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Dishonest Behaviour in Ambiguous Tasks: The Interplay between Effort and Competence

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Abstract

Ambiguous tasks present information that is subject to varying interpretations. Extensive research suggests that ambiguous tasks may lead to dishonest behaviour in various contexts (e.g. claiming back expenses or setting project deadlines), because individuals interpret the information in self-serving ways. Despite "effort" and "competence" potentially helping to disambiguate tasks, and thus deter dishonest behaviour, no research to date has investigated their role in this context. This paper presents a novel experimental design investigating dishonest behaviour in settings involving ambiguous tasks. We explore how both the effort required to disambiguate a task and individual competence impact dishonest behaviour. In Study 1, participants resolved an ambiguous task and self-reported their performance, validating that ambiguity and dishonesty increase in unison. Study 2 further demonstrated that participants who exerted more effort to disambiguate information were more successful at completing the task, leading to less dishonesty. Lastly, in Study 3, we increased participants' competence in resolving ambiguity through a brief training session, which effectively reduced the effort required to disambiguate the task, leading to a subsequent decrease in dishonest behaviour. Overall, our results suggest that dishonesty can be mitigated by either encouraging individuals to invest effort into disambiguating information or by enhancing their competence at solving ambiguous tasks through training sessions.

Keywords: ambiguity, competence, effort, training, dishonesty.

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Introduction

Most people feel at ease carrying out small acts of dishonesty (Mazar et al., 2008), especially when there is no chance of being caught (Abeler et al., 2019). Ambiguous tasks, where the presented information is open to interpretation and requires effort to disambiguate (Balcetis & Dunning, 2006), are particularly conducive to dishonesty (Schweitzer & Hsee, 2002). This tends to be because ambiguity can be exploited as a justification for self-serving behaviour (Gino & Ariely, 2012; Leib et al., 2019; Lois & Wessa, 2021; Pittarello et al., 2015, 2019; Shalvi et al., 2015). When applied to the workplace, this means that the more there is ambiguity in tasks – for example, working hours to fulfil, claiming back expenses or borrowing company equipment – the more employees find it easy to justify self-serving behaviours to themselves.

While it is possible to enhance honesty by disambiguating information, it may not always be feasible, as ambiguity may be naturally embedded into a task or disambiguating procedures may prove too costly. In such contexts, dishonest behaviour may be mitigated by targeting the individual rather than the task. For instance, previous research reports evidence that honesty can be promoted through moral or social cues (Welsh & Ordóñez, 2014; Reynolds & Ceranic, 2007; Ayal, Celse & Hochman, 2021), moral training (Loe & Weeks, 2000), ethical training (Black et al., 2021), and reminding people of their core values (e.g. meaningful relationships; Spoelma, 2021). In essence, these strategies reduce dishonesty by appealing to a person's honest and socially conscious side. It is, however, unclear whether a reduction in dishonesty can be achieved by focusing on the individual, without targeting honesty directly.

In this paper, we provide evidence that it is possible to reduce dishonesty by targeting individual competence in disambiguating information. In other words, by targeting an individual's ability to resolve ambiguity it becomes possible to decrease dishonesty. This builds on existing evidence that engaging with a task, by expending effort on it rather than skipping it, usually results in more honest behaviour (Pascual-Ezama et al., 2020). Moreover, increased competence encourages people to take control, rather than to disengage from a task (Bandura, 1991, 1997). Because competence may reduce the amount of effort required to disambiguate a task, we conjecture that training people may reduce dishonest behaviour. For example, if a non-Chinese speaker receives an email in chinese, they will first have to disambiguate the email before acting upon it. The more the receiver is competent in Chinese the less ambiguous the email will be, which should leave less room for self-serving behaviours such as a favourable, yet untruthful, interpretation of the email. We are therefore interested in decreasing dishonesty by targeting the individual and we ask the following main question: Can we increase the chances that trained individuals will successfully disambiguate an ambiguous task, thus decreasing their tendency to act dishonestly?

Ambiguity and Self-justifications for Dishonest Behaviours

To answer this question, we first focus on the mechanism in play. Self-justifications appear to be a form of motivated reasoning, where personal goals influence one's reasoning (Kunda, 1990). When it comes to solving ambiguous tasks, the availability of self-justifications is the main reason for people's misbehaviour (e.g. Gino & Ariely, 2012; Pittarello et al., 2015; Shalvi et al., 2015), such as not putting any effort into solving a task, or acting dishonestly within the

task. More broadly, there appears to be a strong and unsurprising link between self-serving cognitions (e.g., focusing on one's own needs and interests), and cheating behaviour in the workplace (Mitchell et al., 2018).

By definition, resolving ambiguity requires a degree of effort, where "effort" is used loosely to refer to the expenditure of time, financial, physical or mental resources (e.g. Cannon et al., 2019). Importantly, shying away from exerting effort likely requires justification. One might easily justify skipping a task that appears too difficult, too confusing, tedious or unengaging. The availability of self-serving justifications such as these tends to determine the extent people stretch the truth (Schweitzer & Hsee, 2002). Next, we examine how effort appears to be linked to honesty.

Dishonest Profiles: Cheaters vs Liars

Two different profiles of dishonest people were identified by Pascual-Ezama et al. (2020) in unambiguous settings. "*Cheaters*" put no effort into follow the rules, then lie to benefit themselves. They tend to skip tasks they have been presented with. On the other hand "*liars*", sometimes known as "income maximisers" (Fischbacher & Föllmi-Heusi, 2013), do follow the rules but then lie to benefit themselves. In other words, liars will at least put some effort into solving a task, then proceed to act immorally. Pascual-Ezama et al. (2020) found that cheaters tended to act more dishonestly than liars, and they speculated that this was due to cheaters not knowing the truth, giving them more leeway to act immorally. By encouraging people to put effort into solving an ambiguous task, one may increase the chances that they successfully disambiguate the task, which is expected to promote honest behaviour. Returning to the example of the non-Chinese speaker receiving an email in Chinese, taking time to correctly translate the email would guarantee that the person will at least solve the ambiguity. This effort will reduce the opportunity for self-serving interpretation of the ambiguous information, which can be expected to mitigate dishonest behaviour compared to a person who has not solved the ambiguity.

The Role of Competence: Training to Disambiguate

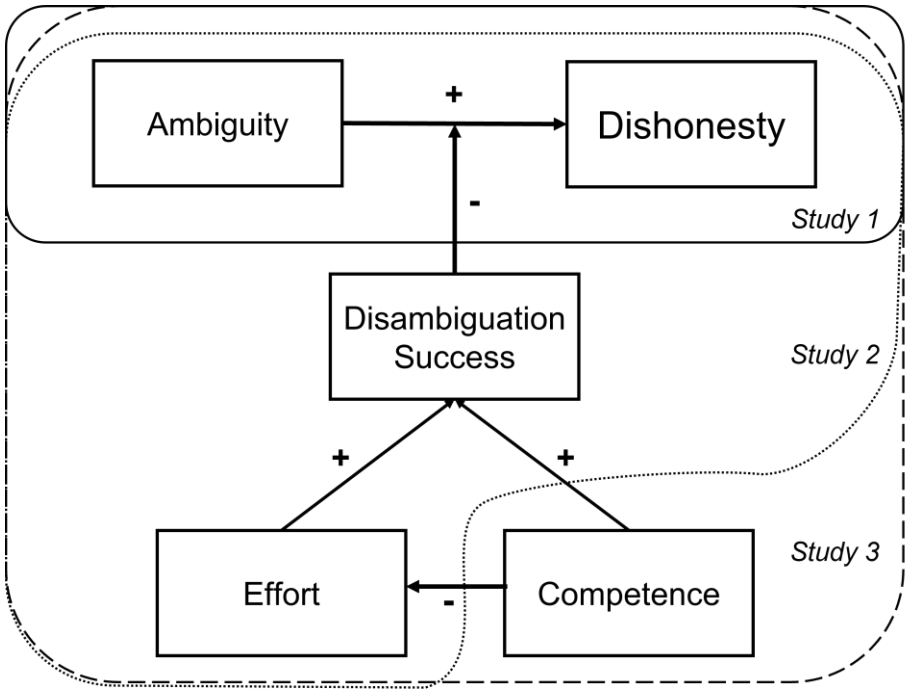
Based on this observation, we hypothesize that an intervention facilitating the disambiguation of information should reduce self-serving justifications and thus encourage people to act less dishonestly. One such intervention may be to increase one's competence through training. People who have been successfully trained on a task should find an ambiguous task easier to resolve due to their increased level of competence. In other words, training may reduce the level of effort required to solve the task, reducing the scope for self-serving justifications. For example, if individuals complete a task several times during training sessions, they cannot argue that they lack understanding of what the task entails, to justify cheating, to themselves or to others. Bandura (1977) explains how raised competence provides the individual with a set of benefits that allows them to better cope with stressful experiences, preventing an avoidant approach towards these experiences. Bandura goes on to explain that higher competence not only aids the individual in taking control when presented with adversity in the environment, but it also changes the way the environment is perceived. We therefore conjecture that increasing competence levels should make it more difficult for individuals to conjure up self-

serving justifications. This, in turn, should prevent them from skipping putting effort into solving an ambiguous task. Lastly, it is worth noting that a link between competence and dishonesty was identified by Gunia & Levine (2019), who argue that deception is perceived as an indicator of skill in certain occupations. Whereas their investigation focused on perceived competence and deception, the current investigation focuses on whether objectively increasing effort and competence reduces dishonest behaviour.

The Current Investigation

Unlike previous research on ambiguity and dishonesty, we consider a setting in which people have time to disambiguate a task, as might occur in the workplace, for instance when interpreting an email. The objective of our experimental design, illustrated in Figure 1, is to identify whether increasing an individual's competence levels may have the same effect as lowering ambiguity in the task.

Figure 1. Illustration of the theoretical framework and the sequence of studies

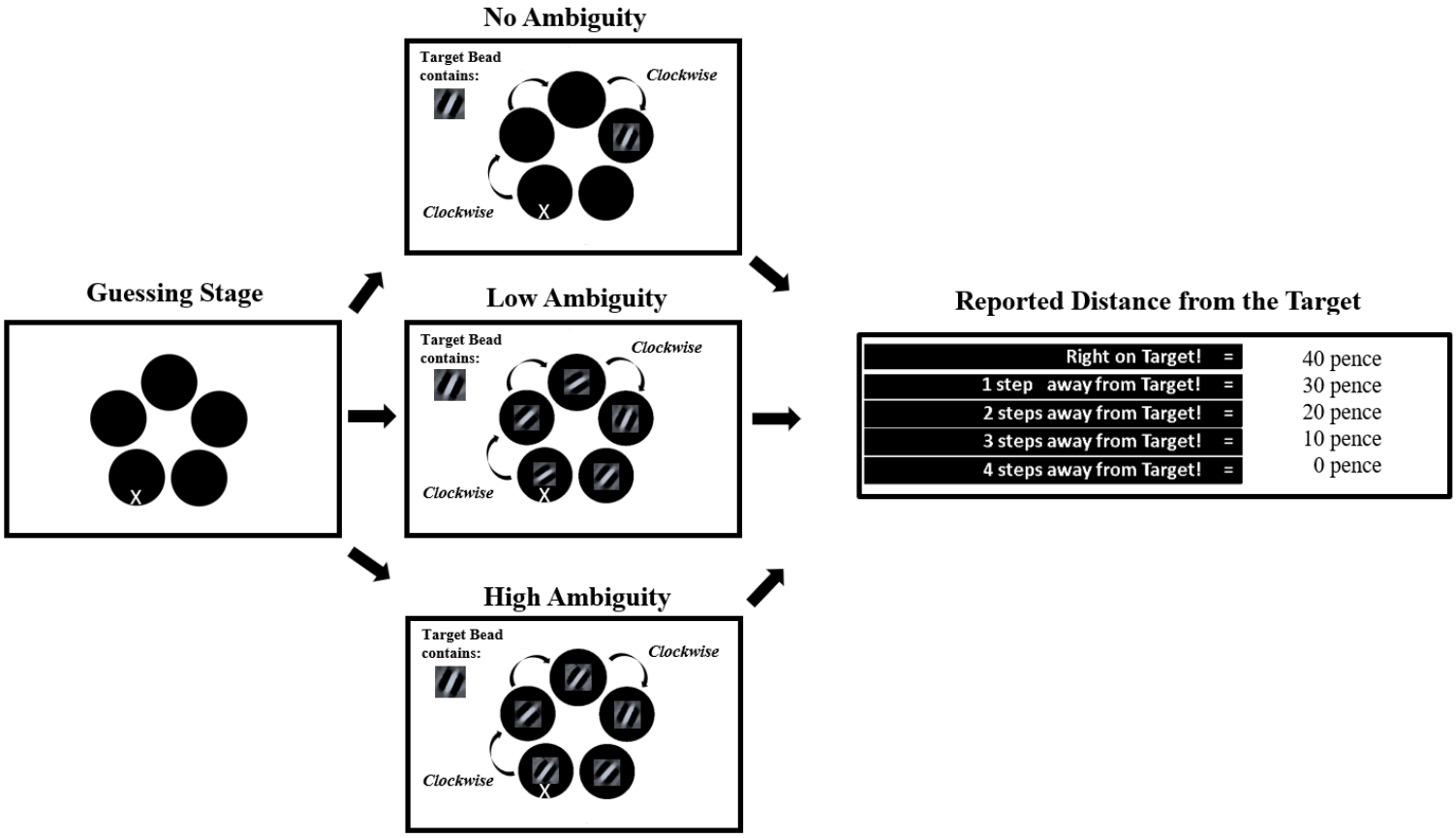


We start by introducing a novel procedure, where participants are first presented with a "necklace" of five beads and asked to guess which bead would be randomly chosen by the computer. Participants are simply told to "pick a bead and remember it now"; that is, they do not reveal their guess. The target bead is then revealed to them as the only bead that contains a specific pattern of a Gabor patch, a popular stimulus used in experimental psychology (e.g. Rolfs et al., 2011). This patch consists of a series of grid-like lines tilted more or less steeply. In line with similar studies requiring that participants disambiguate either a target image (e.g. Balcetis & Dunning, 2006) or the position of a target in relation to other stimuli (e.g. Pittarello et al., 2015), we ask participants to disambiguate a target stimulus from a number of distractors.

We experimentally manipulate ambiguity by rendering the patch at the target bead location more or less similar to the distractor patches.

Once participants identify the target bead, they are asked to report the distance from their guessed bead to the target bead (see Figure 2).

Figure 2. The experimental sequence presented to participants is displayed. Participants were first asked to guess the location of the target bead and to remember their choice (Guessing Stage). In this example, the participant guessed the bottom left bead, indicated with a white cross. Then participants identified the target bead in one of three possible ambiguity conditions – No, Low or High Ambiguity – depending on the presence or not of distractors patches, and how similar the distractor patches were to the patch presented on the target bead. The participant then counted the distance from their chosen bead to the target bead. In this example, the target bead was to the right, in the 3 o'clock position in all conditions, and was therefore three clockwise steps away from the chosen bead. Lastly, participants reported how close they were to the target bead (i.e. the distance).



The distance is counted clockwise. Before entering their reported distance, participants view an incentive scheme instructing them that the closer they are to the target the higher their bonus payment will be. The reported distance is a scale from 0 to 4. Unbiased responses per condition should average to 2.0, which acts as our theoretical benchmark for honesty and is what we empirically observed in unincentivized pre-tests. An average below 2.0 implies dishonest

behaviours within the condition. The smaller the reported distance, the more dishonesty on average within that condition.

We use this procedure to test our first prediction that higher ambiguity leads to more dishonest behaviour (H1, Study 1), thus replicating prior findings in our time-unconstrained setting. Based on the outlined literature, we then predict that higher effort spent disambiguating the task will decrease dishonest behaviour (H2, Study 2), by increasing disambiguation success (H3, Study 2). Finally, we predict that people who have been trained to resolve ambiguity in the task, and are objectively more competent at solving the task, will act less dishonestly (H4, Study 3). This is because higher competence will decrease the effort needed to resolve ambiguity (H5, Study 3).

Disclosure Statement

We describe our sampling plan, all manipulations, all measures in the study, and we adhered to the checklist of Organizational Behavior and Human Decision Processes. Data were analysed using RStudio version 4.0.1 (R Core Team, 2020) and SPSS, version 28 (IBM Corp., 2020).

Study 1. Ambiguity and Dishonesty

Participants

Our first prediction is that the increased ambiguity present in the task leads to more dishonesty. We test this with participants recruited from the online panel provider *prolific.co.uk*, matching the criteria of being over 18 years old, located in the United Kingdom, and using English as a first language. All participants were paid for their efforts according to the National minimum wage.

Using the statistical program G*Power 3.1 (Faul et al., 2009), we estimated that a minimum sample size of 390 was necessary given our predicted medium-sized effect (f2 = 0.20), given $\alpha = 0.05$, using three independent groups. We proceeded to recruit 450 participants, but three did not complete the study. Our final sample consists of 447 participants ($M_{\text{Age}} = 36$; 38% males).

Materials and Procedures

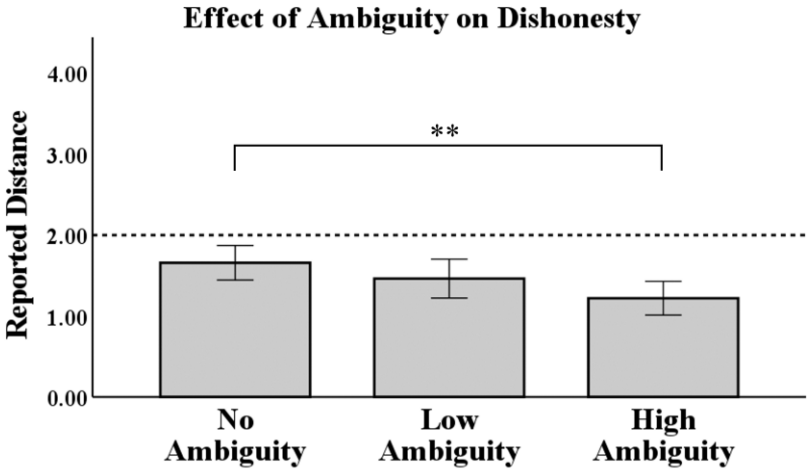
We employed a between-subjects design, where participants were required to identify the target bead either under No, Low or High ambiguity settings. Participants first picked a bead, then identified the target bead, then counted the distance their chosen bead was from the target bead, and finally reported this distance. For details about the procedure see "The Current Investigation" section and the illustration in Figure 2. Overall, the task asked that participants primarily engage in a two-step procedure: 1) attempt to disambiguate the information in the task, i.e. identify the target among distractors, and 2) report their performance, i.e. how close their chosen bead was to the target. Many real-life settings require an initial disambiguation phase and then a decision. Within the context of investigative journalism, a journalist must

resolve ambiguity by deeply investigating a lead, then decide whether to report the true story (i.e. a truthteller) or to peddle a sensational story (i.e. a liar). An academic researcher must first carefully analyse data to investigate a research question, and then can report the true results (i.e. a truthteller) or they could alter the results to render them more publishable (i.e. a liar). It is worth noting that both the investigative journalist and the academic researcher could skip their investigations all together, choosing to not resolve ambiguity, and proceed directly to their fabricated findings (i.e. a cheater).

Results

To detect mean-based differences between the three conditions, we ran a one-way between-subjects ANOVA, expecting that higher ambiguity would lead to more dishonesty. We found a significant difference in "reported distance" between the conditions, $F(2, 446) = 3.82$, $p < .023$, with planned comparisons revealing that participants reported being significantly closer to the target in the high ambiguity condition ($M = 1.23$; $SD = 1.28$) compared to the no ambiguity condition (control) ($M = 1.65$; $SD = 1.34$; mean difference = 0.42, SE = 0.15, $p = .006$; CI: 0.12, 0.72, Cohen's d = 0.32). No differences emerged between Control and Low Ambiguity ($p = .231$, CI: −0.12, 0.49). The results are summarized in Figure 3.

Figure 3. Illustration of the distance from the target reported by participants in each of the ambiguity conditions. The closer participants' chosen bead was to the target, the more money they were paid. Shorter distances to the target signify more dishonesty. The dashed line on y-axis represents a theoretical benchmark of complete honesty. Error bars represent the standard error of the mean (±2). $p < .05$ (*); $p < .01$ (**).



These results showed that people acted more dishonestly the more their task was ambiguous, thus confirming previous results and our H1.

Discussion

The study involved participants guessing the location of a target bead in a "necklace" and then identifying the target bead under different levels of ambiguity (No, Low or High). Participants were incentivized to report a shorter distance between their guess and the target bead. The

results from this first study support the first hypothesis: higher ambiguity led to more dishonest behavior. Participants in the high ambiguity condition reported being significantly closer to the target compared to those in the no ambiguity condition. These results replicate those of past investigations, showing that when ambiguity is embedded into a setting or task, people tend to act more dishonestly.

Study 2. Ambiguity and Dishonesty Profiles

Next, we aim to determine whether increased effort spent disambiguating the task increases the chances of disambiguation success and decreases dishonest behaviour.

Method and Participants

We employed a modified design, with respect to Study 1, which allowed us to set apart the two main stages of the task: 1) resolving ambiguity and 2) reporting the outcome. We compared Control (no ambiguity) and High Ambiguity conditions from the previous study, from now on referred to as "Ambiguity condition". Participants in Study 2 were 600 (M_{Age} = 37; 36% males), which reduced to 585, with 15 failing one of two trivial attention checks. Double the sample size was used in the ambiguity condition to analyse effects pertaining to effort and disambiguation success, clearly only possible in that condition. Data were analysed using RStudio version 4.0.1 (R Core Team, 2020) and SPSS, version 28 (IBM Corp., 2020). This study's design and hypotheses were preregistered (https://osf.io/jud5e/?view_only=fc2210a34ea449fc9b7817c22de8efd3).

Materials and Procedure

Compared to Study 1, we made several key modifications. Firstly, this time we separated the disambiguation task from the reporting stage and incentives. In the disambiguation task, we timed people so as to determine how long they spent on this. We used this as a measure of "effort". It is worth noting that participants could potentially ignore the instructions, and put no effort into solving the task by simply moving on to the next screen. Secondly, we required that participants to click on the bead they identified as the target before moving on to the next screen. This told us whether ambiguity had been successfully resolved or not, i.e. successful identification of the target bead. We coded this as a dummy variable which we labelled "disambiguation success".

Results

Main Effect of Ambiguity on Dishonesty

We began by verifying whether ambiguity led to more dishonesty (akin to Study 1). People in the ambiguity condition reported significantly shorter distances to the target, meaning more dishonesty (M = 1.02; SD = 1.33), than those in the no ambiguity condition (M = 1.66; SD = 1.44), $t(377) = 5.22$, $p < .001$, CI: 0.40, 0.88, Cohen's d = 0.46, given additional support to H1.

Effect of Effort on Dishonesty

Next, we examined the relation between effort, disambiguation success and dishonesty. We first ran a logistic regression to determine whether "effort" (time spent on the task in seconds) would predict "disambiguation success". The logistic regression model was statistically significant $\chi 2(4) = 31.59$, $p < .001$, explaining 10.5% (Nagelkerke R^2) of the variance and correctly classifying 65% of cases. The time spent on the task was a significant predictor of task resolution, Wald = 19.94, B = 0.04, $p < .001$; 95% CI: 1.02, 1.06.

Next, we ran a linear regression model, assessing the effect of "effort" and "disambiguation success" on dishonesty, within the ambiguity condition. "Effort" had a significant positive effect on reported distance, $b = 0.02$, $t(379) = 3.39$, $p = .001$, 95% CI [0.01; 0.03], indicating that the more time participants spent on the task the further they reported being to the target. In other words, more effort was associated with more honesty. "Disambiguation success" was also a significant predictor in the model, $b = 0.34$, $t(379) = 2.49$, $p = .013$, 95% CI [0.07; 0.62], indicating that those who successfully resolved ambiguity acted less dishonestly.

Taken together, the results indicate that those who put effort into the task are better at resolving ambiguity (confirming H3) and go on to behave the least dishonestly (confirming H2).

Discussion

Study 2 aimed to determine whether increased effort spent disambiguating the task increases the chances of disambiguation success and decreases dishonest behavior. We used a modified design from Study 1 and separated the disambiguation task from the reporting stage and incentives. The main findings of Study 2 are the following. First, people in the ambiguity condition reported significantly shorter distances to the target, indicating more dishonesty than those in the no ambiguity condition. This finding supports the first hypothesis (H1). Next, effort was a significant predictor of disambiguation success; participants who spent more time attempting to solve the task had a higher chance of solving it correctly, confirming the third hypothesis (H3). Interestingly, more effort was associated with more honesty, as those who successfully resolved ambiguity acted less dishonestly, supporting the second hypothesis (H2). This confirmed what had emerged indirectly in the literature, that those who engage with a task tend to act more honestly, likely because discovering the "truth" makes it more difficult to justify acting in self-benefitting ways. Overall, the study found that participants who put more effort into the task were better at resolving ambiguity and behaved more honestly. These findings suggest that an intervention that encourages people to put effort into the task, rather than skip it, should increase the chances of people successfully disambiguating the task and, subsequently, acting less dishonestly.

Study 3. Increasing Competence with Training

Method and Participants

To test whether training people affects dishonesty levels in an ambiguous task, we randomly assigned participants to one of three conditions: a "control" (no ambiguity) condition, a

"control training" condition and a "competence training" condition. The control training condition aimed at familiarizing participants with the task without improving their ability to disambiguate the task. By contrast, the competence training condition aimed at improving one's ability to disambiguate the task. We recruited 600 participants on *prolific.co.uk* (M_{Age} = 35; 31% males) and a simple attention check failed by 12 participants led to a final sample of 588 participants. This study's design and hypotheses were preregistered (https://osf.io/b2p6n?view_only=3d2183b25ce140749e096b226a6812e1).

Materials and Procedure

We followed the same general procedure as in Study 2. The "control" condition (N = 197) with no ambiguity remained the same as the previous experiments, while the "control training" condition (N = 200) and the "competence training" condition (N = 191) employed the high ambiguity condition. The "control training" session consisted of six practice rounds where participants clicked on the target bead, which was the only bead containing a Gabor patch, then progressed to the next round. This rather trivial training session simply familiarized participants with the task.

In the "competence training" condition participants also carried out six practice rounds where they had to identify the target bead containing the displayed Gabor patch, while all non-target beads contained distractor Gabor patches of similar tilt. Once the target was identified, the participant clicked on it. If the selected target was correct, the participant progressed to the next training round but, if not, they would continue to select beads until they selected the correct one.

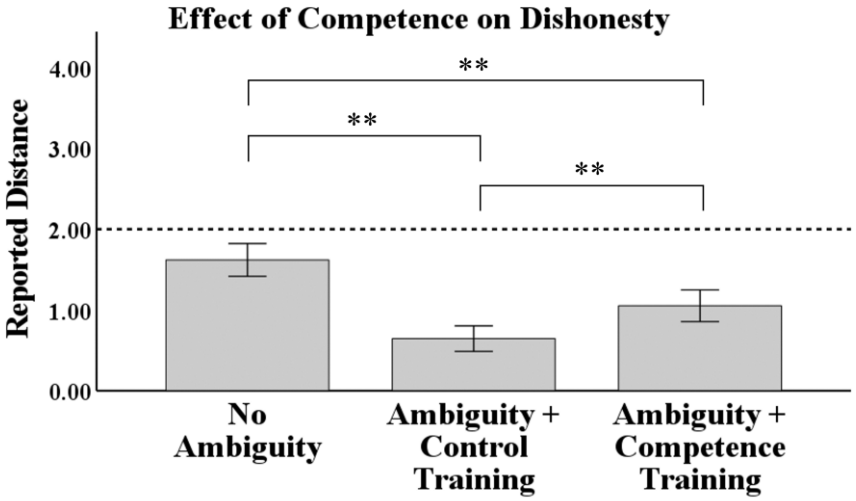
Results

Main Effect of Ambiguity and Training on Dishonesty

To test for dishonesty differences between the experimental conditions, we employed a one-way between-subjects ANOVA. Results highlighted a statistically significant difference in reported distance between the conditions, $F(2, 585) = 27.95$, $p < .001$ (Figure. 4). Planned comparisons showed that the conditions differed significantly from each other, with the control condition leading to larger reported distances, $M = 1.62$; $SD = 1.42$, compared to the ambiguity condition with control training, $M = 0.65$; $SD = 1.12$, $p < .001$; CI: 0.07, 1.22, Cohen's d = 0.76 (supporting H1) and with competence training, $M = 1.06$; $SD = 1.35$, $p < .001$; CI: 0.03, 0.81, Cohen's d = 0.4.

Crucially, a significant difference in reported distance also emerged between control training and competence training conditions, $p = .002$; CI: −0.67, −0.16, Cohen's d = 0.33. This supports our training hypothesis H4, whereby increasing people's ability to resolve ambiguity leads to a decrease in dishonesty levels.

Figure 4. Illustration of the reported distance from the chosen bead to the target bead, averaged per condition. Lower reported distances indicated more dishonesty. The dashed line on the y-axis represents a theoretical benchmark of complete honesty. Error bars represent the standard error of the mean (±2). $p < .05$ (*); $p < .01$ (**).

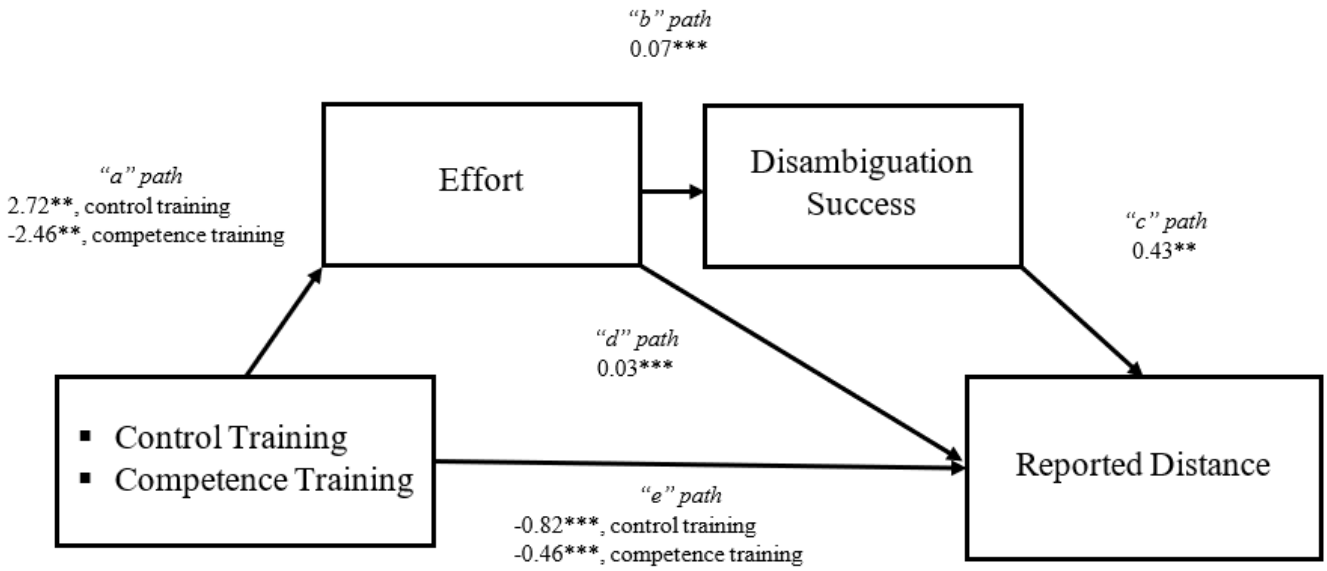


Mediating Effects of Effort and Disambiguation on Dishonesty

Next, we determine whether reduced dishonesty in the competence training condition, compared to the control training condition, was driven by a) increased effort, and/or b) increased disambiguation success. First, we ran a linear regression measuring the effect of effort and disambiguation success on reported distance. The overall model was significant, $F(2, 390) = 19.62$, $p < .001$, $R^2 = 0.09$, with statistically significant positive effects of "disambiguation success", $b = 0.53$, $t(390) = 4.28$, $p < .001$, 95% CI [0.29; 0.77], and of "effort", $b = 0.02$, $t(390) = 3.67$, $p < .001$, 95% CI [0.01; 0.04]. These results were consistent with the results of Study 2, indicating that effort spent on task reduced dishonesty levels (supporting H2).

To test the effects of increasing competence levels on dishonesty, we ran a multi-categorical mediation analysis using the MeMoBootR R package (Buchanan, 2018), entering the three experimental conditions as independent variables. The control condition was selected as the reference condition. Reported distance was the dependent variable, while effort and disambiguation success were the two mediators (see Figure 5).

Figure 5. Effect of training partially mediated by the ability to solve the task. Reference category = control training condition. $p < .05$*, $p < 0.01$**, $p < .001$***.



Relative to the control condition, average reported distance was lower in the control training and competence training conditions (direct effects, "e" paths), indicating greater dishonesty in these two training conditions. In line with H5, competence training decreased the effort needed to solve the task ("a" path), with an effect size of −2.46. "Effort" significantly predicted "disambiguation success" with an effect size of 0.07 ("b" path), confirming once again H3, while "disambiguation success" had a significant positive effect on reported distance (b = 0.43, "c" path). Lastly, "Effort" also directly decreased dishonest behaviour with an effect of 0.031, "d" path, confirming H2 seen in Study 2.

For further visualization of the effect of the training on effort, disambiguation success and dishonesty, see Appendix 1, where we examine behaviour by splitting the data into quantiles, based on the time people spent on the task. We conclude that the effect of ambiguity and of the training is partially mediated by one's ability to solve ambiguity.

Discussion

The study aimed to test whether training people affects dishonesty levels in an ambiguous task. Participants were randomly assigned to a "control" (no ambiguity) condition, a "control training" condition, or a "competence training" condition. The control training condition familiarized participants with the task without improving their ability to disambiguate the task, while the competence training condition aimed at improving one's ability to disambiguate the task. A significant difference in reported distance emerged between control training and competence training conditions, supporting Hypothesis 4 that increasing people's ability to resolve ambiguity leads to a decrease in dishonesty levels. Crucially, the results confirmed that competence training decreased the effort needed to solve the task, leading to less dishonesty

by increasing the chances of participants successfully disambiguating the task. This confirmed our Hypothesis 5. Competence training also had a direct effect on reported distance, i.e. dishonesty, confirming our Hypothesis 4. Lastly, effort significantly predicted disambiguation success and disambiguation success had a significant positive effect on reported distance. In conclusion, the study found that increasing people's ability to resolve ambiguity through training can decrease dishonesty levels. The effect of ambiguity and training is partially mediated by one's ability to solve ambiguity.

General Discussion

These findings show that dishonesty can be lowered by rendering a task less ambiguous; however, one can also decrease dishonesty by targeting the individual rather than the task. Our results suggest that facilitating people's successful disambiguation of a task reduces dishonesty levels. More specifically, our results show that those who spend more effort on the ambiguous task are generally better at disambiguating the task and act less dishonestly. Perhaps more crucially, we saw that people who have been trained on the task become capable of disambiguating the task more successfully with less effort, leading them to act less dishonestly. This emphasizes that dishonesty can be lowered by raising people's competence levels, providing them with the necessary skills to tackle the ambiguity present in a task. We therefore highlight a novel link between ambiguity-induced cheating and the fact that tasks tend to become less ambiguous when we are better at solving them.

We extend the literature on the relationship between ambiguity (i.e. ambiguous tasks) and dishonest behaviour in several important ways.

Firstly, our most important contribution is that of identifying the role that Effort and Competence play in decreasing dishonest behaviour in ambiguous settings. The results confirmed our thinking: because effort is required to solve an ambiguous task, making the task appear less effortful through competence training, helps people to a) successfully disambiguate the task, and b) act more honestly. As our model suggests (Figure 1) both effort and competence impact disambiguation success. When ambiguity in the task is successfully resolved, we see in Studies 2 and 3 that honest behaviour is promoted. We therefore show for the first time that benefits can be obtained when people successfully disambiguate a task. This had been hinted at previously by other researchers, in particular by Pascual-Ezama et al. (2020), who believed that discovering the truth makes an individual more bound to that truth. Our findings demonstrate that by investing greater effort or enhancing competence levels, individuals are more likely to successfully disambiguate ambiguous tasks, thereby uncovering the truth and fostering honesty. Researchers have shown that those who disengage from a task tend to act the most immorally (Bandura, 1991, 1997; Black et al., 2021; Pascual-Ezama et al., 2020). Advancing this line of thinking, we unravelled the link between effort and disambiguation success, showing that those who put more effort into solving ambiguity are more successful in doing so and go on to behave more honestly.

Secondly, we extend previous research in a novel direction by showing that a brief training to increase people's competence at solving an ambiguous task leads to more truthful behaviour. Previous research in this field has highlighted effective ways that dishonesty can be reduced by targeting the individual, particularly by finding ways to stimulate an individual's honest side (Loe & Weeks, 2000; Welsh & Ordóñez, 2014; Reynolds & Ceranic, 2007; Spoelma, 2021). The research most similar to ours is that of Black et al. (2021) who employed a training session to increase an individual's sense of ethics, finding that the training increases intention to act morally. The current research goes beyond moral primes and ethical training by unravelling an effect that, on the surface, may appear far more surprising: that increasing a person's competence levels decreases their tendency to act dishonestly in ambiguous tasks. Competence achieves this by increasing the person's ability to successfully disambiguate the task. This is important because briefly training people to raise their competence levels, before an ambiguous task, is less likely to be interpreted as an attempt to steer behaviour in a moral direction; this is in contrast to using moral primes or moral training, which people may experience as a limit to their personal freedom and cause the intervention to backfire (e.g. Berman & Johnson, 2015). It is also interesting to appreciate the effect of competence level on dishonesty by considering that moral primes are largely ineffective in conditions of unobservability, where participant behaviour is not being individually monitored (Zhao et al., 2021). Because it is not possible, or even ethical, for organizations to constantly monitor employee behaviour, devising interventions intended to be effective in conditions of unobservability, which was at the heart of the current investigation, is certainly valuable. In addition, measuring dishonesty in conditions of unobservability offers a glimpse into behaviour that is unaffected by the presence of others. For practitioners, a further benefit of competence-based interventions as shown in this paper, compared to moral primes and ethical training, is that competence can make it easier to cope with adverse situations and emotions (Bandura, 1977) that may be caused by ambiguous tasks.

Thirdly, the link between ambiguity and dishonesty had been previously established in laboratory settings using tight time constraints (Schweitzer & Hsee, 2002; Pittarello et al., 2015; Shalvi et al., 2015; Leib et al., 2019; Lois & Wessa, 2021; Pittarello et al., 2019). However, when people are faced with ambiguous tasks in their everyday lives, such as conducting academic research or interpreting a document in a foreign language, they are usually free to exert as much effort as they want in order to solve the task. We show that when people are given as much time as they require, then high levels of dishonesty emerge when the task is highly ambiguous. It has been previously suggested that time constraints bias decision-making toward reproachable behaviour (Kruglanski & Freund, 1983; Shalvi et al., 2012), but here we see that the link between ambiguity and dishonest behaviour continues to exist in the absence of time constraints. This issue is perhaps also one of "wording", as research exists that has not explicitly set out to examine the effects of ambiguity on dishonest behaviour, but they have nonetheless employed settings that could be considered ambiguous. For example, Ayal et al. (2021) investigated ticket fare evasion on French trains, in a setting where ticket checks are not frequent, consumers are typically unaware of how many fellow consumers purchase the ticket and there are no time constraints for making the purchase. By providing information

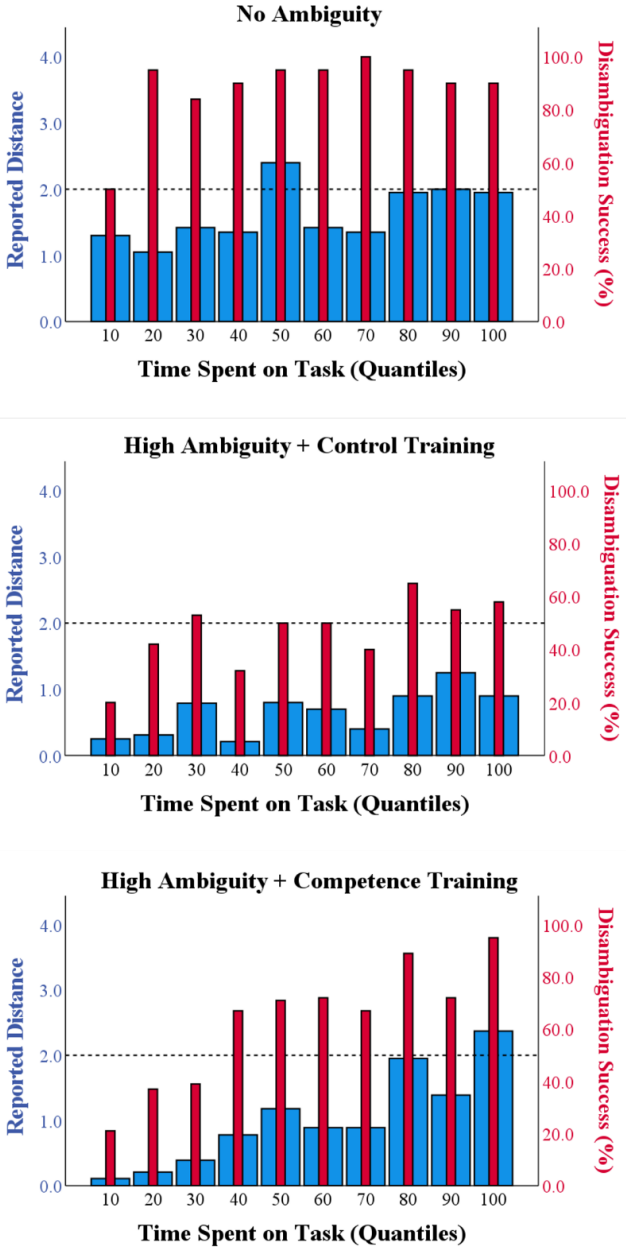
about the high rates at which others purchase the ticket, the authors reduced ambiguity and consequently also reduced cheating.

Overall, our results suggest that public, private and non-profit organizations can reduce dishonesty by reducing the ambiguity present in tasks or by training individuals to better tackle ambiguity. A typical and frequent real-life example would be training employees on how to comply with a given procedure. All forms of brief and cost-effective training that help people to disambiguate a given setting, or clarify the procedures within such a setting, would fall within the class of interventions that we propose here.

Appendix 1.

By looking separately at the quantiles based on time spent on the task, we aim to glean additional insights on the interplay between effort, disambiguation success and dishonesty. We will focus on the behavioural profiles identified by Pascual-Ezama et al. (2020), which are those of truthtellers, liars and cheaters (see profiles described in introduction).

Figure 6. Illustration of the "reported distance" and "disambiguation success" per quantile, indicating the "Time spent on the task" disambiguating the target from the distractors, i.e. "effort". Shorter distances to the target signify more dishonesty. The dashed line on y-axis represents a theoretical benchmark of complete honesty. Higher levels of disambiguation success and reported distance (i.e. less dishonesty) can be seen in the training condition compared to the control training condition. Each bar represents N=20 (+-1).



The first quartiles can be particularly telling, relating to people who spent little to no effort on the task. We therefore decided to initially focus only on the first three quantiles (10%, 20% and 30%, i.e. the 30% who spent the least amount of time on the task) and run a MANOVA with the conditions as independent variable and reported distance and disambiguation success as dependent variables. We observed a main effect on reported distance, $F(2, 173) = 15.43$; $p < .001$; partial $\eta 2 = 0.15$, and disambiguation success, $F(2, 173) = 15.56$; $p < .001$; partial $\eta 2 = 0.16$. Planned comparisons highlighted no differences between control training and competence training on reported distance (S.E. = 0.20, $p = .271$) or on task solved (S.E. = 0.09, $p = .506$), while the no ambiguity condition differed significantly from the two training conditions across both dimensions (all $p < .001$). Therefore, the competence training has no beneficial effect for people in these first quartiles, compared to the control training. The cheaters who tend to put no effort into solving the task, appear to remain unperturbed by the intervention (see results illustrated in Figure 6).

Next, we decided to focus only on truthtellers and liars, who are those who certainly attempt to solve then either act truthfully (i.e. truthtellers) or not (i.e. liars). We therefore selected cases in the last three quantiles (80%, 90% and 100%) and ran a MANOVA once again, which highlighted a main effect on reported distance, $F(2, 171) = 5.58$; $p < .001$; partial $\eta 2 = 0.09$, and disambiguation success, $F(2, 171) = 11.53$; $p < .001$; partial $\eta 2 = 0.12$. This time the planned comparisons highlighted significant differences between control training and competence training conditions on reported distance (S.E. = 0.26, $p < 0.001$) and on task solved (S.E. = 0.07, $p < .001$). Also interestingly, this time no differences emerged between control and competence training conditions on reported distance (S.E. = 0.26, $p = .831$) or on disambiguation success (S.E. = 0.07, $p = .423$). Finally, the control and control training conditions differed significantly across reported distance and disambiguation success (both $p < .001$). This implied that the beneficial effect of competence training is mainly observed in these higher quartiles, therefore helping the liars become truthtellers.

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