



# Development and validation of the pathological lying inventory

Christian L. Hart<sup>1</sup> · Drew A. Curtis<sup>2</sup> · John A. Terrizzi<sup>1</sup>

Accepted: 17 March 2024  
© The Author(s) 2024

## Abstract

Pathological lying has been studied for over a century, but only recently validated diagnostic criteria were developed that consider the frequency, pervasiveness, and chronicity of lying, along with the distress, dysfunction, and risks of danger caused by lying. Using these new criteria, we crafted a set of survey items aimed at measuring those features. In study 1, we carried out exploratory factor analyses that confirmed a three-factor model for our resultant 19-item Pathological Lying Inventory (PLI). In study 2, we validated the PLI against several measures, demonstrating the scores on the PLI are associated with frequent, pervasive, and chronic lying, psychological distress, social dysfunction, and negative life outcomes. In study 3, we conducted a test-retest reliability analysis of the PLI over two weeks, demonstrating that the PLI has high test-retest reliability. Finally, we conducted a confirmatory factor analysis to evaluate the three-factor structure of the PLI. We believe that the PLI will offer researchers and clinicians a brief and valid tool for assessing the degree to which people exhibit patterns of pathological lying.

**Keywords** Pathological lying · Compulsive lying · Deception · Habitual lying · Prolific lying

Most everyone lies, but some lie a lot (DePaulo et al., 1996; Serota & Levine, 2015). The average number of lies people tell per day is about one or two (e.g., DePaulo et al., 1996; Hancock et al., 2004), but the mean number of lies told per day in a population is deceptively high due to a positively skewed distribution (Serota & Levine, 2015; Serota et al., 2010). A more careful examination of lying reveals that most people tell no lies on any given day, while a small group of prolific liars tells a great many. For many of those prolific liars, dishonesty is an individual trait that is stable over timespans of at least months (Serota et al., 2022). The observation that most people are fairly honest, while a few people tend to lie excessively is explained in detail by Truth Default Theory, a broad theory of deception and its detection (Levine, 2019).

In the common vernacular, prolific liars are often referred to as pathological liars, although the terms habitual liars and

compulsive liars are often used synonymously (Curtis & Hart, 2022a; Hart & Curtis, 2023). The psychologist, Hall (1890), first offered a scientific perspective on pathological lying over 130 years ago, and the following year, the psychiatrist, Delbrück (1891), provided several case studies of pathological liars. Those scholars recognized that some people lie so prolifically, and their deceptive behavior is so disruptive that the liars seem to be afflicted with a psychiatric illness. Over the ensuing centuries, pathological lying has continued to be a topic of steady scientific inquiry and clinical treatment. The etiology of pathological lying remains elusive, but recent work suggests that an excessive need for attention, low self-esteem, and a tendency to overestimate the benefits of lying may play significant roles (Curtis & Hart, 2022a; Hart & Curtis, 2023). These same factors may help explain why excessive lying is also a feature of other disorders such as borderline personality disorder. However, perhaps stymying a more robust research program on pathological lying, a widely recognized conceptual definition of pathological lying has been elusive.

Over the years, multiple scientists and practitioners have offered their own unique definitions of pathological lying, each with their own quite varied and particular set of criteria, leading one expert on the topic to conclude that there was no real consensus about what pathological lying was

---

✉ Christian L. Hart  
chart2@twu.edu

<sup>1</sup> Department of Psychology, Texas Woman's University, 76204 Denton, TX, USA

<sup>2</sup> Department of Psychology, Angelo State University, San Angelo, Texas, USA

(Dike et al., 2005). In a comprehensive examination of the scientific literature on pathological lying, Treanor (2012) discerned that at least 17 entirely unique definitions of pathological lying had been offered. She observed that while the various definitions all centered on the key feature of prolific dishonesty, there was little agreement beyond that. In the list of definitions she organized, one can distill some common features. The most common elements seem to be that the lying is prolific, it often appears pointless, the lies are often unbelievable, when challenged the person often remains committed to the lies, the lying is chronic, and the lies seem to be driven by intrinsic rather than extrinsic motivations. Though these criteria were somewhat common among the various historical definitions, as Treanor pointed out, they were far from being universal.

Taking a novel approach to the clinical conceptualization of pathological lying, Curtis (2019) noted that pathological lying ought to be defined in the same manner that other diagnosable psychiatric disorders are characterized. In both of the most widely used nosological systems, the Diagnostic and Statistical Manual (DSM-5) of the American Psychiatric Association (2013) and the International Classification of Diseases (ICD-11) of the World Health Organization (2019), psychiatric conditions are conceptualized as abnormal and warranting treatment based on several key features. A person exhibits clinically significant behavior or mental processes that are not merely expected responses to a specific event (e.g., despair after unexpectedly losing one's job). The problematic behavior or mental processes cause the person significant suffering, or they cause impaired functioning in one or more important domains of life, or they place the person at an increased risk of suffering, death, or loss of important freedoms. Additionally, the condition is generally chronic. Brief episodes of unusual psychological states such as grieving are viewed as normal, whereas protracted problematic psychological states such as major depression are viewed as abnormal.

After reviewing prior definitions of pathological lying as well as the many historical case studies of pathological lying, Curtis and Hart (2020) conceptualized pathological lying in a manner modeled on the diagnostic elements used in the DSM-5 and ICD-11. They suggested that pathological lying is a chronic, pervasive, and persistent pattern of excessive or compulsive lying that can lead to impairment of functioning, marked distress, or risk to the individual. In that same study, Curtis and Hart validated those criteria in a group of self-reported pathological liars. They found that pathological liars did indeed exhibit statistically deviant levels of lying, the lying caused significant distress in the people's lives, the lying impaired life functioning across multiple domains of life, it seemed somewhat compulsive, it placed them at risk, and it was chronic. Curtis and

Hart (2022b) further validated the criteria with a group of 300 therapists, most of whom had worked clinically with pathological liars. The therapists endorsed a belief that pathological liars met the criteria of deviance, distress, poor functioning, risk, and chronicity.

With a validated set of diagnostic criteria, the foundation has now been laid for a more rigorous investigation of pathological lying. The purpose of the present set of studies was to develop and validate an assessment tool that could be used to measure the degree to which a person exhibits features of pathological lying. There are several existing tools to measure lying. For instance, Hart and colleagues (2019) developed and validated the Lying in Everyday Situations scale, however, that instrument only measures the general tendency to lie across a number of common situations rather than examining other features of psychopathology (e.g., suffering and dysfunction). Other recently validated scales such as the Lying Profile Questionnaire (Makowski et al., 2023) also characterize individual patterns of lying, but again do not assess pathological forms of dishonesty. Screening tools and assessment measures are critical in the diagnosis and treatment of disorders such as major depressive disorder (Beck et al., 1961, 1988a), anxiety disorders (Beck et al., 1988b), and personality disorders (Ben-Porath & Tellegen, 2020; Morse & Pilkonis, 2007). These tools are used by researchers and clinicians for assessment and outcome measurements. Our goal was to develop a pathological lying inventory that could facilitate a more cohesive scientific investigation and clinical treatment of pathological lying.

## Study 1

The purpose of study 1 was to generate a pool of self-report survey items that could be used to assess pathological lying. The initial items were compiled using the diagnostic criteria from Curtis and Hart (2020). The factor structure of these items was then analyzed using a couple of exploratory factor analyses across two samples. Our goal was to reduce the item pool to a manageable set of items that reasonably assessed the dimensions of pathological lying. Our hypothesis was that factor analyses would reliably yield factors that aligned with the diagnostic criteria developed by Curtis and Hart (2020).

## Method

### Participants

We collected two samples several months apart. We refer to them as sample 1 and sample 2. Participants in sample 1

were a convenience sample recruited from the general population by students in undergraduate psychology courses. This study and the others mentioned in this paper were reviewed by a university institutional review board and were deemed to meet the ethical standards of that institution. Participants provided their informed consent and were not compensated for their participation. They were asked to complete a brief online survey. 1,010 individuals accessed the survey; however, a great number of participants simply opened the survey but never completed it or only completed a few items. We removed data from people who did not complete the survey and from people who entered invalid responses (e.g., entering a punctuation mark instead of a numerical value on a rating scale). To address the issue of a person completing the survey more than once, we eliminated any duplicate surveys that were submitted from the same IP address. To ensure that participants were giving ample attention and consideration to the survey, we removed participants who failed any of our three validity checks. First, participants were removed if we believed they spent too little time completing the survey. The median completion time was 452 s. We eliminated the small group of participants who completed it in under 180 s. Second, there were two validity check survey items: “I read each question on this survey carefully and answered them accurately” and “I have intentionally provided inaccurate answers on this survey.” Any participants who failed to indicate accuracy were removed. Third, we asked participants how many lies they tell per day and how many lies they tell per week. We deleted any cases in which a participant indicated that their typical daily lies exceeded their typical weekly lies by more than one. After those exclusionary criteria were applied, the data from 653 participants was retained.

The average age of the retained participants in sample 1 was 30.39 years ( $SD=13.53$ ). 66.2% of the participants identified as female, 32.3% identified as male, and 1.5% identified as another gender identity.

Sample 2 was also a convenience sample recruited in the same manner as sample 1. After applying our exclusionary criteria for invalid and incomplete data, we retained data from 350 of the 606 individuals who accessed the survey. The average age of the retained participants in sample 2 was 31.01 years ( $SD=12.74$ ). 63.1% of the participants identified as female, 34.0% identified as male, and 2.9% identified as another gender identity.

Based on widely utilized recommendations for the appropriate sample sizes for factor analyses, our sample sizes of 653 and 350 were adequate for the factor analyses we conducted (Comrey & Lee, 1992; Tabachnick & Fidell, 2013). For instance, Comrey and Lee considered that a sample size of 300 was ample, while Tabachnick and Fidell suggested the

formula  $50 + 8m$ , where  $m$  was the number of independent variables.

## Materials and procedures

We generated an initial list of 39 self-report survey items based on the pathological lying diagnostic criteria from Curtis and Hart (2020). We generated these items based on consideration of interviews we had with pathological liars, feedback from therapists who have worked with pathological liars, and an extensive review of the pathological lying case literature. Each item was phrased as a statement (e.g., My lying causes problems in my social relationships) and was scored on a 1–7 anchored rating scale where 1 = strongly disagree and 7 = strongly agree. We collected data via an anonymous online survey. After the data were collected and invalid data were removed, an analysis of the descriptive statistics of the items revealed that the data for most items were positively skewed (i.e., most items  $N=29$  had a skewness greater than 1.5). In order to address this issue, we performed a natural log transformation on the items, which reduced the number of items that had a skewness greater than 1.5 to  $N=6$ . We used a series of exploratory factor analyses to examine the factor structure of the 39-item scale across two samples.

## Results

Following the recommendations from Costello and Osborne (2005), we conducted an exploratory factor analysis using maximum likelihood as the extraction method ( $KMO=0.95$ ; Bartlett's Test  $<0.001$ ). When considering factor retention, we first examined the number of factors with eigenvalues greater than 1 (i.e., the K1 rule; Kaiser, 1961). Six factors had eigenvalues greater than 1. Those values were 17.74, 4.30, 1.86, 1.34, 1.26, and 1.02. Though some researchers retain all factors with eigenvalues greater than 1, the K1 rule is intended as merely the upper bound for factor retention rather than a determinant of which factors to retain (Kaiser, 1961; Zwick & Velicer, 1986). A large body of evidence indicates that the K1 approach for factor retention greatly overestimates the actual number of factors, often leading to the retention of minor factors that fail to replicate (Fabrigar et al., 1999; Hayton et al., 2004; Ruscio & Roche, 2012; Zwick & Velicer, 1986). In Zwick and Velicer's (1986) analysis, the K1 test extracted the correct number of factors only 22% of the time, almost always over-extracting factors, while Ruscio and Roche (2012) found that it provided the correct number of factors only 9% of the time, again dramatically overestimating the correct number of factors. Given the considerable evidence that the K1 test is among

the poorest methods for selecting factors to retain, we also considered the scree test method (Cattell, 1966).

In the scree test method, eigenvalues are visually plotted in descending order, forming the scree plot. The scree test involves locating the point of maximal inflection (the elbow) in the plot, and then retaining the factor for each eigenvalue that occurs before (to the left) of that point of maximal inflection. For sample 1, the scree test suggested that there was a two-factor solution (see Fig. 1). Factor 1 had an eigenvalue ( $\lambda=17.74$ ) that was more than 3 times greater than that of factor 2 ( $\lambda=4.30$ ). All other factors that occurred at or below the inflection point had eigenvalues that were less than 2.0. However, the scree test has been criticized for its inaccuracy as well. Zwick and Velicer (1986) found that the scree test was correct in only 57% of cases and others have criticized it for being ambiguous (Costello & Osborne, 2005).

We also considered factor retention using parallel analysis, a technique that compares the eigenvalues from a study to the eigenvalues of randomly generated data (Horn, 1965). Only factors whose eigenvalues exceed those generated from random data (i.e., significant factors) are retained. In comparison studies, parallel analysis is typically found to be one of the most accurate factor extraction methods, with accuracy rates above 90% (Hayton et al., 2004; Ruscio & Roche, 2012; Zwick & Velicer, 1986). For sample 1, we generated the parallel analysis cutoff values corresponding to 39 factors. The cutoff values for the first three factors were 1.64, 1.57, and 1.51. The first three factors from sample 1 had eigenvalues that exceeded the respective cutoff values (see Table 1). For all other factors, the eigenvalues fell below the respective parallel analysis cutoff values. Thus, the parallel analysis suggested a three-factor solution. Considering that parallel analysis is reliably more accurate

than the K1 test or the scree test methods, we opted to rely on the parallel analysis and retain three factors.

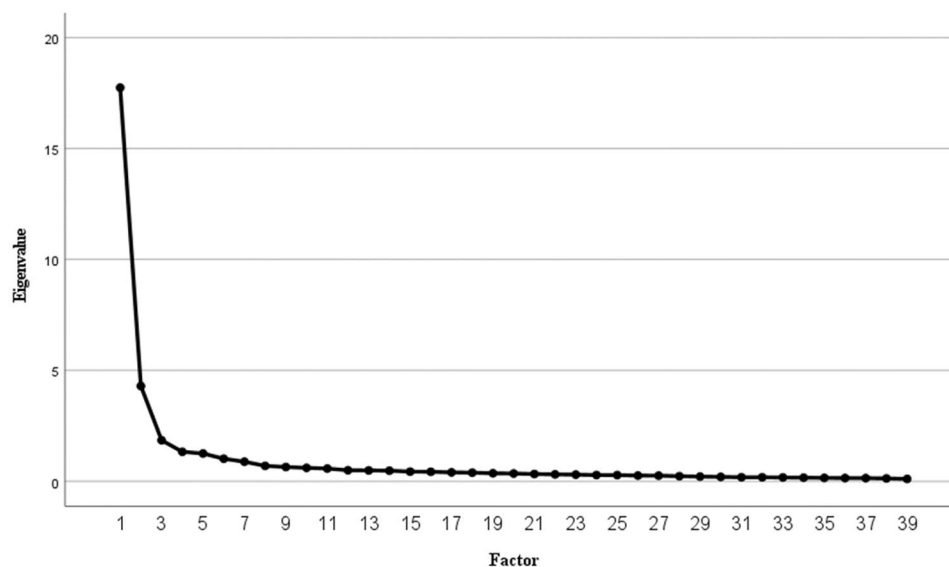
Since we anticipated that the underlying factors would be correlated, we chose a direct oblimin rotation. An analysis of the direct oblimin rotated factor loadings (see Table 1) revealed that factor 1 was representative of social dysfunction. Factor 2 was indicative of frequent, pervasive, chronic, and compulsive lying. We chose to label it “excessive lying.” Factor 3 was indicative of distress, so we labeled it as such. To distill the scale to a more manageable set of items, we retained items that had a factor loading of  $\geq 0.60$ , which Comrey and Lee (1992) suggest results in good to very good factor reliability. This resulted in three subscales. One had 5 items and two had 7 items each (see Table 1). Each scale had high reliability (i.e., *Cronbach's*  $\alpha > 0.9$ ).

For sample 2, we followed the same procedure and replicated the results (see Table 2). The parallel analysis cutoff values for the first three factors were 1.93, 1.80, and 1.73; again, the parallel analysis indicated that the eigenvalues of the first three factors exceeded the cutoff values, but none of the other factors met that threshold. The three factors again represented excessive lying, distress, and social dysfunction.

## Study 1 discussion

In study 1, we analyzed the factor structure of a pool of 39 pathological lying items that we generated using the diagnostic criteria provided by Curtis and Hart (2020), case studies, therapist reports, and self-reports from pathological liars. Across two samples, exploratory factor analyses consistently revealed a 3-factor structure. In both samples, excessive lying, distress, and social dysfunction emerged as the three factors of the 19-item measure we refer to as the Pathological Lying Inventory (PLI).

Fig. 1 Scree plot



**Table 1** Direct oblimin rotated factor loadings from sample 1

Item	Factor		
	1	2	3
My lying causes problems in my social relationships.	<b>0.90</b>	0.02	0.04
My lying causes problems in my friendships.	<b>0.87</b>	0.08	−0.03
My lying causes problems in my romantic life.	<b>0.79</b>	−0.06	0.04
My lying causes problems with my family.	<b>0.65</b>	0.05	0.12
My lying causes problems in my work or school life.	<b>0.61</b>	0.10	0.01
I lie a lot.	0.04	<b>0.91</b>	−0.10
I lie much more than most people.	−0.01	<b>0.89</b>	−0.07
Despite the situation, I often find myself lying.	−0.05	<b>0.73</b>	−0.05
I have a consistent habit of lying.	0.03	<b>0.72</b>	−0.09
If people knew how much I lied, they would be surprised.	0.01	<b>0.69</b>	0.08
I am surprised at how often I lie.	0.03	<b>0.67</b>	0.22
I lie too much.	0.00	<b>0.66</b>	0.17
My lying causes me a great deal of sadness.	−0.03	0.09	<b>0.87</b>
My lying causes me distress.	0.07	0.00	<b>0.84</b>
My lying makes me miserable.	0.08	0.01	<b>0.76</b>
My lying causes me pain.	0.01	0.02	<b>0.72</b>
I can't stand my lying.	−0.03	−0.06	<b>0.70</b>
I would be much happier if I could stop lying.	0.06	0.01	<b>0.68</b>
My lying makes me feel crazy.	0.08	0.01	<b>0.67</b>
Life would be much better if I didn't lie so much.	0.17	0.05	0.52
My lying causes harm to me or puts me at risk.	0.00	0.06	0.23
I seem to keep lying, even when I wish I could stop it.	0.11	0.36	0.20
My lying disrupts my life.	0.51	−0.01	0.19
My lying has caused me to lose freedoms.	0.09	0.01	0.18
Lying causes many bad things to happen to me.	−0.01	0.01	0.17
My lying causes me to lose opportunities.	0.25	−0.01	0.14
Often, I have no idea why I am lying.	0.05	0.09	0.10
My pattern of lying is unusual.	0.03	0.49	0.09
My lying has been an issue for a long time.	0.15	0.10	0.06
My lies sometimes seem to have no point.	0.01	0.02	0.02
For most of my adult life, I've noticed my habit of lying.	0.07	0.05	0.01
My lying causes me to harm others or to put them at risk.	−0.02	0.01	0.01
My lying occurs across various contexts.	0.07	0.54	0.01
When I lie, there is often no clear motive.	−0.04	0.02	0.01
I've noticed my habit of lying for over six months.	0.00	0.05	−0.01
My lying is out of control.	0.09	0.56	−0.01
My lying sometimes puts me in danger.	0.02	0.02	−0.04
I have an irresistible urge to lie.	0.10	0.32	−0.04
My lying has caused legal problems for me.	0.30	0.03	−0.11
<b>Eigenvalue</b>	17.74	4.30	1.86
<b>Percent of Variance</b>	45.50	11.02	4.76
<b>Cronbach's <math>\alpha</math></b>	0.91	0.91	0.93

## Study 2

The purpose of study 2 was to assess the convergent validity of the PLI by examining the degree to which it correlated with the diagnostic criteria of pathological lying that emerged in Curtis & Hart, (2020, 2022a, b). These included measures of lie frequency, lie pervasiveness, distress, life dysfunction, risk or danger, compulsivity, and chronicity. Our hypothesis was that the PLI would positively correlate

with measures of lie frequency, lie pervasiveness, distress, life dysfunction, risk or danger, compulsivity, and chronicity.

## Method

### Participants

Participants in study 2 were another convenience sample recruited from the general population by students in undergraduate psychology courses. Participants provided their

**Table 2** Direct oblimin rotated factor loadings from sample 2

Item	Factor		
	1	2	3
My lying causes me a great deal of sadness.	<b>0.96</b>	-0.07	0.00
My lying causes me pain.	<b>0.89</b>	-0.06	0.03
My lying makes me miserable.	<b>0.84</b>	0.00	0.07
My lying causes me distress.	<b>0.83</b>	-0.02	0.08
I can't stand my lying.	<b>0.81</b>	0.06	-0.06
My lying makes me feel crazy.	<b>0.76</b>	0.07	0.09
I would be much happier if I could stop lying.	<b>0.75</b>	0.05	-0.03
I lie a lot.	-0.06	<b>0.88</b>	0.04
I have a consistent habit of lying.	-0.06	<b>0.86</b>	0.06
I lie too much.	0.09	<b>0.82</b>	-0.08
I lie much more than most people.	-0.09	<b>0.81</b>	0.12
I am surprised at how often I lie.	0.10	<b>0.76</b>	-0.07
Despite the situation, I often find myself lying.	-0.05	<b>0.75</b>	0.16
If people knew how much I lied, they would be surprised.	0.09	<b>0.69</b>	-0.06
My lying causes problems in my friendships.	0.03	0.00	<b>0.87</b>
My lying causes problems in my social relationships.	0.00	0.00	<b>0.86</b>
My lying causes problems in my work or school life.	0.05	-0.01	<b>0.79</b>
My lying causes problems in my romantic life.	0.02	-0.02	<b>0.77</b>
My lying causes problems with my family.	0.04	0.12	<b>0.68</b>
<b>Eigenvalue</b>	15.38	4.01	1.85
<b>Percent of Variance</b>	46.60	12.16	5.60
<b>Cronbach's <math>\alpha</math></b>	0.95	0.91	0.92

informed consent and were not compensated for their participation. 195 individuals accessed the survey. Using our exclusionary criteria to remove incomplete and invalid data resulted in a retained sample of 155 participants. The mean age of the participants was 32.17 years ( $SD = 14.60$ ). 67.1% of the participants identified as female, 29.7% identified as male, and 3.2% identified as another gender identity.

**Materials and Procedure**

The 19-item (PLI) from study 1 was used to assess pathological lying tendencies. Each item was phrased as a statement (e.g., My lying causes problems in my social relationships) and was scored on a 1–7 anchored rating scale where 1 = strongly disagree and 7 = strongly agree. In this study, the Cronbach's alpha for the overall PLI was 0.94; for the excessive lying subscale it was 0.91, for the distress subscale, it was 0.93, and for social dysfunction, it was 0.91. The mean and standard deviation are presented in Table 3.

**Table 3** Descriptive statistics and correlations for study 2 variables

Measure	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
1. PLI	2.10 (1.12)	-										
2. PLI excessive	2.12 (1.26)	0.82**	-									
3. PLI distress	2.26 (1.49)	0.87**	0.48**	-								
4. PLI soc dysf	1.84 (1.24)	0.79**	0.59**	0.67**	-							
5. Lies per day	1.56 (2.11)	0.50**	0.57**	0.31**	0.37**	-						
6. LIES	2.53 (1.15)	0.68**	0.66**	0.54**	0.51**	0.47**	-					
7. DQ-5	2.78 (0.94)	0.25**	0.20**	0.23**	0.22**	0.37**	0.31**	-				
8. LFIQ	1.57 (0.53)	0.24**	0.28**	0.15*	0.21**	0.39**	0.22**	0.40**	-			
9. NLES	0.59 (0.99)	0.18*	0.10	0.16*	0.19*	0.30**	0.25**	0.35**	0.20**	-		
10. UPPS-P	2.15 (0.95)	0.18*	0.18*	0.12	0.24**	0.10	0.18*	0.05	0.05	0.12	-	
11. Chronicity	2.63 (7.40)	0.52**	0.52**	0.36**	0.43**	0.42**	0.53**	0.25**	0.19**	0.24**	0.02	-

\* $p < .05$ . \*\* $p < .01$

To assess the frequency of lying, we used a single item that asked participants to report the number of lies that they tell in a typical day. Specifically, the open-ended response item was, “Considering both small white lies and more serious lies, in a typical DAY, how many lies do you tell?” This form of measure is commonly used to assess lie frequency (Serota & Levine, 2015; Serota et al., 2010, 2022) and correlates with actual lying behavior in laboratory settings (Halevy et al., 2014).

To assess the pervasiveness of lying, we used the Lying in Everyday Situations (LiES) scale (Hart et al., 2019). Each item was phrased as a statement (e.g., I lie in order to escape conflicts or disagreements with other people.) and was scored on a 1–7 anchored rating scale where 1 = strongly disagree and 7 = strongly agree. The 14-item LiES is a brief, validated, and reliable measure of the tendency to lie across situations in day-to-day life. Cronbach’s alpha for the LiES in this study was 0.91.

To assess participant distress, we used the Distress Questionnaire-5 (DQ-5), a brief and validated measure used to identify psychological distresses related to mental disorders (Batterham et al., 2016). Each item was phrased as a statement (e.g., “My worries overwhelmed me”) and was scored on a 1–5 anchored rating scale where 1 = never and 5 = always. Cronbach’s alpha for the DQ-5 in this study was 0.86.

To assess life dysfunction, we used the four social conflict items from the Life Functioning Questionnaire (Alshuler et al., 2002). These items assess the level of social conflict a respondent has recently experienced during work/school activities, leisure activities with family, leisure activities with friends, and duties at home (e.g., “Over the past month, how much difficulty have you had getting along with friends?). Items were scored on a 1–4 anchored rating scale where 1 = no problems and 4 = severe problems. The Cronbach’s alpha for these items was .63.

To assess risk or danger, we used a modified version of the Negative Life Events Scale (NLES; Kowal et al., 2007). The NLES measures whether a respondent has experienced a number of negative life events in the past year. We removed some of the items that seemed very unlikely to be directly tied to one’s personal behavior (e.g., death of a family member), and retained the seven items that were deemed relevant: divorce or separation, not able to get a job, lost a job, alcohol-related problems, drug-related problems, abuse or violent crime, and trouble with the police. Items were scored as occurring or not occurring. A total score was derived by summing the total number of reported negative life events.

To assess compulsivity/pointlessness, we used the four items of the Lack of Premeditation subscale of the Short UPPS-P (Cyders et al., 2014). This subscale measures the

degree to which someone carefully makes decisions about their behavior with items such as, “I usually think carefully before doing anything.” Each item was phrased as a statement and was scored on a 1–4 anchored rating scale where 1 = strongly disagree and 4 = strongly agree. The Cronbach’s alpha for those items was 0.95.

To assess chronicity, we used a single open-ended response item that asked, “How many years ago did you first notice you had a serious problem with lying?” Participants were instructed to indicate “0” if they had not noticed a lying problem.

All items were included in an online survey. Participants were recruited and given a link to the survey. Except for the NLES, each measure was scored by averaging together the items.

## Results

To assess the convergent validity of the PLI, scores on the PLI and the three PLI subscales were correlated with each of the other measures. Because scores on the PLI and some of the other measures were positively skewed, we utilized non-parametric Spearman’s rho correlations. As one can see in Table 3, the overall PLI and the three PLI subscales correlated significantly with all of the convergent validity measures in the expected directions except that the excessive lying subscale was not significantly correlated with the negative life events scale and the distress subscale was not significantly correlated with compulsivity.

In addition to the validation analyses from study 2, we were also able to analyze some validation data from sample 1 (study 1). For that sample, we had asked participants three validation questions about their pathological lying, which we were able to correlate with their PLI scores. The questions were scored on a 1–7 rating scale where 1 = strongly disagree and 7 = strongly agree. The first item was, “I have thought that I am a pathological liar.” Scores on that item correlated significantly with PLI scores ( $r(651) = 0.52, p < .001$ ). The second item, “Others have suggested that I am a pathological liar,” also correlated with PLI scores ( $r(651) = 0.42, p < .001$ ). The third item, “people have taken notice of my lying problem,” was also correlated with PLI scores ( $r(651) = 0.47, p < .001$ ).

## Study 2 discussion

Via several convergent validity analyses, the results of study 2 provide evidence that scores on the PLI correlate with frequent, pervasive, and chronic lying, along with distress, life dysfunction, unplanned behavior, negative life outcomes, and the perception by oneself and others that one lies problematically. These results are consistent with the notion

that those individuals who score high on the PLI tell lies frequently, pervasively, and chronically, and that they experience increased psychological distress, relational discord, and negative life outcomes. These are the same patterns of behavior and life outcomes that are often seen in the clinical case literature of pathological liars (Curtis & Hart, 2022a, b). The PLI seems to represent a validated and reliable measure for the validated definitional criteria of pathological lying (Curtis & Hart, 2020). We should note that in several cases, the purer measures of lying frequency (i.e., LiES scale and the measure of lies per typical day) correlated as strongly or stronger with the outcome measures than the PLI did. This may indicate that frequent lying is more of a determinant of our outcomes than the other elements of pathological lying. It is also important to note that aside from the correlations with measures of lie frequency, the PLI correlated with most measures only weakly.

### Study 3

With the validity of the PLI established in study 2, we set out in study 3 to examine the test-retest reliability of the PLI. Given that the symptoms of most psychiatric disorders are consistent over time, and given that our diagnostic criteria of pathological lying are that it is chronic, we decided to assess the test-retest reliability of the PLI over a span of two weeks. We expected that pathological lying would not vary considerably over such a timespan, so we predicted the scores on the PLI would exhibit a strong positive correlation between the two administrations.

### Method

#### Participants

Participants in study 3 were a convenience sample recruited from undergraduate psychology courses at a university. They provided their informed consent and were compensated with course credit for their participation. 161 participants completed the survey in its entirety at two time points two weeks apart and were retained in the study. The mean age of the participants was 20.34 years ( $SD=4.28$ ). 95.0% of the participants identified as female, 3.1% identified as male, and 1.9% identified as another gender identity.

#### Materials and procedure

Participants were asked to anonymously complete the online 19-item PLI study at two time points two weeks apart. Linking of the two surveys for each participant was done via unique and anonymous codes provided to each participant.

### Results

In order to determine longitudinal measurement invariance, we conducted exploratory factor analyses using maximum likelihood as the extraction method for timepoint 1 and again for timepoint 2. For each, factor retention was determined using the parallel analysis method. We used a varimax rotation for each analysis. For both timepoints, the analysis suggested a three-factor solution. Those were the factors representing the excessive lying, distress, and social dysfunction that were extracted in study 1. Factor loadings were between 0.46 and 0.91 for the timepoint 1 analysis and between 0.64 and 0.91 for the timepoint 2 analysis. These results demonstrate the longitudinal measurement invariance of the PLI.

Given that scores on the PLI were positively skewed, a Spearman rho correlation was computed for the overall PLI scores at the two time points ( $r(159)=0.83$ ,  $p<.001$ ). We also computed the test-retest correlations for the excessive lying subscale ( $r(159)=0.78$ ,  $p<.001$ ), the distress subscale ( $r(159)=0.77$ ,  $p<.001$ ), and the social dysfunction subscale ( $r(159)=0.68$ ,  $p<.001$ ). The results indicated a strong and significant relationship between PLI scores in the two administrations.

### Study 3 discussion

The results of study 3 indicate that the PLI has longitudinal measurement invariance over two weeks, and scores on the PLI are consistent over time points at least two weeks apart. The sample in study 3 consisted mostly of young adult college women. Despite this obvious sampling bias, we suspect that pathological lying exists across sub-populations (see Curtis & Hart, 2019 and, 2022a), and feel confident that the PLI would exhibit strong test-reliability across the broader population. The degree to which PLI scores would be consistent over longer periods is unclear. There is evidence, for example, that lying behavior increases during childhood, peaks in adolescence, and then declines across adulthood (Debey et al., 2015). Given the apparent changes in lie frequency across longer developmental spans, the PLI may exhibit lower test-retest reliability across such spans.

### Confirmatory factor analysis

In order to further explore the factor structure of the PLI, we combined the samples from studies 2 and 3 in order to conduct a confirmatory factor analysis and examine the fitness of the 3-factor model. Although the chi-square analysis was significant ( $\chi^2(df=149)$ ,  $p<.01$ ), the other fit indices



indicated reasonable fit (NFI = 0.90; CFI = 0.93; TLI = 0.92; RMSEA = 0.09 (90% CI [0.08, 0.10])).

## General discussion

Pathological lying is a psychological phenomenon that has been addressed in the clinical and research literature for well over a century. Despite evidence of robust research interest in the topic and abundant evidence that clinicians regularly grapple with the diagnosis and treatment of pathological liars, a lack of conceptual and diagnostic clarity and consistency has hampered progress. Perhaps, consequently, there has not been an available assessment or screening tool to gauge pathological lying. Based on recently developed and validated diagnostic criteria for pathological lying (Curtis & Hart, 2020, 2022b), we were able to generate the Pathological Lying Inventory, a tool that appears to take the measure of pathological lying in a valid and reliable manner.

We believe the PLI is the first instrument developed specifically for the assessment of pathological lying. It captures diagnostic dimensions of pathological lying in the same manner that other diagnostic and assessment tools assess psychiatric features of those disorders. The three dimensions of pathological lying assessed by the PLI are excessive lying (i.e., frequent, pervasive, chronic, and compulsive lying), psychological distress caused by lying, and social dysfunction caused by lying.

Our results indicate that most people experience few features of pathological lying. However, pathological lying, like lying itself, seems to be positively skewed, with most people scoring low on the PLI but a small subset of people scoring quite high. The question of who among these should be considered pathological liars is an open one. While the development of cutoff scores to separate clinically significant cases from more typical ones is common, we do not yet feel confident in offering such cutoff scores for the PLI. We do have evidence that pathological lying is somewhat rare, perhaps presenting 5–8% of the population (Curtis & Hart, 2019; Curtis & Hart, 2022a). Furthermore, Serota and colleagues (2010) found that “almost half of all lies are told by only 5% of subjects” (p. 9). Based on those findings, we might speculate that those scoring in the top 5% on the PLI (an average score of at least 4.13 out of a possible 7.00) may warrant consideration as pathological liars. That cutoff makes more sense when one considers the rating scale used on the PLI. Items are scored on a 1–7 scale where 1 = strongly disagree and 7 = strongly agree. A score below 4.00 indicates that, on average, a person disagrees to some degree with statements indicative of pathological lying, whereas scores above 4.00 indicate some level of endorsement of statements indicative of pathological lying.

Again, more research aimed at norming scores on the PLI, especially in clinical cases, will help establish more definitive cutoff scores.

Some limitations of the work we described here can be readily identified. For instance, there is some clear evidence of sampling bias in our studies, with participants being disproportionately female and youthful. The sample no doubt departed from population values in other important ways as well. Until the PLI can be administered to more generalizable samples and in populations outside of the United States, caution should be exercised in generalizing our results to broader populations.

Another limitation is that both the PLI and the measures against which we validated it are all self-report measures. Though we did take some measures to promote accurate and honest responses such as having participants complete the surveys anonymously, we cannot discount the possibility that lapses in participant awareness and memory or even outright dishonesty may have provided us with a certain amount of unreliable or invalid data. The pathological lying research agenda would benefit from using validation techniques that rely on observable patterns of lying behavior in real-world, laboratory, and clinical settings.

Another consideration when measuring lying, especially pathological lying, is whether or not people are actually honest when reporting their dishonesty. That is, are self-report measures of lying accurate? While we did not address that issue in our studies, other researchers have explored that question (e.g., Halevy et al., 2014). In those studies, researchers had participants self-report about their lying. Unbeknownst to the participants, they were placed in situations where the researchers could actually determine if the participants lied or cheated. The results of those evaluations indicated people who report frequent lying actually do lie more frequently in experimental situations. Though we cannot be certain that people honestly answered our questions about lying, prior research indicates that self-reported lying and actual lying are correlated.

We hope that researchers and clinicians may find the PLI helpful as a research and clinical assessment instrument. Having a consistent way of assessing pathological lying will certainly lead to a clearer understanding of this phenomenon and will hopefully lead to more progress in the conceptualization and treatment of pathological liars. Our previous work suggested that pathological lying leads to marked distress and suffering in the lives of the liars and the people who interact with them. Advances in understanding and treating pathological lying could help reduce its chronicity and severity. We hope that others will find profitable ways to use PLI in that effort.

**Author contributions** Christian Hart developed the idea for the project, collected data, conducted preliminary statistical analysis, co-wrote

the first draft of the manuscript, and led the process of editing the manuscript. Drew Curtis made significant contributions to the conceptual development of the project, offered guidance on data analysis, and contributed to substantial edits of the manuscript. John Terrizzi completed the majority of the statistical analysis and developed the [results](#) section.

**Funding** Open access funding provided by SCEL

## Declarations

**Conflict of interests** The authors have no relevant financial or non-financial interests or competing interests to disclose. The authors did not receive support from any organization for the submitted work. All studies presented here were approved by a university institutional review board and met the ethical standards of that institution. All data and materials from these studies are available via request to the corresponding author.

**Informed consent** Studies presented in this paper were reviewed by a university institutional review board and were deemed to meet the ethical standards of that institution. Participants provided their informed consent before participating and were not compensated for their participation.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Altshuler, L., Mintz, J., & Leight, K. (2002). The life functioning questionnaire (LFQ): A brief, gender-neutral scale assessing functional outcome. *Psychiatry Research*, *112*(2), 161–182. [https://doi.org/10.1016/S0165-1781\(02\)00180-4](https://doi.org/10.1016/S0165-1781(02)00180-4)
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425787>
- Batterham, P. J., Sunderland, M., Carragher, N., Callear, A. L., Mackinnon, A. J., & Slade, T. (2016). The distress Questionnaire-5: Population screener for psychological distress was more accurate than the K6/K10. *The Journal of Clinical Epidemiology*, *71*, 35–42. <https://doi.org/10.1016/j.jclinepi.2015.10.005>
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561–571. <https://doi.org/10.1001/archpsyc.1961.01710120031004>
- Beck, A. T., Steer, R. A., & Garbin, M. G. (1988a). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, *8*(1), 77–100. [https://doi.org/10.1016/0272-7358\(88\)90050-5](https://doi.org/10.1016/0272-7358(88)90050-5)
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988b). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*(6), 893–897. <https://doi.org/10.1037/0022-006x.56.6.893>
- Ben-Porath, Y. S., & Tellegen, A. (2020). *Minnesota Multiphasic personality Inventory-3 (MMPI-3): Manual for administration, scoring, and interpretation*. University of Minnesota.
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, *1*, 245–276. [https://doi.org/10.1207/s15327906mbr0102\\_10](https://doi.org/10.1207/s15327906mbr0102_10)
- Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Lawrence Erlbaum.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation*, *10*(7), 1–9.
- Curtis, D. A., & Hart, C. L. (2020). Pathological lying: Theoretical and empirical support for a diagnostic entity. *Psychiatric Research and Clinical Practice*, *2*(2), 62–69. <https://doi.org/10.1176/appi.prcp.20190046>
- Curtis, D. A., & Hart, C. L. (2022a). *Pathological lying: Theory, research, and practice*. American Psychological Association.
- Curtis, D. A., & Hart, C. L. (2022b). Pathological lying: Psychotherapists' experiences and ability to diagnose. *American Journal of Psychotherapy*, *75*(2), 61–66. <https://doi.org/10.1176/appi.psychotherapy.20210006>
- Curtis, D. A. (2019). Pseudologia phantastica-pathological lying: A theory [Conference session]. Southwestern Psychological Association Conference 65th Annual, & Meeting (April 5-7). Albuquerque, NM.
- Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short English version of the UPPS-P Impulsive Behavior Scale. *Addictive Behaviors*, *39*(9), 1372–1376. <https://doi.org/10.1016/j.addbeh.2014.02.013>
- Debey, E., De Schryver, M., Logan, G. D., Suchotzki, K., & Verschuere, B. (2015). From junior to senior pinocchio: A cross-sectional lifespan investigation of deception. *Acta Psychologica*, *160*, 58–68. <https://doi.org/10.1016/j.actpsy.2015.06.007>
- Delbrück, A. (1891). *Die pathologische lüge und die psychisch abnormen schwindler eine untersuchung über den allmählichen übergang eines normalen psychologischen vorgangs in ein pathologisches symptom für aerzte und juristen*. Ferdinand Enke.
- DePaulo, B. M., Kashy, D. A., Kirkendol, S. E., Wyer, M. M., & Epstein, J. A. (1996). Lying in everyday life. *Journal of Personality and Social Psychology*, *70*(5), 979–995. <https://doi.org/10.1037/0022-3514.70.5.979>
- Dike, C. C., Baranoski, M., & Griffith, E. E. H. (2005). Pathological lying revisited. *Journal of the American Academy of Psychiatry and the Law*, *33*(3), 342–349. <https://jaapl.org/content/33/3/342.long>
- Halevy, R., Shalvi, S., & Verschuere, B. (2014). Being honest about dishonesty: Correlating self-reports and actual lying. *Human Communication Research*, *40*(1), 54–72. <https://doi.org/10.1111/hcre.12019>
- Hall, G. S. (1890). Children's lies. *The American Journal of Psychology*, *3*(1), 59–70. <https://www.jstor.org/stable/1411497>
- Hancock, J., Thom-Santelli, J., & Ritchie, T. (2004). Deception and design: The impact of communication technologies on lying behavior. Proceedings of the Conference on Computer Human Interaction, Vienna, 24–29 April 2004, 130–136. <https://doi.org/10.1145/985692.985709>
- Hart, C. L., & Curtis, D. A. (2023). *Big liars: What psychological science tells us about lying and how you can avoid being duped*. American Psychological Association.
- Hart, C. L., Jones, J. M., Terrizzi, Jr., J. A., & Curtis, D. A. (2019). Development of the lying in everyday situations (LiES) scale. *American Journal of Psychology*, *132*(3), 343–352. <https://doi.org/10.5406/amerjpsyc.132.3.0343>

- Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods*, 7(2), 191–205. <https://doi.org/10.1177/1094428104263675>
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://doi.org/10.1007/BF02289447>
- Kaiser, H. F. (1961). A note on Guttman's lower bound for the number of common factors. *British Journal of Statistical Psychology*, 14, 1–2. <https://doi.org/10.1111/j.2044-8317.1961.tb00061.x>
- Kowal, E., Gunthorpe, W., & Bailie, R. S. (2007). Measuring emotional and social wellbeing in Aboriginal and Torres Strait Islander populations: An analysis of a Negative Life Events Scale. *International Journal for Equity in Health*, 6, article number 18. <https://doi.org/10.1186/1475-9276-6-18>
- Levine, T. R. (2019). *Duped: Truth-default theory and the social science of lying and deception*. University of Alabama.
- Makowski, D., Pham, T., Lau, Z. J., Raine, A., & Chen, S. H. A. (2023). The structure of deception: Validation of the lying profile questionnaire. *Current Psychology*, 42, 4001–4016. <https://doi.org/10.1007/s12144-021-01760-1>
- Morse, J. Q., & Pilkonis, P. A. (2007). Screening for personality disorders. *Journal of Personality Disorders*, 21(2), 179–198. <https://doi.org/10.1521/pepi.2007.21.2.179>
- Ruscio, J., & Roche, B. (2012). Determining the number of factors to retain in an exploratory factor analysis using comparison data of known factorial structure. *Psychological Assessment*, 24(2), 282–292. <https://doi.org/10.1037/a0025697>
- Serota, K. B., & Levine, T. R. (2015). A few prolific liars: Variation in the prevalence of lying. *Journal of Language and Social Psychology*, 34(2), 138–157. <https://doi.org/10.1177/0261927X14528804>
- Serota, K. B., Levine, T. R., & Boster, F. J. (2010). The prevalence of lying in America: Three studies of self-reported lies. *Human Communication Research*, 36(1), 2–25. <https://doi.org/10.1111/j.1468-2958.2009.01366.x>
- Serota, K. B., Levine, T. R., & Docan-Morgan, T. (2022). Unpacking variation in lie prevalence: Prolific liars, bad lie days, or both? *Communication Monographs*, 89(3), 307–331. <https://doi.org/10.1080/03637751.2021.1985153>
- Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). Pearson. Citation for Reference (Tabachnick & Fidell 2013) missing in the manuscript. Please check. That was due to a typo in the spelling of the name in the citation. I have corrected that in the method section for Study 1.
- Treanor, K. E. (2012). *Defining, understanding and diagnosing pathological lying (pseudologia fantastica): an empirical and theoretical investigation into what constitutes pathological lying* [Doctoral dissertation, University of Wollongong Australia]. <https://ro.uow.edu.au/cgi/viewcontent.cgi?article=4817&context=theses>
- World Health Organization (2019). International statistical classification of diseases and related health problems (11th ed.). <https://icd.who.int/>
- Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, 99(3), 432–442. <https://doi.org/10.1037/0033-2909.99.3.432>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.