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Research paper

Lengthy waiting corrupts, especially when unexpected☆

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ABSTRACT

Results of two studies demonstrate that long and unexpected waits adversely shape moral behavior. In Study 1, passengers who had just joined the check-in line at Ben Gurion Airport guessed how long they would have to wait to check in, and then their actual wait duration was recorded. After checking in, they privately rolled a die, reported *an* outcome while knowing that higher reports yield higher earnings. We found that wait duration is positively associated with lying. Study 2 (laboratory experiment) exogenized the duration of waits (long versus short) and whether those durations were known (expected) or unknown (unexpected) to subjects in advance. We find that long waits cause, on average, more lying than short waits, and that average lying is the highest for long and unexpected waits. We propose that after long and unexpected waits, people may seek compensation in the monetary domain via relaxed morals.

1. Introduction

The experience of waiting, be it brief or extended, expected or unexpected, occurs in all domains of life. Abundant empirical research shows that waiting experiences could negatively shape our well-being (McGuire et al., 2010), preferences (Kremer and Debo, 2016), purchase decisions (Ülkü et al., 2020), satisfaction with services and products (e.g., Hui and Tse, 1996) or health outcomes (e.g., Moran, 2013; Prentice and Pizer, 2007). Despite significant research on the consequences of waiting, the focus has been on how this shapes the evaluation of the goods or services for which people waited.

This research expands our knowledge on how waiting shapes choices made right after the waits, though not related to them. We show that lengthy waits, especially when the lengthiness is unexpected, can adversely shape moral preferences in subsequent situations that are only temporally linked to the waiting episode. We propose that an (unexpected) loss in the time domain due to waiting prompts cross-domain compensation-seeking in the monetary domain, via relaxed morality. In two studies, we show that,

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despite a successful resolution, an elongated waiting episode (especially when unexpected) changes moral behavior for the worse. To emphasize that waits and the subsequent choice situation measuring preferences for lying are unrelated, we only consider situations where the resolved waiting episode and the choice situation are only temporally — and, therefore, incidentally — linked. This aspect minimizes the scope for direct negative reciprocity, or the motivation to "even the score" with the entity responsible for the wait, as a main driver of preferences for lying, though some scope for indirect negative reciprocity may remain. Such indirect negative reciprocity, presumably motivated by compensation-seeking after being wronged by a (perceived) unfair treatment is believed to be instrumental in increased lying after receiving disadvantageous outcomes from another human in a dictator game (Houser et al., 2012), sabotage behaviors after receiving low wages (Grosch and Rau, 2020), tax evasion after being underpaid (Dezső et al., 2022) or insisting on compensation at high costs after receiving disadvantageous monetary outcomes (Dezső et al., 2015; Dezső and Loewenstein, 2019).[1]

Academic research on waits distinguishes between two instrumental aspects of a waiting episode. First, the absolute duration, or how long one waited for, and second, the relative duration, or how the absolute duration compares to the expected or anticipated waiting duration (McGuire et al., 2010; Kumar et al., 1997). They find that relative duration is the key factor in shaping customer (dis)satisfaction, subsequent purchases, or brand loyalty (Nie, 2000; Kumar et al., 1997) indicating that the main issue is meeting decision-makers' expectations of the wait duration. To target these expectations, many firms introduce offline or online tools providing real-time updates on the expected waiting time for customers, which indeed successfully mitigate customer disappointment or dissatisfaction (Ulmer and Thomas, 2019) and even violent behaviors toward providers (Efrat-Treister et al., 2019).

The primary role of expectations in shaping honesty has also been emphasized by behavioral economics (e.g., Houser et al., 2012; Greenberg, 1993, among others). The common mechanism is that when decision-makers fall behind monetary expectations, they seek compensation in the monetary domain, which they attain by cheating or lying. We contribute to this research by demonstrating that failure to reach expectations in the time domain results in similar unethical behaviors — in particular, lying to improve one's financial outcomes.

We present the results of two studies investigating how lengthy waiting and its unexpectedness shape subsequent moral behaviors. Study 1 is a framed field experiment and provides correlational evidence that an elongated waiting episode is associated with increased dishonesty. Due to its correlational design, however, we cannot draw causal inferences on the association between lengthy waits and lying. To remedy these shortcomings, we present the results of Study 2, which is a lab experiment. Here, we exogenously vary the length of waits (i.e., short or long) and, orthogonally, whether this length is known (i.e., expected) or not known (i.e., unexpected) to participants in advance. The results of our experiment provide evidence that, on average, long waits lead to more lying than short waits, and unexpectedly long waits cause the most lying.

In both experiments, we measured lying with the so-called die-under-cup paradigm (hereafter DUC) (Shalvi et al., 2011), which is a modified version of the die–roll task from Fischbacher and Föllmi-Heusi (2013).[2] We settled for the DUC task because we needed a paradigm absent strategic interactions, easy and quick to implement, trivial to comprehend for participants, and has a high external validity (e.g., Dal et al., 2018).

In the DUC task, subjects privately roll a die under an opaque cup and report *an* outcome, which may or may not coincide with the *actual* outcome they rolled. The payoff structure is simple: reporting higher numbers pays more. Importantly, the number which the participant rolls is unobserved by the experimenter, and therefore, honest reporting does not have any instrumental value. Although the monetary-maximizing behavior is to report the number that pays the most, not everyone reports the highest number — suggesting that honesty has some intrinsic value to individuals (Fischbacher and Föllmi-Heusi, 2013).

Gneezy et al. (2018) advance and empirically demonstrate that the cost of lying depends on the size of the lie, and identify three dimensions influencing the size of lies. The payoff dimension captures the monetary gain that lying brings. The outcome dimension represents the absolute distance between what the individual observes (i.e., the number he rolls) and what he reports. The likelihood dimension captures the ex-ante probability that the report is true (e.g., how many sides a fair die has determines the ex-ante probability of each number). This latter dimension is closely linked to research proposing that people derive utility from their "social identity" construed from the decision-maker's perceptions of how others see them, even if there is no scope for future interactions (i.e., reputation concerns are absent) (e.g., Bénabou and Tirole, 2011). Incorporating the notion of social identity into the likelihood dimension reveals that even when one's outcome is unobserved by others, people wish to perceive themselves as being honest and, to attain this, they are willing to sacrifice monetary gains. The importance of the likelihood dimension — and the cost of social identity in particular — is also central in various theoretical formalizations of preferences for lying (Khalmetski and Sliwka, 2019; Dufwenberg and Gneezy, 2000; Abeler et al., 2019).

Unlike these aforementioned works, our research has no theoretical foundations. Instead, it is an empirical test of the association between long (and potentially unexpected) waits and lying. Study 1 is a framed field experiment conducted on the departure side of Ben Gurion Airport, Israel, in November and December 2022. When joining the check-in line, passenger participants provided their guesses on how long they would have to wait to check in and answered some questions about themselves and their trips. We recorded the exact times when they joined the check-in line and when they checked in. After checking in, they privately performed

[1] Some research even finds that the motivation to avoid a loss (versus having a loss as the reference state) is associated with increased lying (Grolleau et al., 2016; Garbarino et al., 2019). When it comes to justifying lying — for instance, to avoid a loss — people can be sophisticated in constructing plausible justifications (Shalvi, 2012).

[2] We are aware of the following four other paradigms which measure lying behavior by creating information asymmetries and prompting the decision-maker to trade off monetary gains for morality: the sender–receiver game (Gneezy, 2005), the coin-flip task (Bucciol and Piovesan, 2011), the matrix task (Mazar et al., 2008), and the "mind-games" (Jiang, 2013; Parra, 2024) (for a review, see, Gerlach et al., 2019).

the DUC task and were paid in cash based on their reports. We find that an increase in the waiting duration is associated with increased lying in the DUC task, which relationship is robust after controlling for individual characteristics. We estimate that a roughly 75-minute increase in the length of waits results in an average one-dot increase in the DUC-task reports.

Study 2 is a laboratory experiment conducted on a sample of Israeli university students. We exogenously varied the duration of waiting (long and short) and, orthogonally, whether, at the beginning of the waiting episode, the subjects were informed (expected) or not (unexpected) about how long they would have to wait. The experiment crossed the duration and expectedness factors and was deployed in four conditions in a between-subjects design.

We settled for a simple way to operationalize the expectation dimension: subjects were either given exogenously created expectations about the duration of waiting ahead of them or not. In all four cells, subjects waited for a long or short duration, but in the expected treatment arm, they were told at the beginning of the waiting episode how long they would have to wait, whereas, in the unexpected treatment arm, they received no information. Given that the experimental sessions were scheduled for a fixed period (e.g., from 2 pm to 2:20 pm), in the unexpected arms, the distributions of the endogenously formed expectations in the long and the short-wait duration cells should not differ, since all subjects were assured when recruited and at the beginning of the experiment that the experiment would end as scheduled. This approach to conceptualizing expectations builds on our intuition that, in a waiting episode, it is not the mere fact that one needs to wait, but rather the unpredictable duration of a wait that creates the feeling of losing out on the time dimension.

In Study 2, we find that long waits cause higher average lying than short waits, and average lying is the highest when a lengthy wait is unexpected. From an exploratory (and not preregistered) causal mediation analysis (Hicks and Tingley, 2011; Imai et al., 2010) of the effect of long versus short waits on lying, we learn that frustration from long waits mediates approximately one-third of this effect, while feeling agitated (not relaxed) mediates approximately half of it. The importance of these emotions in determining the quality of a waiting experience and subsequent service satisfaction has also been recognized in psychological research on waits (McGuire et al., 2010). However, this mediation analysis was not preregistered, and we (obviously) could not randomize subjects into different levels of frustration and agitation. Hence, we refrain from drawing conclusions on how an aroused state arising from long waits contributes to the link between long waits and dishonesty. Overall, we document causal evidence that lengthy waiting corrupts in that it increases dishonest behavior, especially when unexpected.[3]

To our knowledge, this research is the first to document the association between long and unexpected waiting and unethical behavior. The experience of lost time prompts compensation-seeking in the monetary domain, which is satisfied through unethical behavior. Our results suggest that regularly unmet expectations about the time spent waiting for something may have a more lasting impact by shaping subsequent ethicality. Although the deleterious effect of falling behind monetary expectations has been widely recognized in economics, we suggest that this link is carried across domains.

In Section 2, we present Study 1 and discuss its limitations. Section 3 presents Study 2. In Section 4, we discuss our findings and propose further research to dismantle the underlying mechanisms of our results.

2. Study 1

2.1. Procedure

Assistants blind to the research questions approached over 500 randomly selected passengers joining various check-in lines at the Ben Gurion Airport. They were invited to participate in a five-minute study in which they could earn between 10 and 60 ILS (Israeli Shekel).[4] To avoid spillover effects, only a few passengers from each line were approached and recruited.

In total, 441 passengers agreed to participate. They received a brief survey sheet with their assigned ID number (also received as a small slip for later identification), a timestamp (recording the exact time of entering the check-in line), and the (ordinal) number of their position in line (counted from the beginning of the line, where the check-in desk is located).

First, they provided their best guesses on how long (i.e., how many minutes) they would have to wait to check in. The elicitation of these beliefs was not incentivized, because doing so could have led to a wealth effect or image concerns arising from being right, which might have undermined participants' reporting behavior. Next, they answered some basic demographic questions, disclosed their flight destination and the purpose of their trip, and self-reported on how patient they were on a patient-to-impatient continuum. They returned their answer sheet, kept a slip with their ID number, and were told that they would be approached again after checking in to do a task in which they could earn the money mentioned on the consent form when recruited. They were assured that participation in this task was not mandatory but was necessary to earn the money.

Participants successfully checked into their flights and their exact check-in time was recorded. After the check-in, the DUC task was immediately implemented in the following fashion. Participants received an opaque cup containing a six-sided, fair die. They were informed that rolling a 1 would pay them 10 ILS, rolling 2 would pay 20 ILS, etc., up to 60 ILS for rolling a 6. They were assured that no one would check the actual number they rolled and that they would be paid based solely on the results they reported. Then, they privately rolled the die and reported the number rolled on the sheet, and received cash payments based on their reports. Figure B1 presents the steps and Appendix A, the material of Study 1.

[3] We use one specific meaning of the verb "corrupt", namely "to make someone or something become dishonest or immoral" as defined at the online Cambridge Dictionary (https://dictionary.cambridge.org/dictionary/english/corrupt).

[4] At the time of the study, 10 ILS $\approx$ 3 USD.

2.2. Empirical strategy and hypotheses

We conjecture that longer waits are associated with more lying, and increased lying is positively associated with the unexpected portion of the waited duration.

Waited Duration is the time spent waiting in the check-in line, expressed in minutes. *Absolute Gap* captures the unexpected portion of waits and is the absolute difference expressed in minutes between the *Waited Duration* and the *Guessed Duration* (i.e., how many minutes participants expected to wait in the first place).[5] We estimate the following specifications with demeaned *Waited Duration* and *Absolute Gap* variables.

$$Normalized\_Report = \beta_0 + \beta_1\ Waited\_Duration\ (+\delta X) + \epsilon \tag{1}$$

$$Normalized\_Report = \gamma_0 + \gamma_1\ Waited\_Duration + \gamma_2\ Absolute\_Gap\ (+\delta X) + \epsilon \tag{2}$$

$Normalized\_Report$ is defined as the raw die-roll report minus the expected value of a fair die roll (i.e., 3.5). We use *Normalized Report* instead of raw *Reports* to facilitate an intuitive understanding of how far the mean reports fall from the expected outcomes, which makes over- or under-reporting easy to identify. This approach also makes the intercept indicate whether, for mean *Waited Duration* and *Absolute Gap*, any over- or under-reporting is present on average. X is a vector of subject-level characteristics.

β_0 and γ_0 capture the mean *Normalized Report* for mean *Waited Duration* and for mean *Waited Duration* and *Absolute Gap* values, respectively. We predict a positive value for β_0 and γ_0 indicating that, on average, for mean *Waited Duration* and *Absolute Gap* values, mean reports are higher than the expected die-roll outcome. In Eq. (1), β_1 describes the association between the increase in *Waited Duration* (irrespective of whether it was expected or not) and *Normalized Report*. In Eq. (2), γ_1 captures the association between an increase in anticipated *Waited Duration* and *Normalized Report* and γ_2 captures the differential effect of unexpectedness on this relationship. Therefore, γ_1 and $\gamma_1 + \gamma_2$ represent the strength of the associations between expected and unexpected *Waited Duration* and *Normalized Report*, respectively. We form the following hypotheses.

Hypothesis 1. On average, there is over-reporting ($\beta_0 > 0$ and $\gamma_0 > 0$).

Hypothesis 2. There is a positive association between *Waited Duration* and *Normalized Report* ($\beta_1 > 0$).

Hypothesis 3. There is a positive association between the expected portion of *Waited Duration* and *Normalized Report* ($\gamma_1 > 0$).

Hypothesis 4. There is a positive association between the unexpected portion of a *Waited Duration* and *Normalized Report* ($\gamma_2 > 0$).

2.3. Results

The final sample consists of 300 participants. The mean (SD) age in years is 34.234 (11.205), and half of the participants are male. Most participants (73.7%) are traveling for pleasure, are from the upper middle class in their respective populations, employed full-time, and have less than a college degree.

From panel "a" of Fig. 1, we learn that most of the participants reported having rolled numbers greater than 4, which high reports occur more frequently than theoretically expected. Panel "b" presents the distribution of passengers' *Waited Duration* values in minutes. From the distribution of the *Absolute Gap* variable (panel "c"), we learn that approximately one-third of the participants deviated by at least 10 min from their *Waited Duration*. Panel "d" presents the distribution of the *Relative Gap* variable, which captures the unexpected increase in wait time as a percentage of the expected time. (Detailed sample demographics and descriptive results of the variables are provided in tables B1 and B2, respectively.)

2.3.1. Addressing the hypotheses

To measure the associations between waits and reporting behavior, and expected vs. unexpected waits and reports, we estimate the specifications presented in Eqs. (1) and (2) respectively, and summarize the results in Table 1. Recall that, in all specifications, we demeaned the scalar variables and sum-coded the categorical ones so that the intercept can be interpreted as the mean response at mean values of the covariates and, in the presence of categorical variables, representing the grand mean across categories.

From the constants in columns 1 and 2, we find support for Hypothesis 1. In all specifications, for mean *Waited Duration* or *Absolute Gap* values, the mean reporting is greater than the expected outcome of the die-roll. In all columns, the magnitude of the coefficients is around 1, indicating that the mean *Waited Duration* and *Absolute Gap* are associated with an average of roughly one dot in over-reporting. The results presented in Column 1 lend support to Hypothesis 2 by demonstrating a positive association between *Waited Duration* and *Normalized Report*. The 0.0133 estimated coefficient of the *Waited Duration* here implies that a roughly 75-min ($\approx 1/0.0133$) increase in waits corresponds to an average one-dot increase in the reports.

[5] For example, if someone waited 60 min and guessed that they would wait 40 min, their *Absolute Gap* is $60 - 40 = 20$ min.

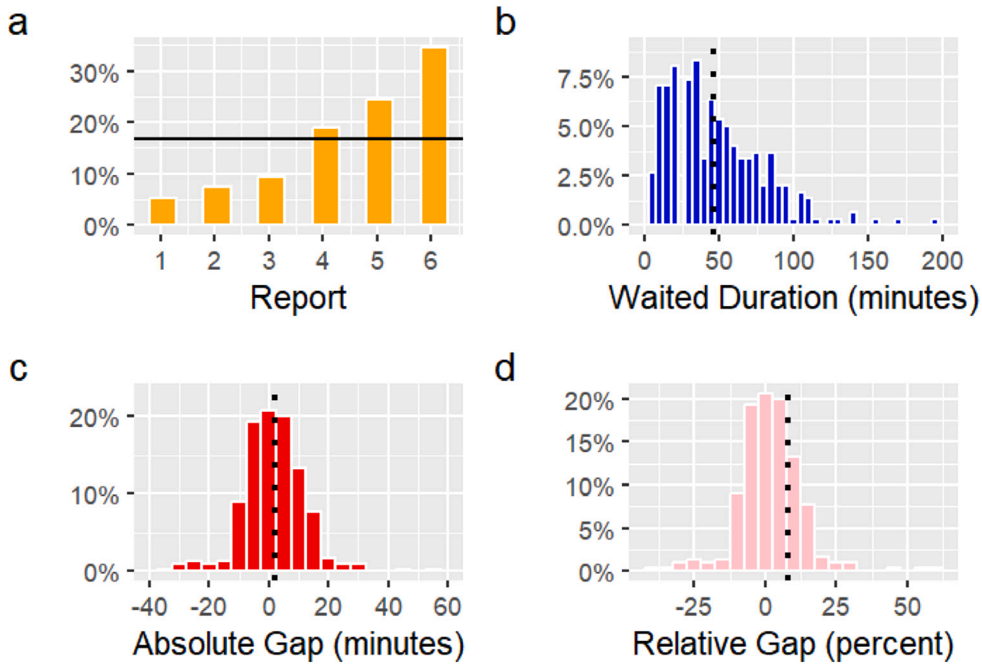

Fig. 1. Distributions of *Report*, *Waited Duration* and *Absolute Gap* and *Relative Gap*.
Notes: Panel "a" shows the distribution of the *Report*. The horizontal black line represents the theoretical proportion of each *Report* (uniformly $1/6 \approx 0.17$). Panel "b" presents the distribution of *Waited Duration* (i.e., how much time in minutes participants waited to get checked in). The vertical dotted line presents the sample's mean *Waited Duration* (i.e., 46.59 min). Panel "c" shows the distribution of *Absolute Gap* (i.e., the difference between *Waited Duration* and *Guessed Duration* for each participant in terms of minutes). The vertical dotted line presents the sample's mean *Absolute Gap* (i.e., 1.89 min). Panel "d" presents the distribution of the *Relative Gap* (i.e., which is ((*Waited Duration/Guessed Duration*)*100)-100). It captures the unexpected increase in wait time, as a percent of the expected. The vertical dotted line presents the sample's mean *Relative Gap* (i.e., 8.25%).

Table 1
Regressing *Normalized Report* on *Waited Duration* and *Absolute Gap*.

	(1)	(1A)	(2)	(2A)	(3)	(3A)
Constant	1.0367***	0.9777***	1.0367***	0.9148***	1.0367***	1.0387***
	(0.0823)	(0.2134)	(0.0793)	(0.1941)	(0.0784)	(0.1995)
Waited duration	0.0133***	0.0133***	0.0096***	0.0100***		
	(0.0021)	(0.0024)	(0.0023)	(0.0025)		
Absolute gap			0.0361***	0.0329***	0.0377***	0.0342***
			(0.0091)	(0.0097)	(0.0095)	(0.0102)
Adjusted R^2	0.0823	0.1060	0.1487	0.1602	0.1682	0.1740
F-statistics	27.810***	2.936***	27.110***	3.952***	7.047***	3.294***
Df1	1	18	2	19	10	27
Df2	298	276	297	275	289	267
Observations	300	295	300	295	300	295
Controls	No	Yes	No	Yes	No	Yes
Waited duration FE	No	No	No	No	Yes	Yes

Notes: OLS with robust standard error estimates (i.e., HC1 method). Standard errors are in parentheses, p-values are two-sided. Scalar variables are demeaned, and categorical variables are sum-coded. The entered Controls are age, income levels, gender, education, employment, travel purposes, and self-reported patience. The samples in columns 1A, 2A, and 3A do not include 1 participant who reported their age incorrectly and 4 participants who did not report their income levels. *Waited Duration FE* denotes the Waited Duration deciles fixed effects. Coefficients of Controls are presented in Table B3, and results with raw *Report* as the regressand are presented in Table B4.
*** $p \leq 0.001$.

Column 2 includes the *Absolute Gap* term, and the results support Hypothesis 3 as we find a positive estimated coefficient of *Waited Duration*. This indicates that an increase in the length of the expected portion of waits is positively associated with *Normalized Report*. Supporting Hypothesis 4, the estimated coefficient of the *Absolute Gap* term is positive: the unexpectedness further exacerbates the

Table 2
Regressing *Normalized Report* on *Waited Duration* and *Relative Gap*.

	(1)	(1A)	(2)	(2A)
Constant	1.0367***	0.8742***	1.0367***	1.000***
	(0.0815)	(0.2193)	(0.0809)	(0.2266)
Waited duration	0.0124***	0.0126***		
	(0.0021)	(0.0023)		
Relative gap	0.0056*	0.0048	0.0056*	0.0046
	(0.0033)	(0.0035)	(0.0033)	(0.0035)
Adjusted R^2	0.1016	0.1173	0.1148	0.126
F-statistics	17.910***	3.056***	4.879***	2.57***
Df1	2	19	10	27
Df2	297	275	289	267
Observations	300	295	300	295
Controls	No	Yes	No	Yes
Waited duration FE	No	No	Yes	Yes

Notes: OLS with robust standard error estimates (i.e., HC1 method). Standard errors are in parentheses, *p*-values are two-sided. *Relative Gap* is the *Guessed Duration* as the percent in excess of *Waited Duration*. Scalar variables are demeaned, and categorical variables are sum-coded. The entered Controls are age, income levels, gender, education, employment, travel purposes, and self-reported patience. Waited Duration FE denotes the *Waited Duration* deciles fixed effects. The samples in columns 1A and 2A do not include 1 participant who reported their age incorrectly and 4 participants who did not report their income levels.

* $p \leq 0.1$.

*** $p \leq 0.001$.

deleterious association between *Waited Duration* and die-roll reports.

Translating our results into monetary terms, in the event of honest reporting, the expected earnings for our DUC task is 35 ILS. At the mean level of *Waited Duration*, the mean over-reporting is associated with an approximate increase of 10 ILS in earnings (i.e., a one-dot increase), which corresponds to 28.6% of the expected earnings ((10/35)*100). From the observed level of over-reporting, our participants asked for 40% of the maximum increase ((10/(60-35))*100) that they could have accumulated had they been willing to report the highest number on the die. This proportion is higher than the 23.4% reported by Abeler et al. (2019), which increase we attribute to the effect of the waiting experience.

Columns 1A and 2A document that the magnitudes of the estimated coefficients are preserved after entering all control variables; see Table B3 for details. We find that, among all controls, only patience is associated with reports. In particular, an increase in *Patience* is associated with a lower mean *Normalized Report*.

Recall that Fig. 1 documents that the distribution of *Waited Duration* is right-skewed. To ensure flexible control and equal weights across different levels of *Waited Duration* when estimating the coefficient of the *Absolute Gap* term, we rerun the specification with fixed effects for the deciles of *Waited Duration* and summarize the results in specifications 3 and 3A in Table 1. We learn that the estimates of the *Absolute Gap* coefficient are robust to these alternative specifications.

Despite the results presented in Column 3, the unexpected portion of waits in general, especially as expressed in the *Absolute Gap* variable, might not withstand scrutiny. First, it is created from the *Guessed Duration* and the *Waited Duration* variables, which are both endogenous. Second, the elicitation of guesses was not incentivized, which gives an additional reason to question the reliability of the *Guessed Duration* variable and all results related to it. Although we recount these (and other) selection issues when discussing Study 1 results and motivating Study 2 design choices, in the remainder of this section, we test the robustness of documented associations between expected and unexpected waits and *Normalized Report* by expressing the unexpected portion of the waits in an alternative way. We create a *Relative Gap* variable that captures the unexpected increase in wait time as the percentage by which the waiting time exceeds the expected time.[6] To emphasize the relevance and importance of this exercise, consider, for example, two passengers, each with a 30-minute *Absolute Gap* value. The preferences for lying of a passenger who expected to wait 30 min and actually waited 60 min may differ from another passenger who expected 60 and waited 90 min. Although the difference is 30 min for both, for the first passenger, the increase is 100% of their guess, whereas the increase is 50% for the second.

We replace *Absolute Gap* with (demeaned) *Relative Gap* and rerun the regressions as specified in Eq. (2). From columns 1 and 2 presented in Table 2, we find that *Relative Gap* and *Normalized Report* are not associated at conventional α-levels, while *Waited Duration* continues to be positively associated with *Normalized Report*. This exercise highlights that the effect of the unexpected portion of the wait duration is not robust to alternative formulations. We learn that while in absolute terms the increase in unexpected duration matters for shaping lying behavior, when expressed as a relative increase, the documented association dissipates.

[6] *Relative Gap* = ((Waited Duration/Guessed Duration)*100)-100. We thank one of the anonymous reviewers for this very creative suggestion.

2.4. Discussing Study 1 results

The main finding in Study 1 is the positive association between waiting duration and lying behavior. Next, we discuss the limitations of Study 1 and simultaneously motivate the conceptual framework of Study 2. Crucially, there may be endogenous factors in Study 1 that could have selected passengers into different wait durations and guesses. This aspect hinders the establishment of causation between the expected and unexpected portions of waits and preferences for lying. Furthermore, the elicitation of guessed duration was not incentivized, raising concerns about the robustness of the association between the unexpected portion of the *Waited Duration* (i.e., *Absolute Gap*) and reports.

There may also exist uncontrolled variations that correlate with one's endogenous propensity to lie and are systematically related to how long one waits and expects to wait. First, it is conceivable that everyone has a different endogenous propensity to lie, and this trait is instrumental in determining which line position one is willing to take. For instance, someone with a low lying propensity would only accept line positions closer to the check-in desk. These participants would then naturally experience shorter waits, as *Line Position* correlates with *Waited Duration* (Pearson's $rho = 0.876$, $p \leq 0.001$; see Figure B2). Although we do not find evidence in our sample that participants systematically selected into *Line Positions* along their observables (see Figure B3), such selection is still imaginable.

Second, consider the possibility of selecting into different values of *Guessed Duration*. It is conceivable that certain characteristics are associated with lying propensity and with forming expectations about the wait duration. Although in our sample, we find no evidence of selecting into different levels of *Guessed Duration* along observables (see Figure B4), we cannot rule out this possibility. Consider, for instance, that the dispositional optimism of passengers is one of such traits. Dispositional optimism captures positive expectations about future outcomes in general, and is a stable cognitive and affective trait (Carver and Scheier, 2014). It is conceivable that two passengers in the same line position make divergent guesses solely attributable to the difference in their trait optimism, which then selects them into different gaps. To our knowledge, no research has been published on the relationship between dispositional optimism and dishonesty. State optimism, on the other hand, is a temporary state in which people form positive expectations about a specific future outcome (Carver and Scheier, 2014). We located one experimental paper from Siniver and Yaniv (2019) documenting that people in an optimistic (pessimistic) mood lie more (less) in the DUC task. To fill this gap, in Study 2, we test whether dispositional optimism is associated with dishonesty.

Another factor that may have inadvertently shaped DUC reports is passengers' internal state of feeling hurried when performing the DUC task. In particular, it is conceivable that reports were shaped by how hurried passengers felt while performing the task, or that those who felt rushed were more likely to select into or out of the experiment. Knowing how much time is left for each passenger until take-off when performing the DUC task could be an objective proxy of "hurry". Unfortunately, we did not collect this information. Even if we had done so, we would still not have known whether the passengers were aware of the actual departure time of the flight and, if so, how confident they were that the flight would depart at the scheduled time. Moreover, there is controversy in the literature over how time pressure (or the subjective perception thereof) influences truth-telling preferences on the die-rolling task (Weyergans, 2019). Some find that being under time pressure is associated with increased lying (Bereby-Meyer and Shalvi, 2015), while others find an association with increased honest reporting (Kandul and Naguleswaran, 2019; Foerster et al., 2013). In Study 2, we eliminate the scope for feeling rushed as the experimental sessions are scheduled for a fixed-length, and subjects are assured that they will be dismissed at the scheduled end of their session.

Finally, the uncovered relationship between increased waits and lying may have been driven by negative reciprocity. Passengers may have felt that the airport or airlines wronged them by forcing them to wait too long, and responded with increased lying to even the score with these companies. Although we are inclined to refute this explanation since our participants knew that our research had nothing to do with the airport or the airlines, with whom the waiting episode could reasonably be associated, to minimize the possibility of direct negative reciprocity in Study 2, we make it explicitly clear that the waiting episode is entirely independent of the researchers and the budget from which the DUC task earnings are paid.

3. Study 2

The purpose of Study 2 was to replicate the main finding of Study 1 and, in particular, to test whether there is a causal relationship between lengthy waits and dishonesty, and between the unexpectedness of this duration and dishonesty. Therefore, Study 2 is a laboratory experiment in which the waited duration (long and short) and its (un)expectedness are exogenized, and subjects are randomly assigned to treatments. The setup yields a 2-by-2 factorial design — Duration (Long or Short) by Expectedness (Expected or Unexpected) — with four conditions. In both cells of the Expected treatment arm, when the waiting episode began, subjects were informed about its duration (Long or Short). In both cells of the Unexpected treatment arm, when the waiting episode began, subjects were not informed of its duration (Long or Short). Due to randomization and otherwise symmetric information provision across cells, in the Unexpected cells, subjects' endogenously formed expectations about the wait duration ahead of them should, on average, not differ between the Long and Short durations. This setup allows us to test whether, on average, longer waits cause more lying than shorter waits, and unexpected long waits cause more lying than expected ones.

To eliminate alternative explanations that arise when interpreting Study 1 results, we made the following design choices in this experiment. First, Study 2 consisted of a "Financial decisions study" and a "Psychology study". The former belonged to us and was paid from our budget, whereas the latter belonged to different researchers and budgets, and subjects were informed of this fact. To further emphasize this distinction, the "Psychology study" was carried out on the computer, and the "Financial decisions study" was conducted as a paper-and-pencil experiment. The waiting manipulations were deployed in four conditions in the "Psychology study" and the DUC task — which belonged to the "Financial decisions study" — was administered right after the waiting manipulations. In summary, our "Financial decisions study" was built around the "Psychology study" to take advantage of the waiting manipulation of the latter. This design aspect minimized the direct negative reciprocity channel from the causal association between lengthy and unexpected waiting and reports on the DUC task. This is because the waiting episode was not attributable to us, who conducted and paid for the DUC task within the framework of the "Financial decisions study".

Second, before administering the DUC task, the waiting episode (which was induced in the "Psychology study") was successfully resolved.[7] The task for which subjects waited was trivial, quick, and without right or wrong answers. It required typing the first word that occurred to the subjects when they saw an image. These design aspects ensured that the entire waiting episode was absent uncertainty and tension over the resolution of the waiting episode and the ability to complete the task, (dis)advantageous or failed resolutions, and monetary- or image-related outcomes. By eliminating these potential confounding factors, we could establish a causal relationship between lengthy and unexpected waiting, and reports on the DUC task.

Third, each experimental session was scheduled for and, in fact, implemented in a fixed duration, which was announced and committed to in advance. Subjects were also informed that to get paid, they would have to stay for the entire duration.[8] To eliminate subjects' concerns about not finishing in time and the possible corresponding feeling of being in a hurry, subjects were told that the DUC task was the penultimate experimental step and was implemented well before the scheduled end of their session. Fourth, to investigate whether dispositional optimism is associated with dishonesty, we measured *Dispositional Optimism* with the LOT-R scale (Scheier et al., 1994).

3.1. Procedure and parameters

Study 2 was implemented in the lab facilities of Bar-Ilan University, Israel, and conducted by research assistants who were blind to the research questions. The subjects were recruited from psychology classes, but were from various study fields that covered natural, formal (henceforth, exact sciences), and social sciences. They were recruited to participate in two studies, which could last up to 20 min, and were implemented in scheduled, fixed-length time slots, ensuring that sessions would not go beyond schedule. They were told that the session involved two studies for which they would be paid separately and from independent budgets of two different sets of researchers. For completing the "Psychology study", they would receive a course credit for their psychology class (this study did not belong to us). For completing the "Financial decisions study" — which belonged to us — they would be paid in cash. Here, their expected earnings were between 10 and 60 ILS, but they were informed that their actual earnings would depend on their luck and choice.

Each session was scheduled for a specific date and time (no late show-ups were accepted). Participants were recruited for parallel sessions, and the duration of the parallel sessions was kept equal. Consequently, parallel sessions were either Long or Short treatments, but they were randomized into Expected or Unexpected cells.

First, participants signed the informed consent form and were seated in a cubicle. Second, they completed a paper-and-pencil survey on basic demographics and responded to the 10 LOT-R items. They were informed that this survey belonged to the "Financial decisions study". Third, the "Psychology study" was implemented on the computer. Participants clicked on a link that opened a Qualtrics survey. They learned that this experiment belonged to another researcher (their name was indicated), from whom subjects would receive a course credit for completion. Subjects indicated their age and gender and clicked on an arrow to proceed. Then, they read that on the next screen they would see an image and would be asked to type the first word that occurred to them. To see the image, one needed to click on an arrow to proceed. After clicking on the arrow to proceed to the next screen, the waiting manipulations were implemented by displaying the following text in the Short-Expected and Long-Expected cells: "Wait! The image is loading. This will take 15 seconds (Duration = Short)/3 and a half minutes (Duration = Long). Hang on and sit quietly!"[9] The waiting manipulation reads as follows in the Short-Unexpected and Long-Unexpected cells: "Wait! The image is loading. Hang on and sit quietly!" Note that in all treatments, the waiting-manipulation page always included the number of seconds elapsed, but the expected duration of total waiting was only provided in the Expected cells. To equalize the information subjects had across cells, after the waiting episode, everyone was informed of how long they had waited for the image to load.

Next, the image was presented to the subjects and their task was to type in the first word that occurred to them. The final screen thanked them and informed them that the psychology professor's study was over, and that the assistants would inform them about the next steps.

Fourth, participants were instructed to reach behind the computer, where they would find a sheet with the number "2" on it and a cup with a die in it. They read the instructions for the DUC task and its payoff structure. They were instructed to roll the die privately, write the number they rolled on the sheet, and turn it over. They were informed that this was the penultimate task in the experiment.

[7] Note that the research in this "Psychology study" is part of a broader research agenda of cognitive psychologists with whom we partnered to implement our research.

[8] To ensure that the actual duration of the entire experiment was the same in the Long and Short cells, subjects in the Short cells received some filler tasks after they had completed all the Study 2 tasks.

[9] Wait durations of 15 seconds and three and a half minutes in the Short and Long cells, respectively, were determined by piloting. Fifteen seconds was the shortest duration that subjects still experienced as waiting, and three and a half minutes was the longest that subjects were still willing to tolerate. We assumed that any noticeable wait for an image to load was experienced as unexpected, since nowadays it is natural for images to load almost instantaneously on computers, which we assumed to be an implicit expectation among all users.

Fifth, subjects were asked again to reach behind the computer for a sheet with the number "3" on it and fill it out. This survey asked about how frustrated, disappointed, relaxed, and pleased they felt during the DUC task, and their responses were anchored on a 5-level Likert scale from strongly disagree to strongly agree. They were also asked whether they believed that the DUC task and the computerized task belonged to a different researcher, with Yes or No response options. Sixth, participants received their payments. Note that in the Short cells, before getting paid, the subjects completed some filler tasks. Table B5 describes the steps of Study 2.

To determine the necessary sample size for the experiment, we expected a small to medium estimated effect size for possible average differences between the treatment groups using the variance of the reports observed in Study 1. For a power of 0.8, the minimum required sample size was 60 per group. Therefore, we collected 70 observations per group, resulting in a total sample size of 280.[10]

3.2. Empirical strategy and hypotheses

Consistent with our preregistered hypotheses, we expect that long waits cause higher mean reports than short waits, both when the duration is expected and unexpected. These predictions are tested using the following specifications:

$$Normalized\_Report = \beta_0 + \beta_1 Long + \beta_2 Expected + \beta_3 Long \times Expected \ (+\delta X) + \epsilon \quad (3)$$

$$Normalized\_Report = \beta_0 + \beta_1 Long + \beta_2 Unexpected + \beta_3 Long \times Unexpected \ (+\delta X) + \epsilon \quad (4)$$

Normalized Report is the outcome variable, defined (as in Study 1) as the report minus the expected value of a fair die roll (i.e., 3.5). $Long$ is a dummy variable for Long waited duration. $Unexpected$ and $Expected$ are dummy variables for the Unexpected and Expected waited durations, respectively. X is a vector of the observable characteristics of subjects.

In Eq. (3), β_0 captures how much mean reporting deviates from the expected outcome of the roll when the duration is Short and Unexpected. In Eq. (4), β_0 captures how much mean reporting deviates from the expected outcome of the roll when the duration is Short and Expected. β_1 captures the effect of Long versus Short Duration on *Normalized Report* when the duration is Unexpected (Eq. (3)) or Expected (Eq. (4)). β_2 captures the effect of Expectedness compared to Unexpectedness (i.e., Eq. (3)) or, vice-versa (i.e., Eq. (4)) on *Normalized Report*. In both specifications, β_3 measures whether the Long versus Short Duration difference varies between the Expected or Unexpected cells. We test the following hypotheses with these specifications.

Hypothesis 5. When the duration of waiting is Unexpected, Long waits, on average, cause higher reports than short waits, $\beta_1 > 0$ in Eq. (3).

Hypothesis 6. When the duration of waiting is Expected, Long waits, on average, cause higher reports than short waits, $\beta_1 > 0$ in Eq. (4).

We also predict that mean reports would be the highest in the Long-Unexpected cells. Therefore, we compare the mean *Normalized Report* in the Long-Unexpected cells against each of the three other cells to address Hypothesis 7.

Hypothesis 7. The average highest report is observed for Long and Unexpected waits.

3.3. Results

A total of 280 students participated in the experiment; 70 students per cell. The mean age in years is 24.89 (2.61), and 50% of the participants are female and 50% male, keeping the gender composition consistent in all four cells. Overall, 64% of subjects indicated social sciences and 36% exact sciences as study fields. See Table B7 for detailed demographics.

From Table 3 we learn that the means of the *Report*, *Normalized Report*, *Frustration*, *Disappointment*, *Relaxed* and *Pleased* responses differ across the four treatments, whereas mean *LOT_SUM* value does not. Additionally, almost everyone correctly held the belief that the "Psychology study" and the "Financial decision study" belong to different researchers.

3.3.1. Addressing hypotheses

To address our hypotheses, we regress *Normalized Report* on the two experimental terms and their interactions; see Table 4 for a summary of the results. Specifications 1 and 2 test Hypotheses 5 and 6, respectively. Controls (demeaned and sum-coded demographics variables for scalar and categorical variables, respectively) are added to specifications 1A and 2A.

From the constants in specifications 1 and 2, we learn that the marginal mean *Normalized Report* is greater than zero in the Short-Unexpected and in the Short-Expected cells, respectively. This indicates that, in these two cells, the average die-roll reports

[10] We used the "pwrss" R package (Bulus, 2023) to determine the sample size for a small effect size of $\eta^2 = 0.04$; details and code are presented in Appendix B. It also presents the ex-post power calculation based on the observed effect sizes and standard deviations. The preregistration can be found at https://aspredicted.org/q95k-br76.pdf.

Table 3
Means (SDs) of the experimental variables in the four treatments of Study 2.

	Short		Long		Statistical test
	Expected	Unexpected	Expected	Unexpected	
Report	4.043 (1.324)	4.157 (1.400)	4.714 (1.092)	5.257 (0.863)	$F(3,276) = 15.500$***
Normalized report	0.543 (1.324)	0.657 (1.400)	1.214 (1.092)	1.757 (0.863)	
LOT_SUM	17.557 (2.528)	16.857 (2.655)	16.929 (2.656)	16.443 (2.690)	$F(3,276) = 2.136$
Frustrated	1.486 (0.654)	1.900 (0.995)	3.557 (1.030)	4.20 (0.926)	$F(3,276) = 141.8$***
Disappointed	1.557 (0.773)	1.786 (0.915)	2.114 (1.136)	2.614 (1.266)	$F(3,276) = 13.61$***
Relaxed	3.871 (1.034)	3.757 (1.268)	1.500 (0.717)	1.829 (0.900)	$F(3,276) = 109.20$***
Pleased	4.314 (0.971)	4.1710 (0.932)	3.328 (1.411)	3.400 (1.160)	$F(3,276) = 14.22$***
Different	1.00 (0.000)	0.986 (0.120)	0.986 (0.120)	0.986 (0.120)	$\chi^2(3) = 1.01$

Notes: Report is the number reported on the DUC task. *Normalized Report* is the *Report* minus 3.5 (i.e., the overall expected value of the die-roll). *LOT_SUM* is the sum of the responses on the LOT-R survey. *Frustrated*, *Disappointed*, *Relaxed*, and *Pleased* questions were asked after the DUC task was completed, and queried subjects' emotions during the DUC task (in retrospect). Their responses were anchored on a 5-level Likert scale: 1 — strongly disagree, 2 — disagree, 3 — neutral, 4 — agree, 5 — strongly agree. *Different* is the proportion of subjects responding Yes to the question about whether the "Psychology study" and the "Financial decisions study" belonged to different researchers. The five items in the bottom panel served as retrospective manipulation checks.
*** $p \leq 0.001$.

Table 4
Summary of regressing *Normalized Report* on experimental terms and controls.

	(1)	(1A)	(2)	(2A)
Constant	0.6571***	0.5781***	0.5429***	0.4122*
	(0.1674)	(0.1608)	(0.1582)	(0.1693)
Long	1.1000***	1.0697***	0.6714**	0.6921**
	(0.1966)	(0.1970)	(0.2051)	(0.2120)
Unexpected			0.1143	0.1659
			(0.2303)	(0.2301)
Long X Unexpected			0.4286	0.3775
			(0.2841)	(0.2922)
Expected	−0.1143	−0.1659		
	(0.2303)	(0.2301)		
Long X Expected	−0.4286	−0.3775		
	(0.2841)	(0.2922)		
Adjusted R^2	0.1349	0.1405	0.1349	0.1405
F-statistics	15.500***	4.509***	15.500***	4.509***
Df1	3	13	3	13
Df2	276	266	276	266
Observations	280	280	280	280
Controls	No	Yes	No	Yes

Notes: OLS with robust standard error estimates (i.e., HC1 method). Standard errors are in parentheses, *p*-values are two-sided. The experimental terms are dummy-coded. Among Controls, scalar variables are demeaned, and categorical variables are sum-coded. Controls: age, gender, education, income, study field. The estimated coefficients of Controls in specifications 1A and 2A are summarized in Table B8.
* $p \leq 0.05$.
** $p \leq 0.01$.
*** $p \leq 0.001$.

are higher than their mean expected outcomes, corresponding to an average earning of approximately 40 ILS.[11]

From specifications 1A and 2A, we learn that the marginal means are greater than zero after adding Controls (coefficients of the constant terms are greater than zero) and that the mean *Normalized Report* are higher in the Long cells than in the Short cells, even after including Controls. Since it is possible that *LOT_SUM* measure is a potentially endogenous control (Gillen et al., 2019), we do not include it among the Controls in these specifications. Instead, we include (demeaned) *LOT_SUM* scores in the main specifications and summarize the results in Table B10 in Appendix B, and we find that increased trait optimism is marginally positively associated with *Normalized Report*. However, due to the potential endogeneity of self-reported optimism, one should be cautious when interpreting these results.

[11] To facilitate an intuitive understanding, in Table B9 in Appendix B, we present the effects of each treatment on *Normalized Report* in comparison to the Short-Expected and Long-Unexpected cells by using the alternative specifications described in Equation B1.

Next, we address Hypothesis 7 and perform three pairwise comparisons (t-tests) to test whether the mean *Normalized Report* is the highest in the Long-Unexpected cell. In support of Hypothesis 7, we find that the mean *Normalized Report* is higher in the Long-Unexpected cell than in the Long-Expected ($t(130.99) = -3.2633$, $p = 0.0042$), the Short-Unexpected ($t(114.80) = -5.5958$, ≤ 0.001) and the Short-Expected cells ($t(118.68) = -6.4302$, ≤ 0.001); p-values are Bonferroni adjusted for the three pairwise comparisons.

Finally, in Appendix B, we present some exploratory (and not preregistered) results showing the association between the four self-reported emotions and the DUC reports. We find that self-reported *Frustration* and *Disappointment* during the waiting episode are positively — while feeling *Relaxed* and *Pleased* are negatively — associated with the reports, see Table B11 and Figure B5 in Appendix B. The results of a causal mediation analysis exploring the direct and indirect (mediated by emotions) effect of Long waits on reports show that self-reported frustration and agitation (lack of relaxedness) significantly mediate the effect of Long manipulation, while the direct main effect of Long manipulation is significant. Specifically, frustration mediates approximately one-third of the effect of the Long manipulation on reports, while this proportion is roughly half for relaxedness (decreased agitation).

4. Discussion

Across two studies, we documented that long waits, especially when unexpected, increase lying to improve one's financial conditions. Study 1 provided correlational evidence on the association between lengthy waiting and dishonesty. Study 2 exogenously varied the length of the wait and whether the duration was expected or unexpected and provided causal evidence that lengthy waiting corrupts, especially when this length is unexpected. Interestingly, it was not only the length of waiting that mattered in shaping preferences for lying, but its unexpectedness as well. The associations between these factors and dishonesty were robust after controlling for demographic variables that were not systematically associated with the measured behavior.

We advance the interpretation that, after having incurred a loss in the time domain, people might seek compensation in the monetary domain, even if this entails lying. Falling behind expectations on the time dimension may instill the sense of having lost out, which may then instigate compensation-seeking, even if this makes relaxing one's morals. This pattern suggests that there may be some form of cross-domain compensation-seeking across the time and the monetary domains. Therefore, we propose that people who experience unexpected waits may seek monetary compensation in another situation that occurs incidentally after their unfortunate experience, even if this involves relaxing their morals.

To our knowledge, academic research on waiting has not yet recognized the negative potential of waiting in shaping preferences in situations unrelated to the waiting episode. However, we assume that the association uncovered between waiting and eroded morals may have broader implications. Even when a waiting experience is unrelated to a choice situation where morality is pitted against pecuniary gains, having just experienced long and unexpected waits could undermine and erode one's morals. Still, we refrain from speculating about the mechanism — unpacking the driving forces goes beyond the scope of this research, as it would require additional experiments. Instead, we draw attention to findings from the exploratory mediation analysis documenting that a significant extent of the lengthy waiting was mediated by self-reported frustration and agitation among experimental subjects. Although these results should be considered with caution, they may still hint at the mechanism and are consistent with research documenting that emotions play a primary role in how waits shape choices. It is conceivable that in a frustrated or agitated state, people care less about their "social identity", or that their cost of lying is different from that in a calm state. Future research could uncover how image and/or lying costs change in an aroused state induced by elongated waiting.

Given that people routinely make choices that mainly rely on their ethicality (e.g., buying transit tickets, weighing one's own fruits or vegetables at grocery stores' self-checkouts, sorting recycling at home, etc.), any experience that could erode moral preferences imposes negative externalities on others, which exacerbates the negative consequences of waits. From a broader perspective, one can imagine that in societies with unpredictable institutions where citizens' expectations of how long administrative processes could take are regularly unmet — as in some developing countries (Hope, 2017; Olken and Pande, 2012) — they may react with deteriorated morals which just further perpetuates moral erosion. Although we recognize the existence of various other mechanisms that could corrupt morals within a society, our approach offers some novel insights into these particular sources of demoralization.

In our research, we focused solely on the consequences of long and unexpected waits on lying behavior, and thus, we refrain from drawing welfare implications. Concerning generalizability, one may consider whether there was something special about the participants in our study. Although our participants were mainly from Israel, we see no reason to suspect that they would be special in responding with increased lying to long and unexpected waits.

We conclude that managing expectations in situations that involve waiting could have beneficial consequences. These advantages of expectation management have long been recognized and exploited in the service sector to shape customers' experience for the better and to increase sales. Our results suggest that expectation management in any waiting situation could indirectly improve human behavior by mitigating the possibility of eroded morals.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jebo.2025.106939.

Data availability

Data and code are at https://osf.io/ktmch/.

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