively correlated (Ekman, 1985; O'Sullivan, Frank, Hurley, & Tiwana, 2009). Increasing

stakes, however, may not automatically result in observers being able to identify smugglers. It will only occur if nervous smugglers come across as being nervous to observers. This was not the case in the present two studies and may not occur in high-stakes situations either. What happens in high-stakes situations is a question that merits further investigation.

The second limitation is our choice of observers. They were students and personnel working at a university who can be considered laypersons in detecting deception rather than professionals. However, lie detection research has shown striking similarities when laypersons and professionals are used as observers: They typically obtain similar accuracy rates in lie detection (Bond & DePaulo, 2006) and have the same beliefs about what behaviours are associated with deception (typically nervous behaviours, Strömwall, Granhag, & Hartwig, 2004). In other words, deception research does not suggest that the findings would be different if we had used professionals rather than laypersons. However, this is a question that merits further investigation, perhaps even more so because studies in which experts and laypersons watched CCTV footage of the build-up to criminal or non-criminal acts, showed that, under special circumstances, professionals were better than laypersons at distinguishing between the criminal and non-criminal acts (Koller, Wetter, & Hofer, 2016; Wijn, van der Berg, & Lousberg, 2013).

Third, we ran several statistical tests across experiments to explore the new questions posited by the current research which may have reduced statistical power. Nonetheless, statistical power was high for the main analyses as can be determined from the power analyses and the large effect sizes obtained (Lakens, 2013). Overall, our findings should be interpreted with caution as we attempted a novel research inquiry that involved several exploratory analyses, which we hope will be informative for future research.

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Availability of data

The data that support the findings of this study are available from the corresponding author upon reasonable request.

¹ Posthoc power analyses were conducted via G*Power software for the main analyses in the four experiments. With a large effect size of $f = 0.5$ and an alpha level of 0.05, statistical power was high for Experiments 1A (0.84) and 2A (0.86) and almost perfect for Experiments 1B (0.99) and 2B (0.94).

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Accepted Article

SMUGGLERS IN A PUBLIC SPACE

Table 1
Descriptive and Inferential Statistics of Self-Reported Nervousness, Behavioural Control and Self-Consciousness as a Function of Smuggling and Smuggling Route: Experiment 1A

Measure	Smugglers		Non-Smugglers		<i>F</i>	<i>P</i>	<i>d</i> [95% CI]
	<i>(n = 52)</i>		<i>(n = 52)</i>				
	<i>M (SD)</i>	95% CI	<i>M (SD)</i>	95% CI			
Nervousness	3.19 (1.76)	[2.70, 3.68]	2.02 (1.46)	[1.61, 2.43]	21.05	<.001	0.73 [0.42, 1.04]
Behavioural Control	4.19 (2.00)	[3.64, 4.75]	2.44 (1.72)	[1.96, 2.92]	52.35	<.001	0.95 [0.59, 1.30]
Self-Consciousness	4.60 (1.97)	[4.05, 5.15]	2.65 (1.88)	[2.13, 3.18]	51.10	<.001	1.02 [0.66, 1.39]

Table 2

Frequency of Reported Strategies when Smuggling: Experiment 1A

Strategy	Kappa	Frequency
Tried to act normal	1.00	31
Chose relevant seating position	0.86	21
Used phone functions	1.00	14
Looked around and at people	1.00	13
Avoided thinking about the task		13
Tried to look like a commuter or bored	1.00	9
Tried to look inconspicuous or blend in	1.00	8
Tried to remain calm and relaxed	1.00	8
Listened to music	1.00	7
Did the same thing both journeys	1.00	5
(Pretended to) talk on the phone		2
Took photos		2
Read a book		1

Note. Not all Kappas could be calculated because some behaviours did not occur in the subsample used for interrater reliability coding

Table 3

Descriptive and Inferential Statistics for Reported Experiences and Behaviours when Smuggling or when Not Smuggling: Experiment 1A

	Kappa κ	Smugglers	Non-Smugglers	McNemar's Test Statistic	p	Odds Ratio
<i>Experiences</i>						
Felt noticed	.89	20 (14)	15 (9)	0.70	.404	1.56
If noticed, that would be because of laptop	1.00	13 (10)	7 (4)	1.79	.182	2.50
Felt noticed as felt people were watching	.86	11 (10)	9 (8)	0.06	.814	1.25
Did not feel people watching	1.00	16 (10)	15 (9)	0.00	1.00	1.11
Tried to look inconspicuous and blend in	1.00	8 (6)	2 (0)	4.17	.041	Infinity
Felt like a normal commuter or student	1.00	26 (11)	20 (5)	1.56	.212	2.2
Worried about being approached	1.00	8 (7)	1 (0)	5.14	.024	Infinity
Did not feel anxious	1.00	7 (6)	1 (0)	4.17	.041	Infinity
<i>Behaviours</i>						
Looked for something I saw	1.00	17 (15)	9 (7)	2.23	.136	2.14
Looked for people looking for me	1.00	18 (14)	10 (6)	2.45	.118	2.33
Looked for certain types of people	1.00	10 (6)	4 (0)	4.17	.041	Infinity
Avoided looking at people	.87	24 (17)	8 (1)	12.5	<.001	17.00
Tried to behave same as normal	1.00	12 (9)	5 (2)	3.27	.070	4.50
Seat selection was motivated by task	.86	20 (20)	0 (0)	18.05	<.001	Infinity
Sat hidden	1.00	6 (6)	0 (0)	4.17	.041	Infinity
Sat inside	1.00	10 (6)	7 (3)	0.44	.504	2.00
Sat upstairs	1.00	11 (7)	8 (4)	0.36	.546	1.75
Focused on surroundings	1.00	19 (16)	8 (5)	4.76	.030	3.20
Listened to music on Ipod or phone	1.00	13 (9)	5 (1)	4.90	.026	9.00
Used phone for texting/internet/games/calling someone	1.00	19 (14)	7 (2)	7.56	.006	7.00

Note. Items in bold are significant ($p < .05$).

The frequencies between brackets are used for the McNemar analyses. To explain, for ‘felt noticed’ (first row), 20 smugglers and 15 non-smugglers felt noticed. Six of these participants felt noticed both when smuggling and not smuggling. McNemar tests exclude these since it tests those that uniquely experience the event in each condition. Hence, among the 20 smugglers, 14 participants uniquely felt noticed when smuggling (they did not feel noticed when not smuggling), and nine uniquely felt noticed only when they did not smuggle. The odds ratio is $14/9 = 1.56$

Table 4

Spearman Correlations between Observer's Perceptions of Target's Behaviour and Observer's Decision to Judge the Target as a Smuggler: Experiment 1B

Observer's Perceptions of Target's Behaviour	<i>R</i> (<i>p</i>)
<i>Nervousness</i>	
Felt nervous	.67 (<.001)
Fidgeted	.46 (<.001)
Felt tense	.52 (<.001)
Displayed tense posture	.52 (<.001)
<i>Behavioural control</i>	
Focused on task	.18 (.068)
Moved about	.14 (.175)
Chose to be among others	.06 (.546)
Tried to avoid being noticed	.45 (<.001)
<i>Self-consciousness</i>	
Noticed being filmed	.18 (.065)
Was aware of people around	.26 (.009)
Felt self-conscious	.42 (<.001)

Table 5

Descriptive and Inferential Statistics of Self-Reported Nervousness, Behavioural Control, Self-Consciousness and Feeling Conspicuous as a Function of Smuggling: Experiment 2A

Measure	Smugglers		Non-Smugglers		<i>F</i>	<i>p</i>	<i>d</i> [95% CI]	
	<i>(n = 30)</i>		<i>(n = 30)</i>					
	<i>M (SD)</i>	95% CI	<i>M (SD)</i>	95% CI				
Felt nervous	2.93 (1.66)	(2.40,3.47)	2.03 (1.22)	(1.50,2.57)	5.74	.020	0.62	[0.10, 1.14]
Behavioural control	4.50 (2.18)	(3.75,5.25)	2.60 (1.94)	(1.85,3.35)	12.73	.001	0.92	[0.39, 1.45]
Self-Consciousness	4.43 (2.18)	(3.68,5.19)	3.03 (1.94)	(2.28,3.79)	6.92	.011	0.68	[0.16, 1.20]
Felt conspicuous	3.60 (2.13)	(2.89,4.31)	2.43 (1.74)	(1.72,3.14)	5.42	.023	0.60	[0.08, 1.12]

Table 6

Descriptive and Inferential Statistics of Observers' Perceived Indicators of Nervousness, Behavioural Control and Self-Consciousness as a Function of Target's Smuggling: Experiment 2B

Measure	Observing smugglers (<i>n</i> = 60)		Observing non-smugglers (<i>n</i> = 60)		<i>F</i>	<i>p</i>	<i>d</i> [95% CI]
	<i>M</i> (<i>SD</i>)	95% CI	<i>M</i> (<i>SD</i>)	95% CI			
<i>Nervousness</i>							
Felt nervous	3.20 (1.78)	(2.77,3.63)	4.22 (1.61)	(3.78,4.65)	10.77	.001	0.60 [0.23,0.96]
Fidgeted	3.20 (1.81)	(2.74,3.66)	4.30 (1.78)	(3.84,4.76)	11.27	.001	0.61 [0.24,0.97]
Felt tense	3.15 (1.90)	(2.69,3.61)	4.40 (1.72)	(3.94,4.86)	14.25	<.001	0.69 [0.31,1.05]
Displayed tense posture	3.23 (1.76)	(2.78,3.69)	4.13 (1.78)	(3.68,4.59)	7.76	.006	0.51 [0.14,0.86]
<i>Behavioural control</i>							
Focused on task	4.78 (1.75)	(4.39,5.19)	4.87 (1.41)	(4.46,5.27)	0.08	.774	0.06 [-.30,0.41]
Moved about	1.78 (1.65)	(1.42,2.15)	1.50 (1.20)	(1.13,1.87)	1.16	.284	0.23 [-.13,0.59]
Chose to be among others	2.85 (1.67)	(2.44,3.26)	2.73 (1.57)	(2.32,3.15)	0.16	.694	0.07 [-.29,.043]
Tried to avoid being noticed by confederates	3.68 (1.94)	(3.21,4.16)	4.23 (1.79)	(3.84,4.79)	3.45	.066	0.29 [-.07,0.65]
Tried to avoid being noticed by others	3.88 (1.94)	(3.40,4.37)	4.15 (1.85)	(3.66,4.64)	0.59	.444	0.14 [-.22,0.50]
<i>Self-consciousness</i>							
Noticed being filmed	3.20 (2.17)	(2.68,3.72)	3.12 (1.87)	(2.60,3.63)	.051	.822	.04 [-.32,.040]
Was aware of two confederates when approached	4.70 (2.16)	(4.19,5.21)	5.37 (1.82)	(4.86,5.88)	3.34	.070	.36 [0.00,0.72]
Was aware of people around	4.78 (1.72)	(4.39,5.18)	5.18 (1.37)	(4.79,5.58)	1.98	.161	.26 [-.11,0.61]
Paid attention to confederates when being approached by them	4.55 (1.66)	(4.06,5.04)	5.20 (1.91)	(4.71,5.70)	3.38	.068	.36 [0.00,0.72]
Being self-conscious when approached by confederates	4.45 (2.10)	(3.97,4.93)	5.45 (1.66)	(4.97,5.93)	8.35	.005	0.53 [0.16,0.88]
Being self-conscious in general	3.57 (1.84)	(3.12,4.02)	4.15 (1.67)	(3.70,4.60)	3.31	.072	0.33 [-.04,0.69]

Table 7

Spearman Correlations between Observer's Perceptions of Target's Behaviour and Observer's Decision to Judge the Target as a Smuggler: Experiment 2B

Measure	<i>r</i> (<i>p</i>)
<i>Nervousness</i>	
Felt nervous	.62 (< .001)
Fidgeted	.39 (< .001)
Felt tense	.53 (< .001)
Displayed tense posture	.48 (< .001)
<i>Behavioural control</i>	
Focused on task	.22 (.018)
Moved about	.10 (.284)
Chose to be among others	-.20 (.028)
Tried to avoid being noticed by confederates	.45 (< .001)
Tried to avoid being noticed by others	.44 (< .001)
<i>Self-consciousness</i>	
Noticed being filmed	-.01 (.877)
Was aware of two confederates when approached	.25 (.005)
Was aware of people around	.27 (.003)
Paid attention to confederates when being approached by them	.36 (< .001)
Being self-conscious when approached by confederates	.40 (< .001)
Being self-conscious in general	.56 (< .001)

Appendix 1. The interview protocol.

1. In as much detail as possible, please tell me what went through your mind on the ferry to City Y?
2. In as much detail as possible, please now tell me what went through your mind on the ferry back from City Y?
3. Do you think that you were noticed on the boat on the particular crossing when you were smuggling?
4. Do you think that you were noticed on the boat on the particular crossing when you were not smuggling?
5. Regardless of whether you believe you were noticed, do you think that you showed any behaviours on the ferry that could have given away that you were smuggling?
6. What strategies did you use to avoid being noticed on the ferry crossing when smuggling?
7. Did you feel conspicuous on the ferry crossing when *not* smuggling?
8. Did you feel conspicuous on the ferry crossing when smuggling?
9. Did you look around for anything/anyone specific on the ferry back from City Y? If so, what or who?