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A Few Prolific Liars: Variation in the Prevalence of Lying

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Abstract

It has been commonplace in the deception literature to assert the pervasive nature of deception in communication practices. Previous studies of lie prevalence find that lying is unusual compared to honest communication. Recent research, and reanalysis of previous studies reporting the frequency of lies, shows that most people are honest most of the time and the majority of lies are told by a few prolific liars. The current article reports a statistical method for distinguishing prolific liars from everyday liars and provides a test of the few prolific liars finding by examining lying behavior in the United Kingdom. Participants (N = 2,980) were surveyed and asked to report on how often they told both little white lies and big important lies. Not surprisingly, white lies were more common than big lies. Results support and refine previous findings about the distinction between everyday and prolific liars, and implications for theory are discussed.

Keywords

lies, deception, prevalence, prolific liars, Poisson distribution

Deception and the detection of deception are extensively studied in the fields of communication and psychology as well as in applied disciplines such as education, law, and marketing. But despite a half century of theoretical development regarding the reasons for lying, the contexts in which lying occurs, the effects of lying, and the different strategies that might be used to detect lying behavior, there is a dearth of research on the extent to which lying actually occurs in daily communication. Until recently, the most authoritative statement about lying prevalence was the DePaulo, Kashy,

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Kirkendol, Wyer, and Epstein (1996) diary panel finding that on average Americans lie once or twice per day. Serota, Levine, and Boster (2010) provided a large-scale validation of that important observation ($M = 1.65$ lies per day), with the addition that lies-per-day results are not normally distributed. On any given day, based on self-report, a majority of adults tell few or no lies while a small subset of the population reports telling the majority of lies. Recently Halevy, Shalvi, and Verschuere (2014) correlated self-reported lying with other measures of lying behavior, validating the use of self-report to measure prevalence. Serota et al. (2010) observed variation by examining a cross-section of the U.S. adult population, reporting that 5% of subjects accounted for more than 50% of all lies told. Reanalysis of the DePaulo et al. (1996) data and several additional studies validated this pattern of infrequent versus prolific lying. The current study, conducted in the United Kingdom, identifies prolific liars as a distinct population that can be statistically separated from everyday liars and provides cross-national validation of the Serota et al. (2010) findings.

Does it matter that some people lie more than others? One aspect of interpersonal deception theories that most researchers agree on is the influence of truth bias. Truth bias is the tendency to believe that a sender is telling the truth independent of the message's actual veracity. Truth bias may be an impediment to a person's ability to detect lies (Buller, Strzyzewski, & Hunsaker, 1991; McCornack & Parks, 1986) and is a primary determinant of accuracy due to a human tendency to judge more messages to be honest than dishonest (Bond & DePaulo, 2006; Levine, Park, & McCornack, 1999). Base rate theory (Levine, Clare, Greene, Serota, & Park, in press; Park & Levine, 2001) treats truth bias as integral to determining detection accuracy. When some senders tell many more lies than others, the base rate is significantly altered and the probability of an accurate judgment also changes. Knowing or assuming a sender's tendency toward truths or lies alters the receiver's truth bias and will affect detection accuracy even further. In general, the variation in base rate among everyday liars is small, but the base rates for prolific liars can be substantially different.

Many scholars seem to believe that lying is a frequent event. Both life experiences and anecdotal evidence encourage acceptance of this proposition. From Santa Claus to inflated résumés to dietary supplements that will make us thin without exercising, we encounter an entire catalogue of personal and not-so-personal lies. But finding diversity among lies is not the same as finding that lying is ubiquitous, or even pervasive. General acceptance of the assumption that lying is a frequent behavior has implications for how studies on lying and deception detection are conducted. If everyone lied every day, then individual differences should not have much influence on either the production or the identification of lying behaviors. However, as Serota et al. (2010) have shown, the average is not a reliable indicator of the incidence of individual lying.

Surprisingly little is known about the prevalence or normative frequency of lies and deception. The majority of deception research relies on untested assumptions, anecdotal evidence, and a handful of studies with small and nonrepresentative samples. Most experimental detection research has focused on improving detection with limited attention to the nature of the phenomena though some exceptions exist. The diary

study of lying in everyday life conducted by DePaulo et al. (1996) used a small sample of students but recruited a separate sample from members of the local community to validate the student results. DePaulo et al. reported the mean number of lies per day as 1.96 ($SD = 1.63$, $N = 77$) for the students and 0.97 ($SD = 0.98$, $N = 70$) for the nonstudent sample. DePaulo et al. also observed significant variations in the propensity to lie, finding that lying frequency was higher among women, among younger people, and during female-to-female interactions. In an experimental setting examining self-presentation, Feldman, Forrest, and Happ (2002) found that different rates of lying could be induced while Tyler and Feldman (2004) found that women lie more than men with whom they have expectations about future interactions; they also reported that women tell more factual lies. Serota et al. (2010) found that men report telling, directionally, more lies overall but replicated the DePaulo et al. (1996) finding that younger people tell more lies than older people.

With regard to detecting deception, the meta-analysis by Bond and DePaulo (2006) called into question the ability to accurately judge others' veracity, finding that truth/lie judgments are accurate about 54% of the time on average; these near-chance results raised the question of whether individual differences even matter. A subsequent meta-analysis by Bond and DePaulo (2008) indicated that there is less variability in deception detection accuracy than in the tendency to regard others as truthful. Bond and DePaulo (2008) found that liar credibility had more to do with judgment outcome than other individual differences. Levine et al. (2011) provided experimental evidence that the tendency to believe a sender was more a function of individual differences in the appearance of honesty than the actual honesty. Park and Levine (2001) hypothesized that the critical factor in truth/lie judgment accuracy is the base rate, or proportion of truthful statements to total statements judged, a probabilistic view that was strongly supported by testing variation in base rates (Levine, Kim, Park, & Hughes, 2006; Serota, 2011). In summary, research examining variations in lying phenomena suggests that different kinds of people in different contexts produce different base rates of lying, and the variation in base rate is a significant predictor of detection accuracy. Thus, the importance of understanding the prevalence of lying and the antecedents of that prevalence, including the categorical distinction between everyday and prolific liars, cannot be understated.

Can we trust subjects to tell the truth about lying? Serota et al. (2010) used projective measures of others' lies to validate prevalence of self-reported lies. More recently, Halevy et al. (2014) substantiated the utility of self-reporting lies. The authors replicated Serota et al. with a Dutch sample and then correlated the results with actual lying when subjects were given a task that incentivized them to break rules for personal financial gain. A subset of survey participants who self-reported lying incidence subsequently completed a Die Under Cup task (Shalvi, Dana, Handgraaf, & Dreu, 2011) in which they could cheat privately. The distribution of reported die roll outcomes skewed to higher than expected levels, indicating that some cheating took place. Those with higher self-reported lying scores also reported higher die roll outcomes ($r = .39$, $p < .01$); therefore, those who report more daily lying are more likely to engage in a higher level of deceptive behavior.

In the few studies focusing on lie prevalence, researchers have examined the phenomenon primarily within an American context.[1] It is therefore reasonable to ask if the findings are culturally specific. If the division of the population between infrequent liars and prolific liars can be generalized across countries and cultures, the importance of accounting for this individual difference would be elevated.

The Current Study

Shortly after publication of Serota et al. (2010), The Science Museum of London issued a press release, "Mum's Most Likely to Be Lied to Shows New Poll" (The Science Museum, 2010). The release was issued to promote the museum's "Who Am I?" exhibition on human behavior. It cited a study of approximately 3,000 British adults and reported, among its notable findings, that men lie more than women, people lie more to their mothers than to their partners, and most people believe there is such a thing as an acceptable lie. Intrigued by the potential to examine the characteristics of prolific liars and for cross-national validation of the prevalence research conducted in the United States, the current authors requested, received, and reanalyzed the U.K. data.

Two characteristics of this data set allow findings of the U.S. studies to be extended. First, the large sample size and additional attitudinal and behavioral data collected in the United Kingdom are sufficient to develop a profile of prolific liars and contrast this with the general population of everyday liars. Second, the study provides an international replication of the Serota et al. (2010) U.S. national survey. Comparing results from participants in England, Scotland, Wales, and Northern Ireland to results from the American sample could help to determine if the key finding from the U.S. study regarding the distribution of lying activity can be generalized. We hypothesized that the U.K. results would replicate the U.S. prolific liar findings. The primary research questions focused on (a) the characteristics of the prolific liar and (b) whether their lying behavior is more prevalent overall or is constrained to specific situations and contexts.

Method

Participants. To examine the extent and nature of lying in the United Kingdom, The Science Museum of London commissioned an Internet survey using the OnePoll omnibus panel of adults distributed across four major subdivisions of the United Kingdom. The omnibus Internet panel is a commercial survey research tool used for multiclient studies. OnePoll is a member of ESOMAR (European Society for Opinion and Market Research), and the organization subscribes to both the MRS (Market Research Society) code of conduct and ESOMAR standards to assure confidentiality, ethical practices, and sound research procedures.

Panelists are voluntary participants, 16 years and older, who have self-selected into a pool of approximately 80,000 panel members. Since the Serota et al. (2010) study was conducted among adults 18 years and older, reanalysis of the U.K. study for

comparison purposes was restricted to those 18 years and older (note that including 16- to 17-year-olds increases the overall frequency of lying but does not alter other findings from the analysis). On registering for the panel, subjects provide demographic information that is merged with the results of individual surveys. The Science Museum lying study was conducted in April 2010 and was open to a general cross section of the panel; participation was not constrained to a nationally projectable subset and 3,042 subjects responded. For the reanalysis, the sample was poststratification weighted (Kish, 1965) to the U.K. Office for National Statistics (ONS) 2009 mid-year population estimates (ONS, 2010). The weighting factors were age group by gender by geography (Wales, Scotland, Northern Ireland, and the nine Government Office Regions of England). After eliminating responses from 16- and 17-years-olds, the reanalysis included 2,980 subjects.

After weighting to ONS census parameters, the sample composition for this analysis is 51.7% female, the mean age is 44.5 years (SD = 15.1 years), and the subjects are geographically distributed to match the United Kingdom's regional population dispersion: 83.8% from England (12.5% in London), 8.5% from Scotland, 5.4% from Wales, and 2.8% from Northern Ireland.[2]

Design. The Science Museum study was nonexperimental and used an online questionnaire to obtained descriptive measures for the incidence of lying in the United Kingdom adult population. Results from this survey are compared across the major U.K. geographic divisions, by age-groups, gender, and prolific versus everyday liars.

Procedure and Measures. Results reported in this article are a reanalysis of The Science Museum study. OnePoll conducts up to 15 projects per day. To recruit subjects, the individual survey is posted in a panel member area of the OnePoll website. OnePoll members are expected to monitor the website for available surveys (rather than receiving specific survey invitations). On the website, panel members are instructed to select a survey and voluntarily click a link and are then redirected to the specific survey questionnaire. Subjects participating in the lying study were entered into a sweepstakes for a cash prize.

The intent of the questionnaire was to assess the nature of lying as social interaction; key behavioral measures included frequency of "white lies" and "big lies." These self-reports differ from the Serota et al. (2010) measure in three ways. First, U.K. lies are disaggregated into white and big lies, based on an assumption that liars distinguish between acceptable and egregious lies. Second, lying was not defined for the subjects (as was done in the U.S. study); however, the subjects were asked to identify lies they believed to be examples of big lies. Third, the frequency of lying scales are different. Whereas the U.S. study used an unbounded ratio scale, in the U.K. study the underlying ratio scale was presented as closed-ended categories. Subjects could answer precisely from 0 to 5 lies, then at intervals of 5 lies up to 25+. Treatment of this scale for our analysis is discussed in the Results section. The questionnaire also asked about people the subject had lied to, the kinds of lies told, guilt, and the consequences for getting caught lying. Attitudinal measures included perceptions of what constitutes a

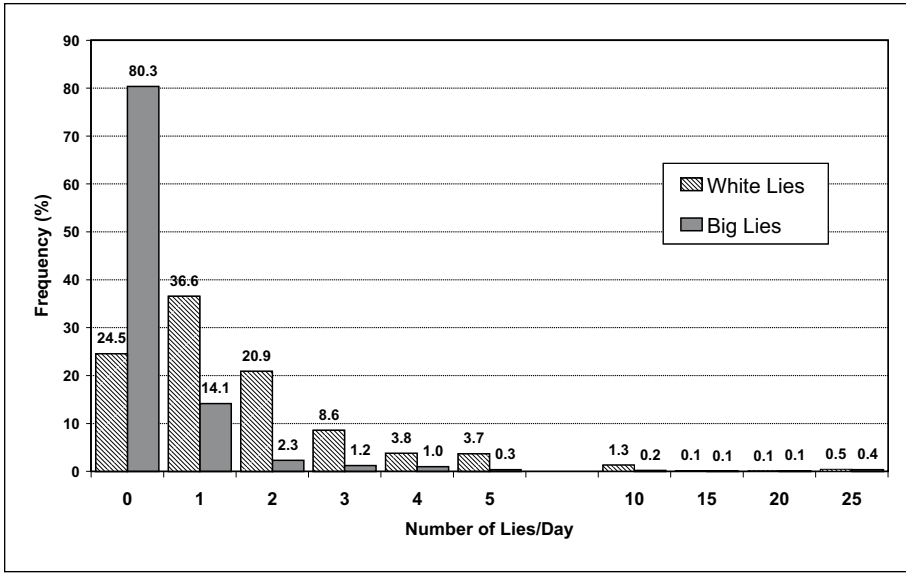

Figure 1. The frequencies of white lies and big lies in the United Kingdom.

big lie, the relative abilities of men and women to produce and detect lies, acceptability of lies, and the appropriateness of lie detection in several contexts. The complete list of questions is shown in the appendix.

Results

Overall Lie Prevalence. Initially, the overall frequencies of lies in the United Kingdom and its subdivisions were calculated and compared. The U.K. study asked subjects, "On average, how many times a day do you tell a little white lie?" and separately, "On average, how many times a day do you tell a big lie?" Although lie frequency is reported as a ratio-scaled measure, subject responses were limited to the categorical set of 0, 1, 2, 3, 4, 5, 10, 15, 20, and 25+ times for each question. We treated the results as approximating the underlying ratio scale by assuming that error in reporting (e.g., reporting 10 when the subject believed the actual value to be 9 or 11) was normally distributed. The value 25 was substituted for the few 25+ responses, slightly understating the average. U.K. subjects reported $M = 1.66$ white lies per day ($SD = 2.37$, $Mdn = 1$, mode = 1, $N = 2{,}980$; and 95% confidence interval [CI; 1.56, 1.74]) and $M = 0.41$ big lies per day ($SD = 1.83$, $Mdn = 0$, mode = 0, $N = 2{,}980$, and 95% CI [0.35, 0.47]). Overall, 75.5% reported telling white lies and 20.7% reported telling big lies on an average day. Figure 1 compares the distributions of white lies and big lies.

To create a total, white lies and big lies were combined ($M = 2.08$ lies per day, $SD = 3.57$, $Mdn = 1$, mode = 1, $N = 2{,}980$; 95% CI [1.95, 2.21]). Serota et al. (2010)

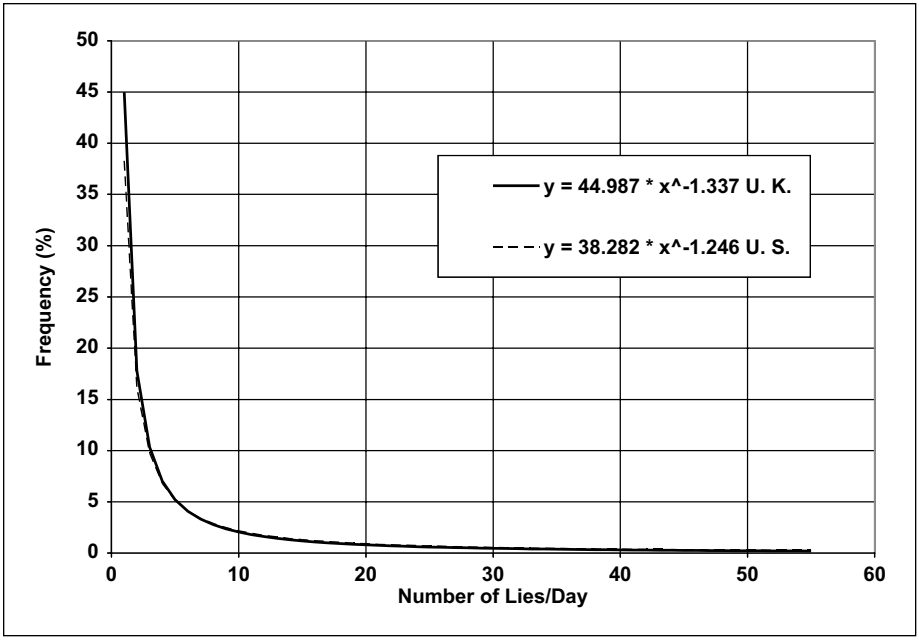

Figure 2. Power functions for total U.K. and U.S. liars are nearly identical.

reported that the frequency distribution of lies (excluding those reporting no lies) fit a power function, a long tail curve with high frequencies for low values and a few responses for very high values. Figure 2 shows a similar curve fit for the United Kingdom, with $y = 44.987 * x^{-1.337}$ and $R^2 = .962$. Visual inspection reveals that the curve fit of the overall U.K. data and that of the U.S. data are nearly identical. Although the United Kingdom is a unified political entity, its political subdivisions have historically distinct cultural traditions that may include different norms and moral standards. Since England accounts for 83.4% of the U.K. population, results from subjects in England should not vary much from the overall results; however, results from Scotland, Wales, and Northern Ireland might yield greater variation. As Table 1 shows, only Northern Ireland ($M = 3.50$, $SD = 6.98$) has a lie frequency for which the 95% CI does not overlap.

Identifying Prolific Liars. As data from all of the prevalence studies and analyses show, lying is generally a low frequency event with the exception that, in each of the populations studied, there appears a small proportion of high-frequency liars. The incidence, or number of lies per day, is a rate. When events are independent, measured as a rate, occur with low frequency over a specified unit of time, and have no obvious upper limit, these events have the properties of a Poisson distribution (Doane & Seward, 2008). The Poisson distribution is often referred to as "the model of rare events" or

Table 1. Mean Lies for the United Kingdom and Major Political Subdivisions.

Country	Total lies		Component means		*N*	95% Confidence interval
	M	*SD*	White lies	Big lies		
England	2.01	3.30	1.61	0.40	2498	[1.88, 2.14]
Wales	2.02	3.23	1.63	0.38	145	[1.49, 2.55]
Scotland	2.28	4.44	1.88	0.41	254	[1.73, 2.83]
Northern Ireland	3.50	6.98	2.62	0.88	83	[2.35, 4.65]
United Kingdom	2.08	3.57	1.66	0.41	2980	[1.95, 2.21]

"the model of arrivals." Sending and receiving messages (including lies) is a form of arrival though this model is rarely used in the social sciences.

The Poisson distribution has only one parameter, the mean ($\lambda = \mu$, which must be known), and all other properties are a function of the mean; specifically, when a variable is Poisson distributed, variance is equal to the mean and the standard deviation is the square root of the mean. The result is a positively skewed distribution when λ is small but has the tendency to approximate a normal distribution as λ increases. The index of dispersion ($D = \sigma^2/\mu$), also known as the variance to mean ratio, can be used to decide if data fit a Poisson distribution. If $D > 1$ the data are considered overdispersed; if $D < 1$ (but not 0) the data are most likely normally distributed, and if $D \approx 1$, the data are considered to fit a Poisson distribution (Cox & Lewis, 1966). As is apparent from Table 1 comparing political subdivisions with the U.K. total, the standard deviations are, in all cases, greater than the mean; and therefore, the index of dispersion values also will be much greater than 1.0 when everyday and prolific liars are treated as a single population.

A theory of prolific liars considers those outside the realm of everyday liars to be a distinct group (i.e., they violate the Poisson assumptions of low frequency) *that should be treated as a separate population*. Once prolific liars are excluded, the *D* index value for the remaining, nonprolific sample should approximate 1.0. By successive trials, removing the highest numbers of lies from the distribution and decrementing the lowest "extreme" value with each trial, the *D* index is reduced until $D = 1$ is reached and a break point is established. With the U.K. data, a value of $D = 0.97$ ($\approx$1) is obtained when the sample is constrained to those telling 0 to 4 lies ($M = 1.31$, normal $SD = 1.129$, Poisson $SD = 1.145$, $N = 2{,}691$). The excluded subjects then form the distinct group of individuals who tell five or more lies per day ($M = 9.18$ $SD = 7.97$, $N = 289$); these prolific liars constitute 9.7% of the U.K. sample. Figure 3 shows the relationship between everyday liars, prolific liars, and the Poisson distribution for $\lambda = 1.31$ (mean of everyday liars' reported lies per day). The distribution of everyday liars fits the Poisson distribution with $R^2 = .98$ while the prolific liars fit a standard power function, $y = 1681.7 * x^{-3.81}$, with $R^2 = .97$. Fitting everyday liars to a Poisson distribution allows us to define the boundary between everyday and prolific lying.

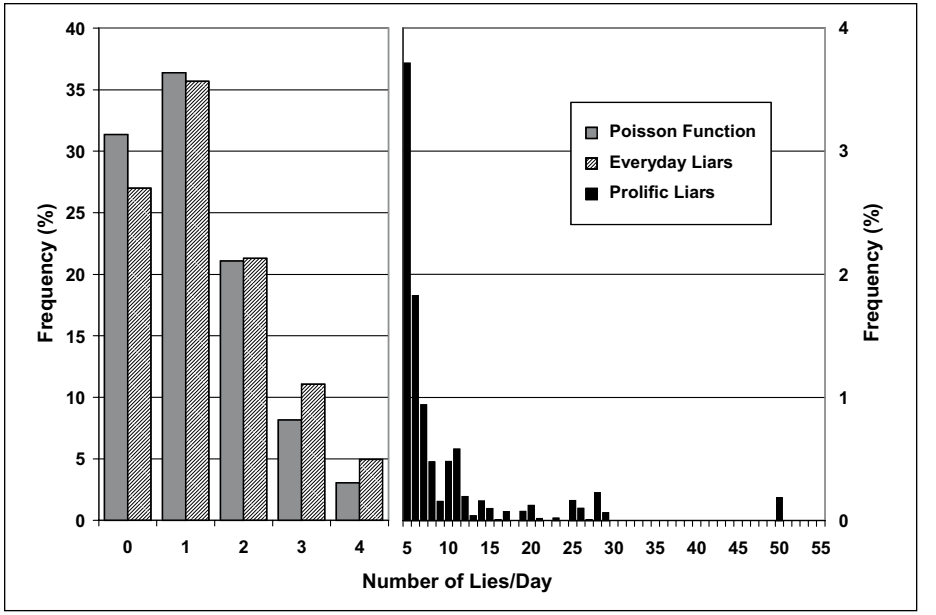

Figure 3. Distributions of the theoretical Poisson function, everyday liars, and prolific liars.

Comparing Prolific and Everyday Liars. Who are the prolific liars? They are younger, are more likely to be male, and have higher occupational status. In the United Kingdom, prolific liars are significantly younger, $M = 39.3$ years ($SD = 14.75$, $N = 289$), than everyday liars, $M = 45.1$ years ($SD = 15.04$, $N = 2691$), with $t(2,978) = -6.25$, $p < .001$, $d = 0.39$. Prolific liars are significantly more likely to be male (58.8%) when compared to everyday liars (47.2% male) with $\chi^2 = 14.04$ (degrees of freedom [df] = 1, $p < .001$, $\phi = .069$). More U.K. prolific liars are from Northern Ireland, 5.9% versus 2.5% of the everyday liars, $\chi^2 = 11.34$ ($df = 1$, $p < .005$, $\phi = .062$) but are less likely to come from England, 79.5% versus 84.3% of everyday liars, $\chi^2 = 4.89$ ($df = 1$, $p < .05$, $\phi = .040$). The differences were not significant for subjects from Scotland and Wales. Prolific liars are much more likely to work in business professional and technical occupations (23.5% vs. 14.1% of everyday liars), $\chi^2 = 18.08$ ($df = 1$, $p < .001$, $\phi = .078$). With the exception of age, most of these variables had effect sizes that are relatively small, evidence that significance of the test statistics may be driven by the study's very large sample size.

Prolific liars are less likely to see lying as a behavior that people grow out of as they age. Asked "when do you tell the most lies," prolific liars are more likely to say as a young adult (31.8% vs. 17.8% of everyday liars) or middle-aged adult (11.1% vs. 7.2%); they are less likely to say as a child (15.2% vs. 27.0%) or teenager (40.8% vs. 47.2%), $\chi^2 = 48.52$ ($df = 4$, $p < .0001$, $\phi = .128$). The Science Museum (2010) reported that "Mum" is the person most likely to be lied to, and this is supported by results from

Table 2. Situations in Which Prolific and Everyday Liars Consider It Acceptable to Lie.

Situation	Everyday liars	Prolific liars	χ^2: N = 2,980, df = 1	p	ω
To save hurting someone's feelings	80.1	72.3	9.59	<.005	0.057
To protect someone	70.3	72.7	0.70	*ns*	NA
When you don't like someone's gift	53.3	54.4	0.14	*ns*	NA
To stop someone finding out a secret	38.8	50.0	13.80	<.001	0.068
When a child wants something he or she can't have	28.1	40.8	20.56	<.001	0.083
Other situations (open-ended responses)	2.5	0.3	5.29	<.05	0.042

Note. *df* = degrees of freedom; *ns* = nonsignificant; NA = not applicable.

everyday liars (23.2%); however, only 14.9% of prolific liars cite their mother as the leading target of their lies. Prolific liars are more likely to lie most to their partner (18.7% vs. 14.3%) and their children (12.5% vs. 6.4%), $\chi^2 = 42.90$ ($df = 10$, $p < .0001$, $\phi = .120$). Occupationally, prolific liars are more likely to be found among managers and supervisors (11.9%) than among workers (7.9%); $\chi^2 = 3.93$ ($df = 1$, $p < .05$, $\phi = .053$). Notably, among workers there is no significant variation by age, but among management those 55 years and older (16.4%) are more like to be prolific liars than 18- to 34-year-old managers (11.1%) or 35- to 54-year-old managers (10.1%), $\chi^2 = 6.84$ ($df = 2$, $p < .05$, $\phi = .079$).

Prolific liars are less inhibited about lying. Although the difference is not large, prolific liars are significantly more likely to believe that there is such a thing as an acceptable lie (21.8% vs. 17.1% of everyday liars), $\chi^2 = 3.99$ ($df = 10$, $p < .005$, $\phi = .037$). Table 2 reports situations in which prolific and everyday liars believe it is okay to tell a lie. More than 70% of U.K. adults say that it is okay to lie in order to protect someone or avoid hurt feelings; however, prolific liars are less likely to be concerned about hurt feelings (72.3% vs. 80.1%). Prolific liars are more likely to approve lying to protect a secret (50.0% vs. 38.3%) or when a child wants something he or she cannot have (40.8% vs. 28.1%).

Prolific liars are more likely to experience the consequences of lying. Among prolific liars, 19.7% reported being "dumped" because they lied to their partner versus 5.2% of everyday liars, $\chi^2 = 89.13$ ($df = 1$, $p < .005$, $\phi = .173$). At work, 13.1% of prolific liars (vs. 1.5% of everyday liars) had been "sacked" and 10.0% (vs. 2.5% of everyday liars) had been reprimanded for lying, $\chi^2 = 189.34$ ($df = 2$, $p < .005$, $\phi = .252$). There is little difference between the two groups with regard to feelings of guilt; 28.6% of prolific liars report ever feeling guilty after telling a lie whereas 26.8% of the everyday liars express the same feeling, $\chi^2 = 0.44$ ($df = 1$, ns).

Table 3. Lies Considered to Be "Big" Lies by Everyday and Prolific Liars.

Big lies	Everyday liars	Prolific liars	χ^2: *N* = 2,980, *df* = 1	*p*	ω
Whether or not you love someone	69.4	67.2	0.59	*ns*	NA
Not telling your partner who you have really been with	66.4	69.0	0.76	*ns*	NA
Not telling your partner where you have really been	61.2	61.9	0.05	*ns*	NA
Calling in sick when you feel fine	51.5	45.0	4.44	<.05	0.039
Whether you like someone or not	32.9	25.6	6.44	<.05	0.046
How much you have spent on something	22.2	17.3	3.74	*ns*	NA
Pretending you were too busy to take a call	14.1	15.2	0.27	*ns*	NA
Saying you haven't had that much to drink when you really have	13.2	11.4	0.74	*ns*	NA
Telling someone they look good when they don't	7.4	8.3	0.31	*ns*	NA
Other lies (open-ended responses)	1.0	1.0	0.00	*ns*	NA

Note. *df* = degrees of freedom; *ns* = nonsignificant; NA = not applicable.

Although prolific and everyday liars are classified on the basis of the total number of lies, there are large differences in their tendencies to tell both big lies and little white lies. Prolific liars report telling $M = 6.32$ little white lies per day ($SD = 5.03$, $N = 294$) whereas everyday liars report $M = 1.16$ white lies ($SD = .96$, $N = 2656$); results of a one-way analysis of variance show $F(1, 2949) = 2117.31$, $p < .001$, partial $\eta^2 = .423$. Similarly, prolific liars report $M = 2.86$ big lies per day ($SD = 5.12$, $N = 294$) whereas everyday liars report only $M = 0.15$ big lies ($SD = .42$, $N = 2656$); the one-way analysis of variance result for big lies is $F(1, 2949) = 709.45$, $p < .001$, partial $\eta^2 = .194$.

Differences between the two lie measures are most apparent when considered as ratios. Prolific liars tell more white lies and more big lies than do everyday liars. Although the prolific to everyday liar ratio for white lies is a substantial 5.5 to 1, the ratio for big lies is an even more striking 19.1 to 1. Table 3 shows the kinds of lies that U.K. subjects consider big lies. Asked to classify a list of possible lies as big or not, U.K. adults tend to consider lying to a loved one as most onerous; lying about love (69.2%), lying to a partner about who you have been with (66.7%), and lying to a partner about where you have been (61.3%) are the most frequently cited big lies. There is general agreement between prolific and everyday liars with regard to what constitutes a big lie. Only two exceptions were reported: Prolific liars are less likely to consider it a big lie to call in sick when feeling fine (45.0% vs. 51.5% of everyday liars) or lie about whether or not someone is liked (25.6% vs. 32.9% of everyday liars).

Discussion

This article reports the analysis of a large-scale survey of lie prevalence in the United Kingdom. In addition to replicating previous findings from the United States, the data provide insight into the differences between prolific liars and everyday liars. The most notable findings are that lying is a less frequent occurrence than one might assume from reading most deception research and that the frequency of lying is not normally distributed across the population. As in the United States, most people in the United Kingdom report lying relatively infrequently, and most lies are relatively benign. Nonetheless, a few prolific liars have deceptive behavior that is both more pronounced (more big lies) and riskier in terms of the consequences of being caught.

Previous research conducted in the United States reports that people tell, on average, between 1 and 2 lies per day. In the United Kingdom the number is slightly higher at about 2 lies per day. Although the frequency of lies above 5 lies per day is measured differently in the U.K. and U.S. studies, 94% of the U.K. sample and 92% of the U.S. sample told lies in the 0 to 5 lie range. Within this range, the U.K. mean is 1.46 lies per day or more than double the U.S. mean of 0.70 (for those reporting more than 5 lies, the U.K. and U.S. means were 11.76 and 12.71 respectively). Given that the U.K. scale will tend to understate the number of lies by prolific liars, the cross-national comparison of lower frequency lying provides some evidence that, normatively, lying is more prevalent in the United Kingdom than in the United States.[3]

Approximately 80% of the U.K. lies were little white lies; the overall average number of big lies was only 0.41 per day. Asking respondents to report both big lies and white lies may partially explain the higher rate of lying reported in the current data. The findings also indicate some cultural variation. Within the United Kingdom, those in England (especially outside of London) tend to tell fewer lies than the average; in Scotland and Wales, the rate of lying is near the U.K. average; in Northern Ireland, the region most culturally and socially distinct from the U.K. mainstream, the overall rate of lies per day is significantly higher.

As with previous studies of lie prevalence, the data were not normally distributed. The nonnormal nature of the distribution makes interpretation of the mean potentially misleading because the average number of lies per day does not reflect the average person. As a central tendency the mean is sensitive to extreme scores, and the existence of a few prolific liars can substantially inflate the mean. The typical (nonprolific) U.K. respondent reported just over 1 white lie per day and only 0.15 big lies per day (or about once per week).

Inflation of the mean is not trivial. Serota et al. (2010) attributed this underlying long-tailed distribution to the apparent differences between prolific liars and the rest of the population. Making this observation required separating the liars from the nonliars (those reporting no lies) to calculate and compare the power functions of those who did report telling lies. However, telling no lies on a given day is a valid event for which the analysis should account. A large proportion of the sample report not lying (24.4% in the U.K. data, 59.9% in the U.S. data).[4]

One alternative is to treat prolific liars as a separate population distinct from everyday or less frequent liars. Recognizing that telling lies (a) consists of independent events, (b) measured as a rate that expresses the frequency at which lying occurs in a fixed period of time, (c) is for most people a low-frequency event, and (d) has no defined upper limit, everyday lying behavior can be modeled according to the theoretical Poisson distribution. The Poisson arrival model accounts for rare or infrequent events (even the substantial number reporting no events), but it cannot be used when there are more than a few instances where a high rate of the event occurs. As the U.K. data show, there is a break point in the distribution of lying where the pattern of events changes and the distributions on either side of the break point are observably different. The distribution differences indicate two distinct populations that behave differently. As Figure 3 illustrates, the majority report lying rates that are Poisson distributed. But there are too many extreme values for the total sample to be Poisson distributed. By varying the break point, applying the index of dispersion, and testing for goodness of fit, the point at which the incidence of lying changes from a normative behavior to an excessive or prolific behavior can be identified. Everyday, infrequent liars very precisely fit the Poisson distribution; the incidences of lying by prolific liars fit a standard power function starting just above the break point.

In the United Kingdom, the average adult tells 2.08 lies per day, which, as the analysis shows, is a nearly meaningless statistic. But the Poisson break point analysis indicates that telling between 0 and 4 lies per day is both normative of the general population (in the United Kingdom) and consistent with the theoretical distribution of relatively low-incidence events. It also indicates that beyond the break point, lying occurs at abnormally high rates, and consistent with the long-tailed distribution, as this population grows large the likelihood of observing extremely aberrant behavior increases.

Notably, cultural differences with regard to normative lie behavior also become clearer when prolific liars are separated from everyday liars using the break point procedure. As a test, the approach was applied to the U.S. data collected by Serota et al. (2010). The boundary for both the U.K. and U.S. samples fall within that part of the response range that can be compared, more or less, directly (0-5 lies); therefore we are comfortable about making this comparison. In the United States, the break point for dividing the populations is much lower than in the United Kingdom; telling 0 to 2 lies per day appears acceptable as an everyday occurrence ($M = 0.39$, normal $SD = 0.670$; Poisson $SD = 0.624$, $N = 830$); the rate of 3 or more lies per day fall outside the acceptable range and is classified as prolific ($M = 7.91$ lies, $SD = 8.282$, $N = 168$). With 0 to 4 lies considered the acceptable level for everyday lies in the United Kingdom, the difference between the means of everyday liars is substantial ($M_{US} = 0.39$ vs. $M_{UK} = 1.31$) and statistically significant, $t(3,519) = 35.898$, $p < .001$, $d = 0.991$. The cross-national difference between the means of the nonnormative prolific liars ($M_{US} = 7.91$ vs. $M_{UK} = 9.18$) is not significant, $t(455) = 1.603$, nonsignificant, although it is likely that the mean for prolific liars in the United Kingdom is understated.

The questions asked in this study provide some clues with regard to the differences between everyday liars in the general population and those who lie prolifically. Everyday

liars in the United Kingdom report telling, on average, just over one little white lie daily, and at the fractional rate reported, they tell one big lie only about once a week. Most people in the general adult population are likely to approve of a lie told in order to avoid hurting someone's feelings. Everyday liars do not necessarily abstain from lying, perhaps because they have learned the negative effect of too much honesty through early socialization. They rarely report that trouble at work or in their personal life has been caused by deception. Everyday and infrequent liars indicate that lying is a behavior they practiced on a more frequent basis when they were younger; as they have matured, presumably they learned other, more effective methods of communication.

In contrast to the once-a-week big lie rate of the everyday liars, prolific liars tell almost three big lies a day; this is in addition to the six white lies they tell on an average day. Prolific liars are more likely to approve of lying to protect a secret or avoid giving in to the whims of children. Whereas most everyday liars say they have reduced the rate of lying from that experienced early in life, prolific liars stretch their lying behavior on into adulthood. Their dishonesty permeates from business situations to personal relationships. At work, they are 4 times more likely than the rest of the population to have been reprimanded for lying and almost 9 times more likely to have been fired for their dishonest behavior. Prolific liars are also 4 times more likely to report losing a partner because of their lying habits. Even so, prolific liars express no more guilt than everyday liars; 29% of prolific liars report feeling guilt after telling a lie, 27% of everyday liars expressing the same feeling. This distinction between prolific liars (high frequency–low guilt) and everyday liars (low frequency–low guilt) supports the finding that prolific and everyday liars are different populations that need to be examined separately.

Limitations and Future Research

The current study provides a method, Poisson break point analysis, for distinguishing prolific liars from everyday liars and adds important insights into the nature of prolific liars. However, there are several limitations to be considered. First, cross-national comparisons have to be qualified; the U.K. data were not measured in a way that is entirely consistent with data collected in the United States. Second, to achieve some consistency between the sample and the population being represented, the data were weighted to population parameters. Finally, the recurring criticism that self-reporting raises also may be directed to this study.

Consistency. Scale differences between the U.K. study and studies conducted in the United States raise questions of comparability. First, studies in the United States have focused on reports of actual behavior in a fixed time period (typically the past 24 hours). The U.K. study asked subjects to estimate their "average" daily behavior. An individual's most recent experience may not be the same as his or her usual or typical behavior. To compare the results, we have to rely on an assumption that the variation in behaviors over time is normally distributed around an individual's mean behavior even though the data tell us that the behavior itself is not normally distributed across

the population. As sample sizes increase, we expect the errors in reporting for a specific time period will average out and the central tendency will approach that reported directly as the average behavior response.

Second, the U.K. study used a scale with prescribed closed-ended responses. Although the rate of lying is inherently a ratio scale, as the number of lies increased above 5 lies, subjects were forced to report in multiples of 5 lies. At very low rates (which are most of the responses) the scale is accurate, but as the rate of lying increases, subjects had to approximate their answers, and for those with very high rates the scale was bounded by a maximum response value of 25+ lies per day. The total U.K. lies are also an additive combination of white lies and big lies. However, it should be noted that the question developed by Serota et al. (2010) and used by others is also an additive combination of categories (direct vs. mediated communication and five levels of receiver relational closeness).Treating the target behavior as separate activities may inflate the results. Future cross-national and cross-cultural research should strive for directly comparable measures of lying behavior.

Weighting. Data collection was done using an online consumer panel. To generalize from the convenience sampling that the panel method relies on, the sample is stratified and population weighting is applied to the results. The sample was substantially younger and there were more females than in the actual U.K. population. Nonetheless, most (but not all) of the strata weights were within the limits of acceptable practice. The unweighted mean number of lies per day is $M = 2.34$ (normal $SD = 3.69$, 95% CI [2.20, 2.48]). Although higher than the 2.08 lies per day in the weighted sample, the difference is not unexpected since age is the measure most strongly associated with different rates of lying and the weighting procedure raised the age, placing it in line with the U.K. census.

Self-Reporting of Lies. In general, prevalence studies have relied on self-report; this U.K. study is no different. The question often asked is, "How do you know the subjects are not lying [about the extent to which they lie]?" This study was not administered by the authors and did not include validation measures. However, other studies support the validity of using self-report. Serota et al. (2010) tested the self-report results against projective questioning about others' lies and found self-reported data agreed fairly well with the projective data. Halevy et al. (2014) provided a direct comparison of self-reported lies and lying behavior, confirming that self-reports correlate with behavioral measures. Within the U.K. study, comparison of measures of white lies and big lies provides some confidence that the self-report results are logical and the subjects appear to be forthcoming. Furthermore, social desirability bias was limited; subjects were assured anonymity, and there was little about this study that serves as a motivation to lie about one's own behavior. However, future studies in this area should include measures with which to establish convergent and divergent validity.

Future Research. The results of this study provide substantial evidence that prolific liars are a distinctly different population from the general population. A small amount

of lying seems to be acceptable and normative, often undertaken with good intentions and despite the concern by Bok (1999) that even well-intentioned lies constitute a slippery slope. However, the prolific liar is not only a more aggressive practitioner, he or (to a lesser extent) she navigates with a different moral compass. The prolific liar is more likely to risk endangering relationships and to experience the consequences of deceptions at home and in the work place. This leads to several specific research recommendations: (a) Those studying lying behavior should strive to account for or control differences between prolific and everyday liars, (b) cross-cultural studies should be extended to a more diverse cultural set, and (c) observed differences indicate a need for more formal study of the motivations and attitudes related to lying frequency.

Conclusion

This study of lying in the United Kingdom provides substantial support for the U.S. findings reported previously by Serota et al. (2010). The overall results validate other research showing that most people tell very few lies but a few people are prolific with their lying behavior. The study also provides strong evidence that the tendency toward lying is inversely correlated with age. In the debate over who lies more, the U.K. data also support the argument that in general, men lie more than women. These result help put everyday lying into perspective; it is normal for people to tell a few lies, and many lies are minor transgressions or simply efforts to avoid being hurtful. These data provide a strong case that the people who tell a lot of lies daily are not only different, they are a population that needs to be studied independently of everyday liars in order to better understand the motivation and production of lies. In addition, it is clear that the differences between prolific and everyday liars are sufficiently large that experimental deception research should control or account for the effect of prolific lying on base rates, truth bias, situational factors, and transactional measures.

Appendix

Questionnaire Items From the OnePoll Survey Conducted April 2010 for The Science Museum of London

1. On average, how many times a day do you tell a little white lie?
   (0, 1, 2, 3, 4, 5, 10, 15, 20, 25+)
2. On average, how many times a day do you tell a big lie?
   (0, 1, 2, 3, 4, 5, 10, 15, 20, 25+)
3. What do you think counts as a big lie?
   Telling someone they look good when they don`t
   Calling in sick to work when you feel fine
   Saying you haven`t had that much to drink when you really have
   Pretending you were too busy to take a call
   How much you have spent on something

Whether or not you love someone
Whether you like someone or not
Not telling your partner where you have really been
Not telling your partner who you have really been with

4. How many times a day do you lie to your partner?
   (0, 1, 2, 3, 4, 5, 10, 15, 20, 25+)
5. How many times a day do you lie to one of your work colleagues?
   (0, 1, 2, 3, 4, 5, 10, 15, 20, 25+)
6. How many times a day do you lie to your boss?
   (0, 1, 2, 3, 4, 5, 10, 15, 20, 25+)
7. MEN, which of the following lies have you told your partner?
   32 items (e.g., "I'm on my way"; "No, your bum doesn't look too big in that")
8. WOMEN, which of the following lies have you told your partner?
   31 items (e.g., "I've got a headache"; "Someone must have bumped into the car")
9. Which of the following lies have you told while at work?
   16 items (e.g., "Traffic was bad"; "I've got a call on the other line")
10. Who do you think tell the most lies?
    (Men, women, both the same)
11. Who do you think are the better liars?
    (Men, women, both the same)
12. Who do you think are the best at spotting when someone is lying?
    (Men, women, both the same)
13. When do you think you tell the most lies?
    (Child, teenager, young adult, middle aged adult, pensioner)
14. Who are you most likely to lie to?
    (Partner, children, dad, mum, mother or father in law, brother, sister, best friend, other friend, boss, work colleague)
15. Do you think there is such a thing as an acceptable lie? (no, yes)
16. When do you think it is OK to lie?
    To save hurting someone`s feeling
    When you don`t like someone`s gift
    To protect someone
    When a child wants something he or she can`t have
    To stop someone finding out a secret
17. Do you ever feel guilty after telling a lie? (no, yes)
18. Have you ever been dumped because of a lie you told your partner? (no, yes)
19. Have you ever got into trouble or been sacked because of a lie you told at work? (no, yes)
20. Do you think you can tell when people are lying to you? (no, yes-maybe, yes-definitely)
21. If yes, which of the following things do you look for?

10 items (e.g., "They can`t look directly at you"; "They fidget a lot") and Other (open-ended)

22. Do you think lie detection is acceptable to use in everyday life? (no, yes)
23. Do you think lie detection is acceptable to use in criminal cases? (no, yes)
24. Do you think lie detection is acceptable to use in the workplace? (no, yes)
25. Do you think lie detection is acceptable to use in home life? (no, yes)
26. Which method of lie detection would you find most convincing? (Brain scanning, polygraph test, reading body language)

Data include additional items coded from the sample file: age, gender, iPhone user, education, marital status, home ownership, work status, income, industry, and occupation.

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Notes

1. A study by Gozna, Vrij, and Bull (2001) examined the relationship between personality and prevalence using English university students but did not report actual prevalence statistics.
2. The unweighted sample was 66.7% female with a mean age of 34.9 years. Geographically, 85.1% of the responses came from England (22.3% in London), 8.1% were from Scotland, 5.4% were from Wales, and 1.4% were from Northern Ireland.
3. To examine the effect of the truncated U.K. scale we fit the open-ended U.S. data to the U.K. scale values (6-7 = 5, 8-12 = 10, etc.; all values >25 = 25). This reduced the total number of lies by 7.5%; only 0.2% of the adjustment was due to values less than 25. The overall mean declined from 1.65 to 1.53 lies per day.
4. Both DePaulo et al. (1996) and Serota et al. (2010, Study 3) show that most subjects who do not lie on a given day do lie but with less than daily frequency. When the interval for reporting is expanded to a week, more than 90% of the samples reported lying behavior. If fractional lies per day replace no lies per day in the mean calculations, the means will increase slightly. However, adjusting both the U.K. and U.S. means with estimates based

on 90% reporting some lying in a week does not substantially alter the comparison of U.K. and U.S. results or the overall findings of either study.

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