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ORIGINAL PAPER

The Phenomenology of Lying in Young Adults and Relationships with Personality and Cognition

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Abstract
Despite research suggesting that lying may be a normal aspect of development and a fairly frequent occurrence in many adults, surprisingly little is known about its phenomenology and possible associations with relevant personality traits and cognitive functions. University students were invited to participate in an online study, which included a 91-item questionnaire and four neurocognitive tasks (selected to focus on frontal lobe function). The survey included questions about frequency of lying and reasons for doing so, mental health history, personality traits, religiosity, and insight into lying. Those who lied daily ("Daily Liars") were compared to those who lied less frequently ("Non-Daily Liars"). 18.1% of the sample reported lying every day. Daily Liars showed worse grade point averages, quality of life, and self-esteem. Daily Lying was associated with negative functional impact on school, social, and family/home domains. We did not find evidence that is was associated with frontal lobe dysfunction on the cognitive tasks examined.

Keywords Lying · Impulsivity · Personality

Introduction

Most people lie every now and then; however, some individuals lie far more frequently than others. In fact, lying plays a role in the differentiation of the self during normal development [1]. When persistent and compulsive, however, lying may result in difficulties for people. In a 2002 study conducted by the University of Massachusetts, 60% of adults lied at least once

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during a 10 min conversation. Additionally, of those 60% who did lie, each person told an average of 3 lies during their conversation [2]. There may be multiple reasons for why people lie. Some may lie to improve their own self esteem or to make another person feel better [2], whereas some people lie to seem more impressive and likeable [3]. A recent report in the National Geographic found that the majority of people (59%) between the ages of 18 and 44 lied one to five times per day and an additional 15% told more than five lies each day [4].

Several studies have examined how personality constructs, such as manipulativeness, anxiousness, and sociability, may be related to the perceived ability to lie in everyday life [5–7]. Several years ago, Ford and colleagues identified personality disorders they felt were associated with lying: Antisocial, histrionic, narcissistic, borderline, and obsessive-compulsive personality disorders [1]. Other research has suggested that people with antisocial personality disorder tend to tell manipulative lies, while people with narcissistic personality disorder may tell falsehoods to boost their image [4].

From a neurocognitive perspective, studies have previously explored relevant mechanisms during lying: typically, comparing responses for honest and dishonest responses in the same participants (for detailed discussion see [8]). For example, a meta-analysis of reaction time tasks found that lying was associated with a large reaction time cost compared to control conditions [9]. In contrast to this body of research examining mechanisms involved directly in the process of lying, relatively little is known about whether people who lie exhibit cognitive deficits versus controls *in general*. An association between lying and worse cognition may be anticipated based on the finding that antisocial behavior (which is linked with lying) has been associated with executive dysfunction [10]; as has antisocial personality disorder [11]. There has been some suggestion that lying is linked with disorders of impulsivity (i.e. that a person fails to learn from the past and that others use the past for reference) [12]. Failing to learn from the past, as is implicated in impulsive disorders such as pathological gambling and intermittent explosive disorder (IED), can cause significant impairment in social and occupational functioning as well as legal and financial difficulties [13]. It has been implied that the frontal cortex is fundamental to lying as it facilitates planning, attention, and self-control [4]. Furthermore, one study found that pathological liars exhibited a 22–26% increase in prefrontal white matter compared to people with antisocial personality disorder [14]. Pathological lying has also been associated with right hemithalamic dysfunction based on SPECT scan [15].

Given the relative paucity of research into lying, the aim of this study was to explore frequency and reasons for lying in young adults; and associated personality / cognitive features linked with higher frequency of lying. Based on the limited findings from the previous literature, we hypothesized that people who lie daily would be more likely to exhibit problems with self-esteem and impulsivity.

Methods

Participants

Participants included 138 students at a small, nondenominational and coeducational Midwestern college. Study participants completed an online survey addressing lying, which include four cognitive tests (see later). Recipients were recruited via email, and were first required to view the IRB-approved online informed consent page, at which point students could choose to participate in the survey or to opt out. The survey asserted

that all information provided was not linked back to their personally identifiable information; and that participation was confidential. Participants were given the option to enter a raffle to win one of three $150 gift cards to an online store. Participants were required to review all survey questions to be eligible for prize drawings, but were not required to answer all questions, due to the sensitive nature of some of them. All study procedures were carried out in accordance with the Declaration of Helsinki and were approved by the Institutional Review Board of the University of Chicago.

Assessments

The self-report survey consisted of 91 questions and four computerized cognitive tasks, taking approximately 30 min to complete per individual. Survey questions assessed demographic information, self-reported academic achievement (i.e., grade point average [GPA]), and questions regarding self-esteem, lying, religiosity and personality traits.

Embedded within the survey, each participant completed the following valid and reliable measures:

Lie Acceptability Scale The self- report Lie Acceptability Scale (LAS) examines an individual's attitude about deceptive communications using 11 Likert-like items with a seven-point response range from strongly disagree (1) to strongly agree (7). Of the 11 questions on the scale, 4 of them are reversed, and the average of all responses is used as the lie acceptability total score [16].

Machiavellian Personality Scale **(MPS) [17]** The MPS is a 16-item scale assessing four domains of personality: Distrust of others (people scoring high on this are not just cynical about the motivations of others; rather, they are actively distrustful of the actions of others and the potential for negative outcomes that may occur because of those actions); Amoral manipulation (high scorers in this area are willing to disregard standards of morality and see value in behaviors that benefit the self at the expense of others); Desire for control (high scores reflect a desire for domination over interpersonal situations and minimize the extent to which others have power); and Desire for status (higher scores suggest a stronger motivation by external goals such as wealth, power, and status rather than internal goals like personal develop).

Brown Assessment of Beliefs Scale **(BABS) [18]** We used 3 questions from the BABS specifically focusing on awareness of lying behavior: how aware the person is about lying; can they explain the difference between when they lie and what others think about the truthfulness of what they are saying; and if questioned about whether or not they were telling the truth, what their reaction might be. Lower scores suggest a greater awareness of their lying.

Passive Aggressive Personality Disorder To examine passive aggressive personality disorder, each participant completed the module taken from the Structured Clinical Interview for DSM IV axis II disorders (SCID-II) [19]. The signs of a passive aggressive personality disorder include resentment and opposition to the demands of others, procrastination and intentional mistakes in response to others' demands, cynical, sullen or hostile attitude, and frequent complaints about feeling underappreciated or cheated (based on the DSM-IV [20]).

Duke University Religion Index (DUREL) **[21]** Religiosity was assessed using the DUREL, a valid and reliable, 5-item measure of religious involvement across three domains: organizational religious activity (ORA), non-organizational religious activity (NORA), and intrinsic or subjective religiosity (IR). The ORA domain assesses frequency of participation in religious services (1 = never to 6 = more than once/week). The NORA domain measures the extent of involvement in private religious activities, such as prayer or the study of religious texts (1 = rarely or never to 6 = more than once a day). The IR domain (3 items) assesses the degree to which the participant is motivated by or committed to his or her religion (1 = definitely not true to 5 = definitely true of me). Higher scores reflect greater religiosity.

***Internet Addiction Test* (IAT) [22]** The IAT measures maladaptive internet use. The IAT comprises 20 questions examining facets of PIU. Scores on the IAT range from 20 to 100 with 20–49 reflecting mild Internet use, 50–79 moderate Internet use, and 80–100 reflecting severe Internet use.

Rosenberg Self-Esteem Scale (RSE) The RSE measures both positive and negative feelings about the self, utilizing a 4-point Likert scale where scores range from strongly agree to strongly disagree [23]. This yields a total score, with higher scores indicating better self-esteem.

Cognitive Assessments

Based on the possible involvement of frontal cortex in lying, and a reported link in the literature between impulsivity and lying, we included the following four online cognitive tasks. These were included after the questionnaire part of the online survey. The reader is referred to the citations provided for more discussion of the nature of these types of task and their theoretical backgrounds.

1. *5-Trial Adjusting Monetary Discounting Task* (adapted from [24]). This is a task adapted from the original Kirby Questionnaire, which measures the tendency to prefer shorter more immediate theoretical monetary rewards compared to larger delayed theoretical monetary rewards. The outcome measure was the K value, a measure of discounting. Higher k indicates that the subjective value of a reward decays more steeply as a function of time, i.e. higher discounting-related impulsivity.
2. *Spatial Working Memory task*. This task adapted from [25]. Volunteers attempt to locate tokens hidden inside boxes on the screen. They are told in advance that tokens will not be hidden behind the same box twice. Hence the task measures the ability to hold location information 'on-line' and retrieve rewards from different locations, also known as working memory. The outcome measure of interest was the total number of errors made on the task.
3. The *Hampshire Tree task*. The task was adapted from the classic Tower of London task [26]. Volunteers attempt to work out 'in mind' the minimum number of moves it would take to move a set of colored balls on sticks to match a goal arrangement shown by the computer. This quantifies executive planning. The outcome measure was the total number of errors; i.e. the total incorrect choices made.

4. The *Intra-Extra Dimensional Set Shift Task* (IED). This was adapted from the classic attentional set-shifting paradigm [27]. Volunteers view two stimuli on-screen and attempt to work out which of the two is correct. After making a choice, the computer gives feedback ('correct' or 'incorrect'). Through trial and error, the participant works out the underlying rule governing which stimulus is correct. By varying the rule over time, the task examines the ability of the person to learn and flexibly adapt their behavior. The outcome measure was the total errors made.

Statistical Analysis

Participants were grouped according to how often they lied: daily ("Daily Liars") or less frequently ("Non-Daily Liars"). Demographic, clinical, and cognitive measures between the two groups were compared using analysis of variance or suitable non-parametric tests as indicated in the text. This being an exploratory study, statistical significance was defined as $p < 0.05$ uncorrected. All statistical analyses were conducted using JMP Pro Software.

Results

Of the 138 participants, 25 (18.1%) reported lying on a daily basis. Those who reported daily lying were more likely to report a lower quality of life and that lying had adversely affected multiple domains of their lives (Table 1). Those students who lied daily reported lower school performance (lower GPAs), poorer self-esteem, and more symptoms of a passive aggressive personality disorder. There were no differences between those who lied daily versus did not, in terms of religiosity or awareness of lying (i.e. BABS scores). The two groups did not differ on the main type of person lied to (see Supplementary Online File; Likelihood Ratio Chi-Square = 3.474, $p = 0.747$). Friends, parents, and strangers were the groups of people most often lied to, whereas the groups of people most seldom lied to were employers, professors, teachers, and significant others. Daily liars were significantly more likely to endorse 'complex lies (relating to identify, accomplishments, or merit)' as the main type of lying (see Online Supplement; Likelihood Ratio Chi-Square = 5.081, $p = 0.024$). The two groups did not differ significantly in terms of self-reported rates of previous psychiatric disorder diagnoses (Supplementary Online; all $p > 0.10$).

There were no differences between daily and less frequent liars based on cognitive measures (Table 2).

In terms of lying behavior, lying was significantly more acceptable to those who lied daily (Table 3). In addition, the daily liars endorsed personality symptoms of amoral manipulation, that is, they were more willing to disregard morality see the value to themselves in their lying.

Discussion

This study examined the prevalence of lying in a sample of university students and its association with a range of demographic, clinical, and cognitive measures. We found that almost one in five students lied on a daily basis, a rate similar to or slightly less than found in community samples [2, 4].

Table 1 Demographic and Clinical Measures Associated with Lying

	Less than daily liars		Daily liars		ANOVA		
	N	Mean (SD)	N	Mean (SD)	F	df	p
Females, N (%) @	113	85 (75.2%)	25	16 (64.0%)	4.956 #	N/A	0.0839
What is your current GPA?	113	3.52 (0.48)	25	3.19 (1)	6.181	1, 136	0.014
Body Mass Index (BMI) (weight/height^2)	95	23.3 (4.8)	17	22.3 (2.6)	0.750	1110	0.388
On a scale of 1–5, how would you rate your quality of life?	113	4.15 (0.82)	25	3.52 (1.08)	10.776	1, 136	0.001
Has your lying affected your school life?	113	1.32 (1.52)	25	2.8 (2.4)	15.408	1, 136	<0.001
Has your lying affected your social life?	113	1.99 (1.85)	25	3.68 (2.46)	15.027	1, 136	<0.001
Has your lying affected your family life/home responsibilities?	113	2.07 (2.03)	25	4 (2.6)	16.674	1, 136	<0.001
Rosenberg Self-Esteem	113	27.76 (5.09)	25	25.04 (4.41)	6.114	1, 136	0.015
Duke Religiosity, organized religious activity	113	2.32 (1.4)	25	2 (1.29)	1.093	1, 136	0.298
Duke Religiosity, non-organized religious activity	113	1.71 (1.19)	25	1.28 (0.84)	2.891	1, 136	0.091
Duke Religiosity, intrinsic	113	6.24 (3.44)	25	5 (2.86)	2.810	1, 136	0.096
Internet Addiction Test	113	32.78 (13.95)	25	32.04 (19.08)	0.050	1, 136	0.824
Passive Aggressive Personality Disorder, number of diagnostic criteria met	113	2.08 (1.69)	25	2.88 (1.72)	4.562	1, 136	0.034
Passive Aggressive Personality Disorder, N (%)	113	17 (15.0%)	25	8 (32.0%)	3.540 #	N/A	0.0599
Brown Assessment of Beliefs, conviction	113	2.82 (1.11)	25	2.56 (1.33)	1.066	1136	0.3036
Brown Assessment of Beliefs, explanation of differing views	113	2.60 (0.70)	25	2.48 (1.00)	0.5204	1136	0.4719
Brown Assessment of Beliefs, fixity of ideas	113	1.78 (0.09)	25	1.72 (0.19)	0.0785	1136	0.7798

Likelihood Ratio test

Although relatively high occurrence of daily lying was expected, we found that the psychological associations were somewhat complex. As expected perhaps in people who tell daily lies, low self-esteem, poor quality of life, and telling complex lies (i.e. fabricating identities and accomplishments) to strangers was evident, suggesting a picture of immaturity whereby lying may compensate for the low self-esteem and a sense of not living the life the person wants. This perspective also seems consistent with the higher number of symptoms of a passive aggressive personality disorder shown in the daily lying group.

One issue that makes the psychological picture rather more complex is that the people who reported lying every day endorsed problems due to the lying that affected every domain of their lives that was quantified. Why tell lies to bolster self-esteem if the lies themselves then result in problems for the person? This suggests that daily lying may have been out of control for some individuals, perhaps being somewhat habitual or compulsive. While this may be the case of some of these people, the fact that the cognitive tasks were normal and that there was a Machiavellian element of amorality associated with daily lying, would suggest that the people who lied daily were in control of their behavior. If this is the case, then it may suggest that the reward from lying outweighs the problems that lying causes. This in turn may explain why anyone lies and why some people lie to a much greater extent than others. Lying is common in children to differentiate themselves from their parents [12]. The assumption is that as identity develops, we essentially grow out of our need to lie. These data suggest that this is clearly not

Table 2 Cognitive measures associated with Lying

	Less than daily liars		Daily liars		ANOVA		
	N	Mean (SD)	N	Mean (SD)	F	df	p
K value, 5-Choice Temporal Discounting Task	81	1073.66 (1424.1)	16	2203.07 (3056.72)	2.0945@	1, 16.3	0.167
Total errors, Spatial Working Memory Task	82	5.32 (6.1)	16	5 (4.73)	0.039	1, 96	0.845
Total errors, Hampshire Tree Task	84	8.54 (2.67)	16	9.25 (2.49)	0.980	1, 98	0.325
Total errors, extra-dimensional set-shifting	75	7.19 (8.39)	16	7 (7.47)	0.007	1, 89	0.935

@ Welch t-test due to unequal variances

the case for many people, and in fact, if the reward from lying outweighs the negative consequences, then perhaps lying as adults is not a developmental problem but rather a means of compensating for other issues (i.e. the risk-benefit balance may be in favor of lying for some people in society).

In the child development literature, executive functions including working memory have been implicated in the ability to deceive by some researchers [28]. In adults, it has been suggested that general cognitive abilities, and executive functions, may be as important determinants of the tendency to lie as personality traits are [29]. Our findings run counter to this model, as we found no evidence for relative cognitive impairments in those who lied daily compared to controls on the domains examined, which included monetary discounting, spatial working memory, executive planning, and set-shifting. It remains possible that other cognitive abilities, such as relating to theory of mind, may play a role in lying in adults, as has been suggested to be the case in children when they lie [30]. It is also important to note that we examined cognitive abilities as a function of lying frequency in general, as opposed to prior work that largely focused on cognitive processes involved directly in the act of lying (e.g. [9]).

This study of lying in non-treatment seeking students has the advantage of having used multiple scales with sound psychometric properties. Nonetheless, there are several limitations. First, the study was cross-sectional and therefore no causality of effects can be determined. Second, online surveys have inherent limitations such as less accurate diagnostic assessment, compared to in-person assessments by a trained clinician. Third, due to the sample size and exploratory nature of this investigation, we presented these results uncorrected for multiple comparisons. The study was not statistically powered to undertake multiple comparisons. For these reasons, findings warrant replication in future work using a larger sample. Finally,

Table 3 Lying and truthfulness measures associated with lying

	Less than daily liars		Daily liars		ANOVA		
	N	Mean (SD)	N	Mean (SD)	F	df	p
Lying Acceptability	113	11.05 (3.69)	25	14.84 (3.7)	21.569	1, 136	<0.001
Machiavellianism, amorality	113	8.73 (3.48)	25	11.12 (4.07)	9.029	1, 136	0.003
Machiavellianism, desire for control	113	11.23 (3.16)	25	12 (3.7)	1.143	1, 136	0.287
Machiavellianism, desire for status	113	8.32 (3.16)	25	7.84 (3.35)	0.459	1, 136	0.499
Machiavellianism, distrust of others	113	11.51 (4.22)	25	11.92 (4.49)	0.186	1, 136	0.667

findings from a fairly homogeneous population of students may not generalize to the larger community of people who lie.

In summary, this study found that lying every day was relatively common in university students, and was associated with worse academic performance and with poorer quality of life and lower self-esteem. Questions remain as to whether people who lie daily actually want to stop their behavior or are unable to stop it.

Compliance with Ethical Standards

Disclosure of Potential Conflicts of Interest Dr. Grant has received research grants from NIAAA, AFSP, TLC Foundation, and Takeda Pharmaceuticals. Dr. Grant receives yearly compensation from Springer Publishing for acting as Editor-in-Chief of the Journal of Gambling Studies and has received royalties from Oxford University Press, American Psychiatric Publishing, Inc., Norton Press, and McGraw Hill. Dr. Chamberlain's research is supported by a Wellcome Trust Clinical Fellowship to Dr. Chamberlain (110,049/Z/15/Z). Dr. Chamberlain consults for Cambridge Cognition, Shire, and Promentis. Ms. Paglia has no potential conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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