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Case-based modeling of prolific liars and constant truth-tellers: Who are the dishonesty and honesty self-reporters?☆

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ABSTRACT

Do some individuals identify themselves to be prolific liars? Here, “big-liars” are individuals who self-report telling lies twelve-or-more times annually. What share of Americans (or any other national population) is big-liars? What share reports telling no lies? Can individual social-economic status (SES) and social factor configurations identify big-liars consistently? The present study includes proposing and testing the case-based theoretical tenet that single-variable SES and social factors do not identify big-liars or self-report truth-tellers consistently even if these single-variables associate significantly statistically with lying/truth-telling in symmetric tests. The theory here proposes that configurations (i.e., screening algorithms or recipes of SES and social factors) are capable of identifying big-liars as well as self-reported persons claiming to never lie. A national omnibus, representative, sample of Americans ($n = 3350$) provide some surprising answers to the questions and substantial support for the usefulness of case-based configurational models for identifying big-liars. To prevent, “I knew that” perceptions, before reading further (using a pen or pencil), consider answering the following multiple-choice questions. What share (%) of Americans identify themselves to be non-liars: 30, 40, 50, 60, or 70? What share (%) identify themselves to be big (i.e., monthly) liars: 30, 40, 50, 60, or 70?

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1. Introduction

Possibly unsurprisingly, telling lies is headline news especially in 2015 and 2016. The following two brief stores illustrate. Running for U.S. President in 2015–16, Donald Trump has repeatedly labeled his political opponents liars. He dubbed Senator Ted Cruz lying when it became clear that Cruz was a serious rival for his nomination; he identified Senator Marco Rubio an “even a bigger liar” than Cruz. He dubbed Dr. Ben Carson a pathological liar and said former Florida Governor Jeb Bush’s lies were almost as bad as Cruz’s. Trump has termed virtually every mildly adversarial media member a liar, too. Yet for the “2015 Lie of the Year Award”, PolitiFact (a Pulitzer award-winning fact checking organization) recognized “the misstatements of Donald Trump” as the recipient of the award, “PolitiFact has been documenting Trump’s statements on our Truth-O-Meter, where we’ve rated 76 per cent of them ‘Mostly False’, ‘False’ or ‘Pants on Fire’, out of 77 statements checked. No other politician has as many statements rated so far down on the dial” (Holan & Qiu, 2015, p. 1).

The Wells Fargo retail banking scandal of 2016 is a second example of widespread lying. For years, Wells Fargo employees secretly issued credit cards without a customer’s consent—an assumed consent lie. The employees created fake email accounts to sign up customers for online banking services. They set up sham accounts that customers learned about only after they started accumulating fees. In 2016 these illegal banking practices cost Wells Fargo \$185 million in fines, including a \$100 million penalty from the Consumer Financial Protection Bureau, the largest such penalty the agency has issued. Federal banking regulators said the practices, which date back to 2011, reflected serious flaws in the internal culture and oversight at Wells Fargo, one of the nation’s largest banks. In September 2016 Wells Fargo fired at least 5300 employees who were involved but no senior managers. In all, Wells Fargo employees opened roughly 1.5 million bank accounts and applied for 565,000 credit cards that may not have been authorized by customers, the regulators said in a news conference (Corkery, 2016).

The present study conceptualizes four types of individuals based on their self-reported lying versus non-lying frequency and whether they view most others as being honest or dishonest. This study investigates whether individual social-economic status (SES) and prosocial and antisocial behaviors identify big-liars consistently. The study describes the “heavy-half” of self-reported big-liars—adopting the heavy-half proposition from prior marketing theory (Cook & Mindak, 1984; Perfetto & Woodside, 2009; Twedt, 1964), that is, half or the majority of lies are

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told by a relatively small share of the population (e.g., a population share less than 20%). The study proposes a case-based theory that individuals scoring high on complex configurations of SES and social behavior conditions are consistently big-liars while other cases scoring high on other complex configurations of SES and social behavior conditions identify “truth-tellers” consistently. The present study defines “truth-tellers” to be individuals claiming not to tell lies.

The study recognizes the invalidity of variable-based, symmetric, null hypothesis statistical testing (NHST) (Falk & Greenbaum, 1995; Gigerenzer, 2004; Hubbard, 2016; Trafimow & Marks, 2015) and tests the consistency of the findings with predictions of the theory via the use of “somewhat precise outcome testing” (SPOT) (Woodside, 2016). SPOT is asymmetric testing whereby all or nearly all cases with high scores in the complex antecedent configurational model should have high scores in the outcome condition (i.e., frequent lying).

Lying is an important issue to study (Bok, 2011; DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; Ekman, 2009; Vrij, 2000). Catching lies is difficult and even most professionals are unable to identify liars as in the work done on catching liars by many scholars (Ekman, 1996; Ekman & O'Sullivan, 1991; Ekman, O'Sullivan, & Frank, 1999; Loeber, Green, Lahey, & Stouthamer-Loeber, 1991; Vrij, 2004, 2008). Although how honest people are in reporting high dishonesty is a philosophical question, still some prior studies also examine self-reported liars (Feeley & Young, 2000; Halevy, Shalvi, & Verschuere, 2014; Serota, Levine, & Boster, 2010). Self-report data for the U.S. adult population show the average rate of lying is around 1.65 lies per day (Serota et al., 2010). Feldman, Tomasian, and Coats (1999) report that as individuals grow older, they become more proficient at lying. One study reports a decrease in lying associating with increasing age; younger persons may lie more frequently than older persons but age alone is unlikely to be sufficient for accurately predicating lying with high consistency (Serota et al., 2010).

Some studies report males lie more than females while others suggest females lie more frequently than males (e.g., DePaulo et al., 1996; Levine, Park, & McCornack, 1999). In other studies, no gender differences were observed when controlling for other demographic predictors (Serota et al., 2010). For gender and all other SES variables, dichotomous and quintile cross-tabulations with these variables and the lowest and highest quintiles for lying indicates the occurrence of numbers of cases in all cells. The issue of substance is not if a relationship exists that refutes a null hypothesis or whether or not one SES variable relationship with lying has a larger effect size than another SES variable. The substantive issues are what configurations of SES conditions indicate frequent liars and what configurations of SES conditions indicate non-liars, if any. Both genders will occur in both big-liar and truth-telling configurations.

A study (Vrij, Granhag, & Mann, 2010) identifying individuals who might be naturally good at lying establishes that being good at lying is inherent in some individuals and related to personality. Levine and Bond (2014) investigates prosocial lies, lies told to benefit others, and finds that prosocial lies are often judged to be more moral than honesty. No overlapping activity was observed during the moral judgment of anti- and prosocial lying. Cognitive and neural processes for the moral judgment of lying are modulated by whether the lie serves to harm or benefit listeners (Hayashi et al., 2014).

Professionals can learn how to better discriminate between truthful speakers and liars relating to extremely high-stakes lies (Shaw, Porter, & ten Brinke, 2013). Francis, Pearson, and Kay (1988) report a significant positive correlation between the lie scale scores and religiosity and confirm the proposition that children who score high on their lie scale also tend to score high on the religiosity scale, although most of religions forbid lying (Bok, 2011).

Following this introduction, section two describes case-based models of big-liars and truth-tellers. Section three presents the method to test the propositions in the case-based models. Section four presents

the findings. Section five is the discussion section. Section six discusses limitations. Section seven concludes.

2. Case-based model of big-liars and truth-tellers

Fig. 1 is a visual summary of a configurational theory of complex antecedent conditions leading to big-liars and four types of individuals. The Venn diagrams in Fig. 1 suggest the adoption of the perspective of configurational influence on outcome conditions. The arrows in Fig. 1 illustrate five of six principal propositions in the theory. P1a: SES recipes by themselves are sufficient in identifying big-liars with high consistency. P1b: Constructing separate configurations of SES conditions having high consistency in indicating big-liars for separate samples of cases supports high cross-validity. P2: SES recipes by themselves are sufficient in identifying cases with high prosocial behavior. P3: SES recipes by themselves are sufficient in identifying cases high in antisocial behavior. P4: A high antisocial behavior recipe by itself is sufficient for identifying cases of big-liars. P5: A high prosocial behavior recipe by itself is sufficient for identifying self-report non-liars. P6: Configurations of SES along with pro- and antisocial behavior are necessary to construct recipes to identify big-liars and cases of the four types of lying. P6 stands in conflict with the first five propositions. P6 implies that the first five propositions are insufficient in identifying big-liars and individuals representing each of the four combination of lying/truth-telling and pro- and antisocial behaviors. P6 implies that including both SES and socially-related behavior are necessary. The study considers opposing views rather than advocating one perspective necessary for identifying big-liars. While advocacy hypothesis construction and testing is the current dominant logic, the study adopts a multiple (competing) hypotheses stance rather than an advocacy hypothesis stance as Armstrong (1979) recommends.

P7: Asymmetric models identifying truth-tellers are not the mirror opposite of models identifying big-liars. P7 builds from the complexity theory principle that the causal conditions resulting in favorable outcomes include some ingredients that are not found in the causal conditions resulting in unfavorable outcomes (Hsiao, Jaw, Huan, & Woodside, 2015). P7 is an adoption at the human case level of Weick's (1987) highly reliable organization (HRO) proposition that the study of failure is distinct from the study of successful enterprise operations.

P8 proposes four two-conditional outcomes: big-liars who believe everyone lies (i.e., “rounders”), big-liars who believe most others are honest (i.e., “confessors”), truth-tellers who believe most others are big-liars (i.e., “skeptics”), and truth-tellers who believe that most others are honest (i.e., “innocents”). P8: Unique configurations of SES characteristics and social behaviors indicate each of the four personal-world belief outcomes.

An attempt is not made to show P6 or P7 in Fig. 1. The theory proposes that different configurations containing two-to-seven socioeconomic-status configurations associate with big-liars for each of four types of individuals. The seven SES conditions appear in the Venn diagram in Fig. 1. Fig. 1 illustrates all possible two-way to seven-way configurations of the seven simple antecedent conditions. Seven socioeconomic configurations are age, education, gender, income, marital status, does have any children-at-home or not, ownership of residence. The study also proposes that prosocial behavior and antisocial behavior also associate with big-liars and four types of individuals. The present study demonstrates how fuzzy-set qualitative comparative analysis (fsQCA) — a relatively new method of configurational analysis that builds from an asymmetrical way of thinking about relationships among antecedent conditions. The study here uses fsQCA to investigate how configurations of antecedent conditions (“causal recipes”; Ragin, 2008a,b, p. 9), rather than how individual antecedents, indicate prolific liars and how distinctly different recipes indicate truth-tellers.

Rounders are the big-liars in a dishonest world (B~H, thus, big_liars AND ~honest_world, where ~ indicates NOT or negation of the condition).

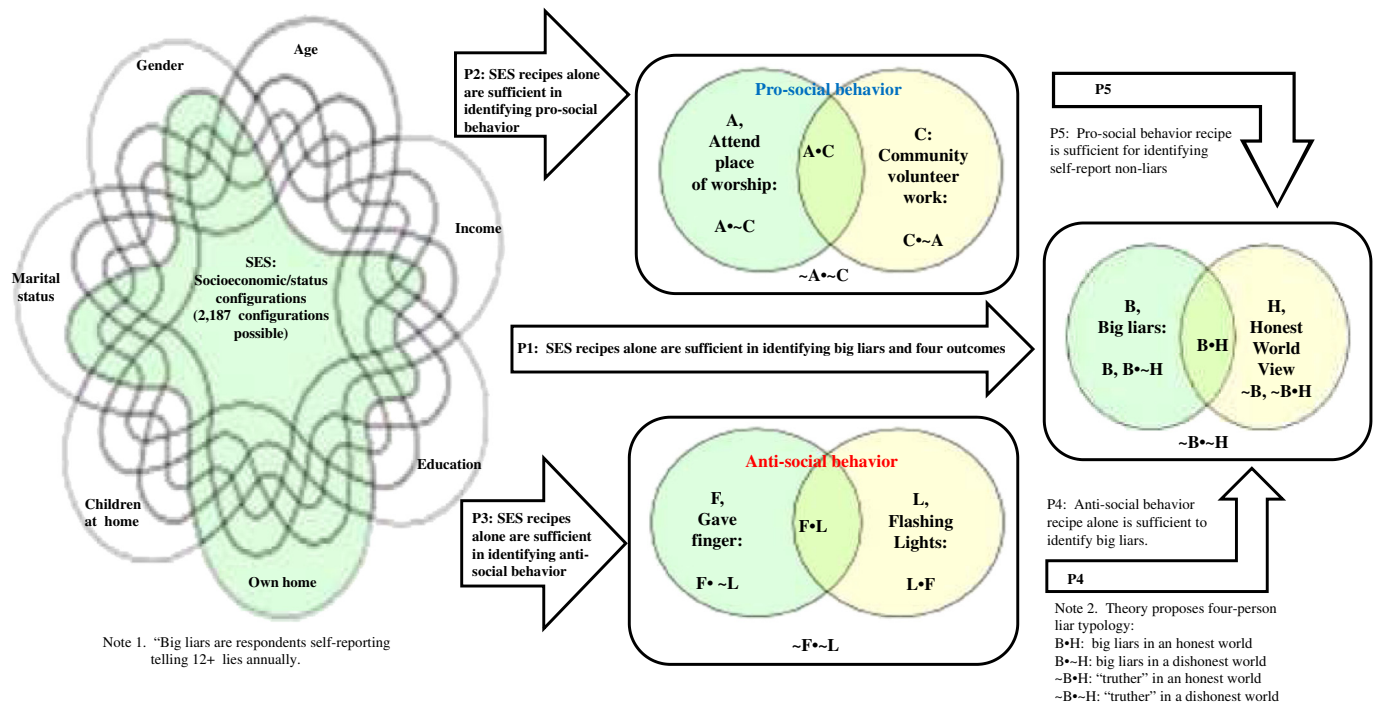


Fig. 1. Case-based modeling of big liars.

Rounders think they are surrounded by lies and the world is full of liars. Confessors are the second type of big-liars in this study. Confessors are big-liars in an honest world (B•H). Confessors confess that they lie but report others do not lie and so they do not hear lies except their own lies. Skeptics are the third type of individuals. Skeptics report that they are truthful individuals in the dishonest world (~B~H). Skeptics report not telling lies whereas others around them lie. Another way of explaining confessors is ~big_liars AND ~honest_world. Innocents are the truthful individuals in an honest world. Neither do innocents lie nor believe that others around them lie; thus, making the world an honest environment. Innocents are the conjunction of negation of big-liars with honest world (~B•H). Another way of describing innocents is ~big_liars AND honest_world.

The theory proposes that different configurations containing two-to-seven socioeconomic-status configurations associate with big-liars for each of four types of individuals. The seven SES conditions appear in the Venn diagram in Fig. 1. Fig. 1 illustrates all possible two-way to seven-way configurations of the seven simple antecedent conditions. Seven socioeconomic configurations are age, education, gender, income, marital status, does have any children-at-home or not, ownership of residence. The study also proposes that prosocial behavior and antisocial behavior also associate with big-liars and four types of individuals. The present study demonstrates how fuzzy-set qualitative comparative analysis (fsQCA) — a relatively new method of configurational analysis that builds from an asymmetrical way of thinking about relationships among antecedent conditions. The study here uses fsQCA to investigate how configurations of antecedent conditions (“causal recipes”; Ragin, 2008a,b, p. 9), rather than how individual antecedents, relate to prolific liars.

Though currently rarely done in the configurational research literature, drilling deeper than simply stating the complex configurations of antecedent conditions to identify specific outcome conditions is possible. For example, “footloose and fancy-free” proposition can be constructed and tested, that is, frequent lying associates with young, adult, unmarried, high-income, males having no children, who rent rather than own their residences. One subset of truth-tellers might be young, females, married, with high income, with young children, who own their residences. The findings section considers the confirmability

of each of these configurations as indicators having high consistency in predicting each outcome.

3. Method

3.1. Dataset

The study uses an annual DDB data set provided by DDB Needham's Life Style Surveys. These surveys were conducted for the years 1975–1998 by the DDB Needham advertising company (now known as the DDB Worldwide Communications Group). The response rates of these surveys were above 60%, which illustrates a good research practice since most survey studies report much lower response rates (Woodside, 2016). The present study uses data from the 3349 respondents for the year 1998 which contains 300+ items of which 11 were thought to relate to antecedents of extremely frequent liars (as Fig. 1 indicates). Seven items were socio-demographic variables (i.e., age, education, gender, income, marital status, does have any children-at-home or not, ownership of residence). Two variables indicate prosocial behavior (attended church or another place of worship another volunteer work). Two variables indicate antisocial behavior (“gave the finger to someone while driving a car” and “flashed lights at another motorist when annoyed with his or her behavior”).

3.2. Measurement

The seven socio-demographic variables are measured on dichotomous nominal scales or ordinal scales (i.e., age, education, gender, income, marital status, have any children-at-home, ownership of residence). The behavioral variables (attended church or another place of worship, did volunteer work, gave the finger to someone while driving car, flashed lights at another motorist when annoyed with his or her behavior) were measured as frequency in last 12 months (1 = None, 2 = 1–4 times, 3 = 5–8 times, 4 = 9–11 times, 5 = 12–24 times, 6 = 25–51 times, 7 = 52+ times). Table 1 summarizes measurements. The prosocial variable metric was calculated by summing of attending church or another place of worship and volunteering. The antisocial variable was computed by summing the reported frequency of giving the

Table 1
Items and Measurements.

Condition	Symbol	Item
<i>Demographic</i>		
Age	age_c	Respondent's age
Income	income_c	Respondent's income
Gender	gender	Respondent's gender (1 = male, 2 = female)
Education	educ_c	Level of education completed by respondent (1 = elem school, 2 = att high school, 3 = grad high school, 4 = att college, 5 = grad college, 6 = postgrad educ)
Children at home	Children home	Any children at home? 0 = No, 1 = Yes
Marital status	Marital	Marital status (1 = married, 2 = widowed, 3 = divorced, 4 = separated, 5 = never married)
Ownership of residence	Owners	Ownership of residence (1 = owned by household, 2 = rented for cash, 3 = occupied w/no cash rent)
<i>Behavioral</i>		
Gave finger	Finger	Gave "the finger" to someone while driving my car(frequency in last 12 months: 1 = None, 2 = 1–4 times, 3 = 5–8 times, 4 = 9–11 times, 5 = 12–24 times, 6 = 25–51 times, 7 = 52+ times)
Flash lights	Flash	Flashed my lights at another motorist when annoyed with his or her behavior (frequency in last 12 months: 1 = None, 2 = 1–4 times, 3 = 5–8 times, 4 = 9–11 times, 5 = 12–24 times, 6 = 25–51 times, 7 = 52+ times)
Antisocial behavior	Rage	Conjunction of finger (high) and flash (high); finger•flash
Worship place	Church	Attended church or other place of worship (frequency in last 12 months: 1 = none, 2 = 1–4 times, 3 = 5–8 times, 4 = 9–11 times, 5 = 12–24 times, 6 = 25–51 times, 7 = 52+ times)
Volunteer work	Volunt	Did volunteer work (frequency in last 12 months: 1 = none, 2 = 1–4 times, 3 = 5–8 times, 4 = 9–11 times, 5 = 12–24 times, 6 = 25–51 times, 7 = 52+ times)
Prosocial behavior	Prosocial	Conjunction of church (high) and volunt (high); church•volunt

finger to someone while driving car and flashing lights at another motorist when annoyed with his or her behavior.

The self-report question on lying frequency included a scale of seven responses to select from. The scale includes a response for telling zero lies to telling more than 52 lies annually (the value of 60 lies was used as a guess for the median among respondents reporting more than 52 lies annually). Arranging liars in order of lying frequency indicates that lies made by one heavy-half liar is equal to lies made by seven light-half liars. Table 2 provides a summary distribution: 21% of Americans reported no lying at all, 41% report 1 to 5 times, 15% report telling 6 to 7 lies annually, and 10% telling more than 8 lies annually. The finding that 21% report not lying is not beyond the pale of the finding by Ariely (2013) in experiments identifying cheaters that 30% of participants in his studies did not cheat. Ariely (2013) reports that only a small share (less than 0.01%) of participants were big cheaters. These exploratory findings suggest that some people consciously attempt not to lie and that the distribution of lying is skewed toward most people lying a few times annually.

For the present study, self-reported lying more than 12 times is considered as a necessary and sufficient condition for the outcome, big-liar. Contributing to the heavy-half of liars, 7% of Americans reported 18 telling lies a year, 3% of Americans reported 38 lies a year, and another 3% reported 60 lies a year. A total of 424 Americans were heavy-half liars in the sample; they reported telling an estimated 13,856 lies in total with an average of 32.7 lies per heavy-half American. The 2226 light-half Americans told an average of 4.5 lies. As the average lies by the heavy-half liars are around seven times the lies by the light-half liars, identifying cases among the heavy-half of liars is as important to liar-catching as is identifying heavy-half users of products in marketing.

Table 3 is the representation of heavy-half liars using Twedt's (1964) representation of heavy consumers. The heavy-half of liars are the 13% of Americans who reported telling 58% of the lies, the light-half of liars

is the 66% of Americans reporting telling 42% of lies; 21% of Americans reported telling no lies.

3.3. Fuzzy-set qualitative comparative analysis

Fuzzy-set qualitative comparative analysis (fsQCA) is a set-theoretic method for studying configurations using a comparison of cases to differentiate attributes that relate to an outcome of interest (Fiss, 2011; Ragin, 2000). The analysis applies fsQCA using fs/QCA 2.5 (Ragin & Davey, 2014). FsQCA (Ragin, 2009) is a technique that links quantitative, variable-oriented research methods, and qualitative, case-oriented research methods (Pajunen, 2008; Woodside, 2008). Testing by fsQCA requires calibration of all variable scales into calibrated scales, with scores ranging from extreme points 0.00 for full non-membership to 1.00 for full membership. To do calibration, criteria are necessary for three points—0.05 for full non-membership, 0.50 for maximum membership ambiguity, and 0.95 for full membership. The calibrated score for an attribute for a case represents a membership score and not a probability.

The raw data matrix is transformed into truth tables to analyze the findings of multiple fuzzy-set assessments. We follow Ragin (2009) in constructing truth tables. Initiating from a multidimensional vector space with 2^k corners (where k represents the number of antecedent conditions), the initial truth tables consist of 2⁸ rows representing all possible configuration of antecedent conditions. From the remaining configurations, the software selects those displaying high consistency, meaning that the configurations are subsets of high scores in the outcome. Ragin (2009) proposes that values smaller than 0.75 indicate substantial inconsistency. Ragin (2008a,b) recommends a consistency threshold of 0.80 or higher to conclude that a model is useful for identifying cases consistently having high scores in an outcome.

Table 2
Share of lies by share of respondents.

(A) Lying response	(B) Point estimate	(C) Number of RESPONDENTS	(D) Share of participants	(E) Total number of lies	(F) Share of lies
0	0.0	700	21 Non-liars	0	0
1–4	2.5	1386	41	3465	14
5–8	6.5	514	15	3341	14
9–11	10.0	326	10	3261	14
12–24	18.0	225	7	4050	17
25–51	38.0	97	3	3686	15
52+	60.0	102	3	6120	26

Note. Big liars are defined to be the respondents self-reporting telling 12+ lies annually; the big liars (13% share of respondents) tell 58% of the lies.

Table 3
Sufficient configurations of antecedent conditions for big-liars (all data).

	Antecedent conditions							Coverage	Consistency	Overall solution	
	Old	High-income	High-education	Male	Married	Have child at home	Own residence			Coverage	Consistency
1	○	●	○	○	○	○	○	.03	.90	.07	.83
2	○	●	○	○	○	○	○	.03	.92		
3	○	●	○	○	○	○	○	.02	.90		
4	○	○	○	○	○	○	○	.03	.89		
5	○	○	○	○	○	○	○	.03	.92		
6	○	○	○	○	○	○	○	.02	.91		
7	○	○	○	○	○	○	○	.03	.91		
8	○	○	○	○	○	○	○	.02	.94		

Note. Black dots “●” indicate the presence of antecedent conditions. White dots “○” indicate the negation of antecedent conditions. The blank cells represent not relevant conditions. For example, model 1 includes young, high-income, males, single, with child at home, renting.

4. Findings

4.1. P1a receives support: SES recipes by themselves are sufficient in identifying big-liars

Table 3 presents the resulting truth table which contains the seven demographic antecedents (columns) and, in this case, eight configurations of antecedents (rows) each of which sufficiently explains the respective outcome condition (i.e. the big-liars). Note that black circles “●” indicate the presence of antecedent conditions and white circles “○” indicate the absence or negation of antecedents, and blank cells represent ambiguous ones or “don’t care” conditions. For example, row 1 reveals that “unmarried young high income who have children-at-home and they do not own a home” is a sufficient combination of antecedents of big-liars.

Table 3 includes indices for consistency and coverage for each model solution. The consistency indices indicate whether the specific causal configuration (“consistency”) or the solution as a whole (“solution consistency”) is sufficient for causing an outcome to occur (Ragin, 2008a,b). Coverage indices indicate the proportion of cases in the outcome set that the complete solution (“overall solution coverage”) explains, by each term of the solution (“raw coverage”). In all the rows, consistency

Table 4
Sufficient configurations of antecedent conditions for big-liars. (Odd-numbered cases).

	Antecedent conditions							Coverage	Consistency	Overall solution	
	Old	High-income	High-education	Male	Married	Have child at home	Own residence			Coverage	Consistency
1	○	●	○	○	○	○	○	.04	.93	.08	.87
2	○	●	○	○	○	○	○	.03	.97		
3	○	○	○	○	○	○	○	.02	.96		
4	○	○	○	○	○	○	○	.02	.93		
5	○	○	○	○	○	○	○	.03	.90		
6	○	○	○	○	○	○	○	.02	.96		
7	○	○	○	○	○	○	○	.03	.92		
8	○	○	○	○	○	○	○	.02	.93		

Note: Black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the negation of antecedent conditions. The blank cells represent not relevant conditions.

is above 0.85 which shows that all configurations of antecedents and the solution as a whole are sufficient for identifying big-liars. Raw coverage indices for the eight configurations of antecedents range from 0.02 to 0.03 and consistency ranges from 0.89 to 0.94.

Some broad results are worth discussing of the alternative equifinal configurations of antecedents. First, eight configurations of antecedent conditions occur, all of these configurations are sufficient but not necessary for identifying big-liars. For example, configuration model 2 reveals that “single young males with high income and who have children-at-home” to a sufficient configuration of antecedent conditions for identifying big-liars based on demographic variables. Second, all consistency indices are close to or above 0.90, indicating that the configurations of antecedents and the solution as a whole are sufficient for identifying big-liars. Third, the absence of own residence occurs in six-of-eight configurations while residency type is irrelevant for remaining two conditions. Fourth, six-of-eight configurations have children-at-home, and in one of the remaining two, children status is irrelevant. High income is an ingredient in 6-of-8 recipes and young age is an ingredient in 5 recipes.

4.2. P1b receives support: separate samples of data indicate high consistency of the SES models across the samples

For the purpose of cross validation, also called rotation estimation, the set of data was partitioned into complementary subsets (odd and even). The analysis of subsets of odd and even numbered cases in the set of data resulted in Tables 5 and 6, respectively. Table 4 displays 8 recipes and similar to Table 3, six-of-eight recipes have children-at-home as an ingredient, and one of remaining two is ambiguous. In Tables 4 and 5, four-of-eight solutions identify unmarried as an antecedent and 3 models show married as an antecedent. A total of 5-of-8 rows show young age as an ingredient in both Tables 4 and 5. Row 8 of Table 3 (models for all the cases) and row 7 of Table 4 (odd data sample) are exactly same. The overall consistency and coverage of both solutions is high. The models for the odd numbered cases (Table 4) were run for the even numbered cases; the findings indicated consistencies higher than 0.78 for all of the models. The reverse analysis—models for the even numbered cases (Table 5) were run for the odd number cases—had the same consistency finding; all cross-validation models have consistencies higher than 0.78.

Table 5 (even numbered cases in the dataset) present six configurations of antecedents and all of them have very high consistency (i.e. from 0.93 to 0.97). Table 5 also includes high income as an ingredient in four recipes which is also an ingredient in four recipes in Table 4. Children-at-home is present in all three tables with 6-of-8 rows in Tables 3 and 5; 4-of-6 rows in Table 5.

4.3. P2 and P3 do not receive support: SES recipes by themselves are insufficient in identifying cases with high prosocial behavior and high antisocial behavior

The findings do not confirm P2 and 3. Prior studies (Crimmins & Callahan, 2003; Woodside, 2008) suggesting that some SES characteristics associate with road rage (“giving the finger” to other motorists) provides credence to constructing P2 and P3. However, SES configurations by themselves fail support the statements. One conjecture is that additional lifestyle conditions along with SES characteristics may be necessary for identifying high pro- and antisocial behavior.

4.4. P4 receives support: a high antisocial behavior recipe by itself is sufficient for identifying cases of big-liars

Close to 90% of respondents high in both flashing lights in anger and giving the finger to other motorists are big-liars. Consistency for the model is equal to 0.83 and coverage is equal to 0.15. The low coverage

Table 5
Sufficient configurations of antecedent conditions for big-liars.
(Even-numbered cases).

	Antecedent conditions							Coverage	Consistency	Overall solution	
	Old	High-income	High-education	Male	Married	Have child at home	Own residence			Consistency	Coverage
1	○	○	○	○	○	●	●	.02	.93	.05	.90
2	●	○	○	○	○	○	○	.02	.94		
3	○	●	○	○	○	○	○	.02	.96		
4	○	○	●	●	○	○	○	.02	.96		
5	○	○	○	○	○	○	○	.02	.96		
6	○	○	○	○	○	○	○	.01	.97		

Note: black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the negation of antecedent conditions. The blank cells represent no relevant conditions.

indicates that additional configurations are necessary for identifying additional big-liars—not all big-liars engage in road rage frequently.

4.5. P5 receives support: a high prosocial behavior recipe by itself is sufficient for identifying self-report non-liars

The analysis fails to support P5. High weekly attendance at a religious service and high community volunteer work fail to indicate cases of low-lying frequency (truth-telling cases). This finding indicates a lack of an asymmetric association and does not support a symmetric statement that high scores on the recipe indicates big-liars.

4.6. P6 does not receive support: the inclusion of pro- and antisocial behavior is not necessary to identify big-liars and the cases of the four types of lying

Table 6 presents sufficient configuration of the antecedent conditions for big-liars taking in account SES characteristics and social behavior. Table 6 has two additional columns versus Tables 4, 5, and 6. These two columns are prosocial behavior (conjunction of attending a place of

Table 6
Sufficient configurations of antecedent conditions for big-liars.
(Antecedent conditions: demographics and social behaviors).

	Antecedent conditions								Coverage	Consistency	Overall solution		
	Old	High-income	High-education	Male	Married	Have child at home	Own residence	Prosocial behavior			Antisocial behavior	Consistency	Coverage
1	○	○	○	○	○	○	○	○	○	.01	.98	.05	.97
2	○	○	○	○	○	○	○	○	○	.01	.98		
3	●	○	○	○	○	○	○	○	○	.02	.98		
4	○	○	○	○	○	○	○	○	○	.01	.97		
5	○	○	○	○	○	○	○	○	○	.01	.97		
6	○	○	○	○	○	○	○	○	○	.01	.98		
7	○	○	○	○	○	○	○	○	○	.01	.98		
8	○	○	○	○	○	○	○	○	○	.01	.99		
9	○	○	○	○	○	○	○	○	○	.01	.98		
10	○	○	○	○	○	○	○	○	○	.01	.97		

Note: black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the negation of antecedent conditions. The blank cells represent not relevant conditions.

worship like church and volunteering) and antisocial behavior (conjunction of gave the finger and flashing lights in anger).

Ten configurations with high consistencies appear in Table 6. Fig. 2 is a plot of the cases and includes the consistency and coverage for model 6 in Table 6 (young married females with low education, high income, own residence, do engage in antisocial behavior, do not engage in prosocial behavior). Fig. 2 plots all cases in the dataset along two dimensions: the horizontal axis is the degree of membership of the configuration and the vertical axis is the degree of membership of the outcome condition, that is, big-liars. Note the distribution of the cases below and above the diagonal: If all cases were above the diagonal, the configuration could be labeled sufficiently with a perfect consistency of 1. In this example, most (but not all) cases with a high membership of the configuration of antecedents show high membership of the outcome, indicating that model 6 is a consistent subset of the outcome set big-liars (consistency = 0.985). The relatively small number of cases who show high membership of both sets indicates low coverage (0.014). This configuration identifies 54 big-liars (female) and does not represent 409 big-liars (male and female).

Fig. 3 is an illustration of model 5 of Table 6 (young unmarried males with low education, do not own residence, do not have children-at-home, do engage in antisocial behavior, and do not engage in prosocial behavior). This model is represented by using symbol “•” of Boolean algebra which means AND, as ~age•~married•gender•~edu•~owners•~childhome•~prosocial•antisocial; the presence of all the conditions is required for the outcome for this model. Specific individual cases can also be identified in addition to generalizing cases with fsQCA. In Fig. 3, the model represents 28 big-liars (male) but does not represent 263 big-liars; these 263 include male and female big-liars. This configuration has a high consistency of 0.97 and a coverage of 0.012.

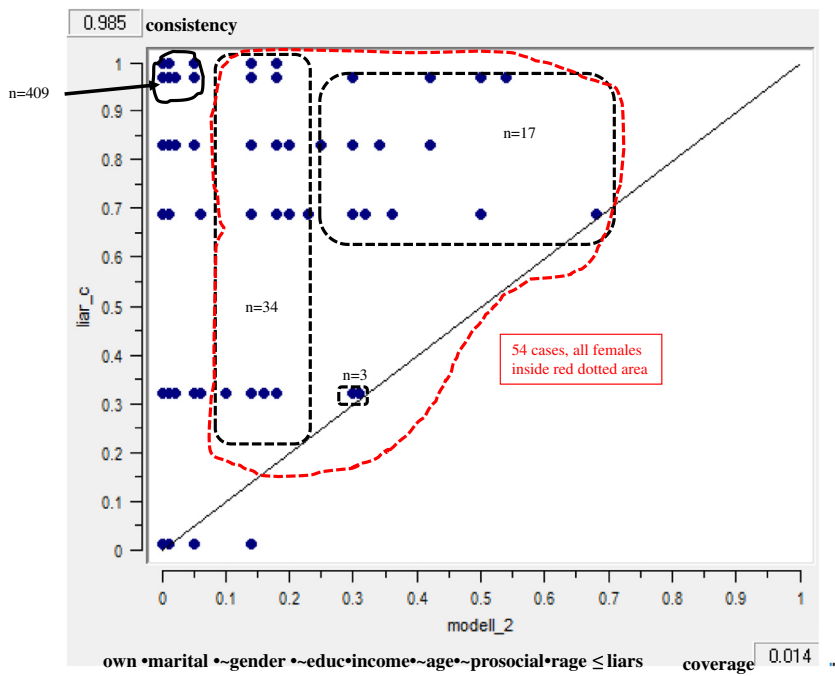
4.7. P7 receives support: asymmetric models identifying truth-tellers are not the mirror opposite of models identifying big-liars

Table 7 contains SES antecedents and two social behavior antecedents (columns) and eight configurations of antecedents (rows) each of which sufficiently indicate the respective outcome condition, that is, truth-tellers. In all the rows, consistency is more than 0.89 which is sufficient for consistently indicating the solution in identifying truth-tellers. Raw coverage indices for the 8 configurations of antecedents range from 0.01 to 0.03 and consistency ranges from 0.90 to 0.93.

Table 7 reveals that old is an ingredient in 7-of-8 recipes and unmarried is an ingredient in six recipes. The absence of high education occurs for 7-of-8 alternative equifinal configurations of antecedents. Not engaging in antisocial behavior is present in 7-of-8 and not engaging in prosocial behavior is present in 5-of-8 configurations. A total of 5-of-8 configurations include having children-at-home and 4-of-8 have high income. So a sufficient condition for being a truth-teller includes “single, old, females with high income and low education and who have children-at-home and they do not own residence and do not engage in prosocial and antisocial behaviors” (model 7 in Table 7).

4.8. P8 receives support: unique configurations of SES characteristics and social behaviors indicate each of the four personal-world belief outcomes

Unique configurations of SES characteristics and social behaviors indicate the outcome conditions for four different types of individuals: rounders, confessors, skeptics, and innocents. Table 8 presents seven demographic antecedents (columns) and six configurations of antecedents (rows) each of which sufficiently indicates the rounders. The ingredient unmarried is a part of all six recipes; thus, being single associates with rounders and the same holds for high income. Five of six models include children-at-home and the same is true for own residence. So sufficient configuration of antecedent conditions for identifying rounders based on demographic variables can be single young males with high income, high education, and have children-at-home (model



Description
 Model 2 for all the data identifies 54 frequent liars. These frequent liars are/have:

- females
- married
- young
- low education
- high income
- do not engage in prosocial behavior
- do engage anti-social behavior (rage)
- own residence.

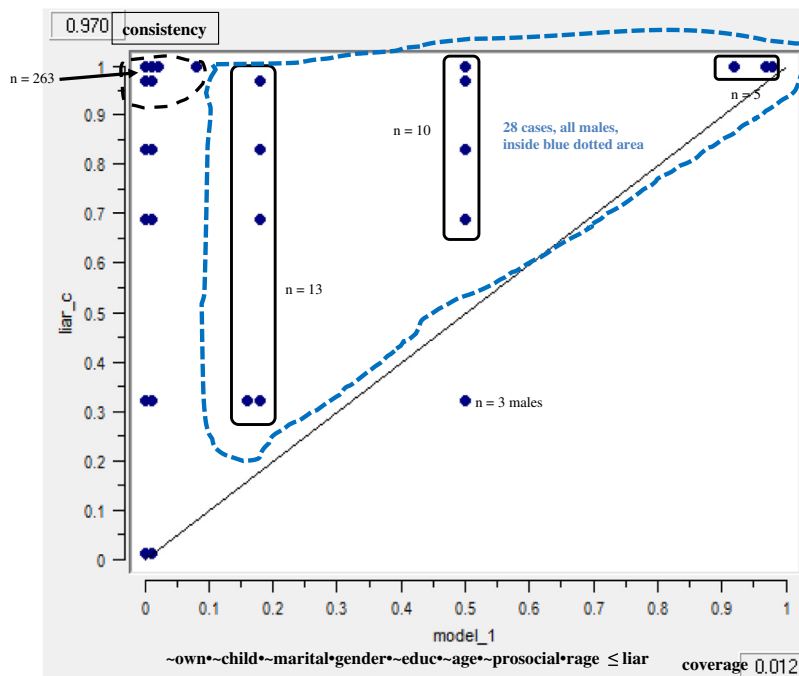
Note: model 2 does not represent 409 big liars; these 409 include male and female big liars.

Fig. 2. Model consistently profiling big-liars.

3) or can be young single females who have high income but low education, do not have children-at-home, and do not own residence (model 4 of Table 8). The consistency of the solution ranges between 0.85 and 0.90 and coverage between 0.02 and 0.03.

In addition to demographic variables, social behavior identifies rounders. The solutions appear in Table 9 and include six models. The configurations have a high consistency of 0.91 to 0.94 and coverage between 0.01 and 0.02. Seven general findings follow from Table 9. First, six configurations of antecedent conditions occur, and all of these configurations are sufficient but not necessary for identifying rounders. For example, configuration number 6 reveals that “single young males

with high income, low education, who have children-at-home, and do not engage in either prosocial or antisocial behavior” is a sufficient configuration of antecedent conditions for identifying rounders based on demographic variables and social behavior. Second, low education and being single prevails in all six rows making them necessary (but not sufficient) antecedents. Third, the absence of own residence is found in 5-of-6 configurations. Fourth, 5-of-6 configurations are male, and in the remaining one, gender is non-relevant. Fifth, 4-of-6 configurations are young, and for the remaining two, age is non-relevant. Sixth, prosocial behavior is negative in 5-of-6 configurations. Seventh, antisocial behavior is present in 4-of-6 rows. Engaging or not engaging in prosocial or



Description
 Model 1 identifies 28 big-liars. These big-liars are:

- males
- unmarried
- low education
- do not engage in prosocial behavior
- do engage anti-social behavior (rage)
- no child(ren) at home
- young
- rent/do not own residence.

Note: Model 1 does not represent 263 big liars; these 263 include male and female big liars.

Fig. 3. Model high in consistently profiling big-liars.

antisocial behavior cannot be sufficient enough to identify rounders as these conditions are neither necessary nor sufficient.

Confessors are the second type of big-liars—individuals who are big-liars in an honest world. Table 10 has a configuration for this kind of individual based on demographic variables. Table 10 includes one model with high consistency (.81) and a coverage equal to .02. The only configuration reveals that “single young highly educated males with high income who have children-at-home and do not own residence” is a sufficient configuration of antecedent condition for identifying confessors.

Skeptics are truth-tellers perceiving a dishonest world. Table 11 presents four models for skeptics. The models have consistencies ranging from .81 to .86 based on demographic variables and social behavior. Not engaging in antisocial behavior and absence of own residence are necessary (but not sufficient) antecedents as they are present in all four rows. Not engaging in prosocial behavior is also an ingredient in 3 out of 4 recipes, and the same is also true for low education and having children-at-home.

The fourth type of individuals in this study is innocent individuals. An attempt was made using fsQCA to find the antecedents which indicate the outcome conditions for innocents, but a high consistency solution does not occur for such respondents.

4.9. Additional analysis

Fig. 4 is a demographic screening representation of big-liars. This line-graph compares the percentage shares of big-liars with the age of respondents by gender-marital status of cases in the dataset. In this graph, the Y axis shows the percentage share of big-liars and the X axis shows age in years. The four lines represent married males, unmarried males, married females, and unmarried females.

The share of percentage of married males in big-liars declines with the increase in age. Note that 23% of 139 married males of age around 25 years are big-liars, the percentage drops to 19 at the age of 35 years and further lowers to 12 and 10 at the ages of 50 and 70, respectively. At the age of 88 years, the percentage share of married males as big-liars is reduced to 6. The percentage share of big-liars of female counterparts also follows the similar gradual decline pattern with a decrease from 20 (at the age of 25) to 11 (at 35 years) to 9 (at 50 years) to 5 (at 70 years) and finally zero at the age of 88 years.

The share of percentage of unmarried males in big-liars also witnesses a gradual decline until the age of 50 (25% to 17% to 6% at the ages of 25, 35 and 50 years, respectively) after which it levels to 10% at the age of 70 years before diminishing totally at the age of 88 years. The line graph of unmarried females also experienced similar deviation

after the age of 35 years after decreasing sharply from 29 to 8% for the age of 25 and 35 years, respectively. After reaching 15% at the age of 50 years, it drastically reduces to zero at the age of 70 years and remains nil at the age of 80 years.

Findings from cross-tabulating demographic variables by truth-telling appear in Fig. 5. The line-graph illustrates the variation percentage share of truth-tellers with the age of respondents. The share of the percentage of married males in truth-tellers rises with the increase in age from 45% of 139 at the age of 25 years to the 82% at the age of 88. On this journey, the milestones are percentage shares of 48, 66, and 76 at the ages of 35, 50, and 70, respectively. The line graph of married females also has a similar outline; it rises and reaches a high of 88% at the age of 88 years from 48% at the age of 25 years. Truth-teller percentage share is 52 at the age of 35, 65 at the age of 50, and 81 at the age of 70 years. At the age of 50, the number of individuals in the data is very high.

The share of unmarried males by age is not as linear as married males. The line-graph of single males witnesses a sharp decline and fluctuates to as low as 35% at the age of 50 years from 52% at the age of 35 years. The percentage share of truth-tellers rose from 36 to 52 at the ages of 25 and 35 years, respectively. The truth-teller share sky-rockets from 35 to 70 (at the age of 70 years) and further to 100 (at the age of 88 years). The line-graph depicting share of single females in truth-tellers is pretty much similar to married females and is like a straight line with percentage share rising continuously from 42 to 100 via 55, 62, and 84. At the age of 88 years, the share of unmarried truth-tellers is 3%.

5. Discussion

This section covers five topics. The impact of big-liars is bigger than prior research suggests. The real issue in research on big-liars should not focus on which variables move symmetrically with lying. Modeling truth-tellers requires constructing separate asymmetric models to identify them versus constructing symmetric models for big-liars versus truth-tellers. Modeling complex outcome conditions is possible and research should include the recognition that big-liars differ by their beliefs about whether or not they see their lying to be unique in everyday life. Predictive validations of big-liar and truth-teller models are necessary but such validating models for predictive accuracy using additional samples is a rare occurrence.

5.1. Big-liars' impact

The findings here call into the question some of the conclusions to Ariely's (2013) “matrix experiments”. In these experiments, Ariely's team gave participants, men and women from different age groups, twenty simple-math questions. The researchers asked participants to solve as many questions as they could in 5 min and promised to reward the participants \$1 for each problem solved. After 5 min, the participants are instructed to count how many problems they solved, insert their answer sheets into paper shredder machines, and report their results to one of the test supervisors to receive their cash. The participants did not need to show their answers as a proof. What the test takers did not know was that Ariely's team programmed the shredders in such a way that they only shredded the margins of the papers while the main body of the page remained intact. “In the end, Ariely and his colleagues found that very few people lie a lot, but almost everyone lies a little. They tested over 40,000 people and found that only a few dozen were “big cheaters” who claimed to have completed many more problems than they did. Conversely, more than 28,000 people, or nearly 70%, were “small cheaters” who, on average, solved four problems but reported to have solved six. What is interesting to note is that the sum of the team's losses to so-called big cheaters was a total of \$400. Compare this to the few dollars each that ‘small cheaters’ stole. Together, these small transgressions added up to a whopping \$50,000, causing a

Table 7 Sufficient configurations of antecedent conditions for truth-tellers. (Antecedent conditions: demographics and social behavior).

	Antecedent conditions								Coverage		Consistency		Overall solution		
	Old	High-income	High-education	Male	Married	Have child at home	Own residence	Prosocial behavior	Antisocial behavior						
1	○	○	○	●	○	○	○	○	○	.01	.90	.06	.89		
2	●	○	○	○	○	○	○	○	○	.01	.93				
3	○	○	○	○	○	○	○	○	○	.02	.92				
4	●	○	○	○	○	○	○	○	○	.03	.92				
5	●	●	○	○	○	○	○	○	○	.02	.93				
6	○	○	○	○	○	○	○	○	○	.01	.92				
7	○	○	○	○	○	○	○	○	○	.01	.93				
8	○	○	○	○	○	○	○	○	○	.01	.92				

Note: Black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the negation of antecedent conditions. The blank cells represent non-relevant conditions.

Table 8
Sufficient configurations of antecedent conditions for rounders.
(Liars in a dishonest world).

	Antecedent conditions							Coverage	Consistency	Overall solution	
	Old	High-income	High-education	Male	Married	Have child at home	Own residence			Consistency	Coverage
1	○	●	●	○	○	○	○	.03	.85	.05	.81
2	●	●	○	○	○	○	○	.03	.90		
3	○	○	●	●	○	○	○	.02	.85		
4	○	●	○	○	○	○	○	.03	.89		
5	○	●	○	○	○	○	○	.03	.89		
6	○	○	○	○	○	○	○	.02	.89		

Note: black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the negation of antecedent conditions. The blank cells represent not relevant conditions. Rounders are the liars in the dishonest world.

much higher impact than the few bad apples” (Bauer’s, 2016 summary of the matrix experiments).

The basis for the emphasis on the relatively large impact of small versus big cheaters relies on an artifact (i.e., the time-limit and one-round participation of the experiment) of design features in the experiments. Under the guise of testing how much learning occurs from the experiment, redesigning the experiment to permit the respondents to repeat their participation as many times as they wished to do so that day and to come again to continue to participate on additional days would likely increase the relative impact in favor of big cheaters (i.e., funds paid to the big-liars). Big versus small cheaters would be more likely to repeat their participation and increase the amount of their cheating as the number of game repetitions increased. The impact of big cheater behavior is much bigger than the findings from participating in a one-round experiment with a short-time limit to complete the exercise.

The 1980s–2008 Bernie Madoff Ponzi scheme is an exceptionally enlightening example of the impact of one big-liar. On March 12, 2009, Madoff pleaded guilty to 11 federal felonies, including securities fraud, wire fraud, mail fraud, money-laundering, making false statements, perjury, and theft from an employee benefit plan, and making false filings with the SEC. The plea was the response to a criminal complaint filed two days earlier, which stated that over the past 20 years, Madoff had defrauded his clients of almost \$65 billion in the largest Ponzi scheme in history (Smith, 2010). Big versus small liars are likely to lie both much more frequently over days, months, and years, and for much

Table 9
Sufficient configurations of antecedent conditions for rounders.
(With demographics and social behavior).

	Antecedent conditions								Coverage	Consistency	Overall solution		
	Old	High-income	High-education	Male	Married	Have child at home	Own residence	Prosocial behavior			Antisocial behavior	Consistency	Coverage
1	○	○	○	○	○	○	○	○	○	.02	.92	.04	.89
2	○	○	○	○	○	○	○	○	○	.01	.91		
3	○	○	○	○	○	○	○	○	○	.01	.94		
4	○	○	○	○	○	○	○	○	○	.01	.92		
5	○	○	○	○	○	○	○	○	○	.01	.93		
6	○	○	○	○	○	○	○	○	○	.02	.92		

Note: black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the absence or negation of antecedent conditions. The blank cells represent ambiguous conditions.

higher stakes. The consequences likely support the conclusion that accumulating the impact of a thousand or more small liars is necessary to equal the impact of a typical big-liar. Certainly, longitudinal experiments on the impact of small and big-liars are worth doing.

5.2. Theory and research on identifying big-liars

The real issue in big-liar research should not focus on directional association of variables with the frequency of lying. Even if an SES variable associates positively or negatively with lying, a substantial share of cases exhibit contrarian behavior to the main direction of the relationship. The focus needs to be placed on the complex antecedent conditions that indicate big-liars accurately almost every time. Is construction possible of somewhat precise outcome models (SPOT) for indicating big-liars using SES conditions and social behavior conditions? The findings in Tables 3-6 support the conclusion that constructing useful SPOTs is possible. A high membership score on any one SES is insufficient for identifying a big-liar but big-liars are identifiable from a few algorithms—specific configurations of SES conditions appearing in Tables 3-6.

While configurations of performing or not performing prosocial behaviors alone are insufficient for identifying big-liars, the configuration of performing the two antisocial behaviors is sufficient in identifying big-liars. However, the ability to identify big-liars improves by combining SES and prosocial and antisocial behaviors. The findings in Table 6 inform the need to understand how social behaviors are useful for describing big-liars in complex ways: high prosocial behavior in an ingredient in two of the ten models in Table 6 and antisocial behavior appears in three of the ten models but both behaviors do not appear in same models. A membership in one or the other social behaviors appears in five of the ten models.

5.3. Theory and research on truth-tellers

Analysis of the omnibus survey here and the experiments by Ariely (2013) indicate one-fifth to one-fourth of study participants do not engage in lying, at least consciously. The study of non-liars is helpful in providing clues on how to dampen the behavior of liars—especially small liars. Cases who are old, non-married, and who do not engage in antisocial behavior are conditions occurring in five of the eight models for truth-tellers in Table 7; but this three-ingredient configuration is insufficient for high consistency in accurately indicating truth-tellers. All eight models that are consistently highly accurate in identifying truth-tellers include eight to nine ingredients. At first blush, such complexity might appear to be overwhelming. However, considering each ingredient at three levels (i.e., low, medium, high) indicates a property space (Lazarsfeld, 1937) of 19,683 combinations (i.e., 3⁹). Cases are likely to appear in a few thousand of these 19,683 combinations. From the

Table 10
Sufficient configurations of antecedent conditions for confessors.
(Liars perceiving an honest world).

	Antecedent conditions							Coverage	Consistency	Overall solution	
	Old	High-income	High-education	Male	Married	Have child at home	Own residence			Consistency	Coverage
1	○	●	●	●	○	○	○	.02	.81	.02	.81

Note: black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the absence or negation of antecedent conditions. The blank cells represent ambiguous conditions. Confessors are the liars in the honest world.

Table 11
Sufficient configurations of antecedent conditions for skeptics.
(-big_liars AND dishonest_world, with demographics and social behavior).

	Antecedent conditions								Coverage	Consistency	Overall solution		
	Old	High-income	High-education	Male	Married	Have child at home	Own residence	Prosocial behavior			Antisocial behavior	Consistency	Coverage
1	●	●	○	○	○	○	○	○	○	.02	.81	.03	.80
2	○	○	○	○	○	○	○	○	○	.02	.85		
3	○	○	○	●	●	○	○	○	○	.01	.86		
4	●	●	○	○	○	○	○	○	○	.02	.85		

Note: Black circles “●” indicate the presence of antecedent conditions. White circles “○” indicate the absence or negation of antecedent conditions. The blank cells represent ambiguous conditions.

perspective that eight configurations occur with nearly all high truth-teller cases, with high scores for these eight configurations among the thousands of possible configurations, the benefits of configurational analysis become apparent.

5.4. Theory and Research on Outcome Conditions

Recognizing that not all big-liars are the same is one of the contributions made by the present study. Separating big-liars into those who believe their lying to be unique versus those who believe that everyone lies like they do enable more pinpoint prediction of each type. Examining complex outcome conditions (Tables 9 and 10) shows that unique causal recipes indicate each group but both types of big-liars who are identifiable are nearly all unmarried males. Being female and married is an ingredient combination appearing in two of the truth-tellers-in-context models in Table 11. The finding that all models useful in identifying truth-tellers in contexts is only possible for truth-tellers who believe themselves to be uniquely honest, indicating a self-serving bias similar to the bias that Mazar and Ariely (2006) describe for persons committing small versus large-size dishonest actions. Such a self-serving bias has policy implications for promoting honesty effectively. Promoting truth-telling as a behavioral norm is unlikely to be effective

because constant truth-tellers do not believe that such a norm exists. Promotion of truth-telling as an indicator of uniquely high self-worth is likely to be more effective. This conjecture needs confirming by a series of controlled laboratory and field experiments.

5.5. Predictive validation via testing models using additional samples

By testing the accuracy of models found to be useful for one sample on identifying big-liars and truth-tellers in additional samples, the present study avoids the problem of reporting only the fit validity of models. Such cross-validation testing of models’ usefulness is necessary but a widely ignore practice in symmetric testing via regression models (Armstrong, 2012; Gigerenzer & Brighton, 2009; McClelland, 1998). A meta-analysis comparing the validity of symmetric versus asymmetric models indicates that symmetric models win in fit validation but lose to asymmetric models in predictive validity. Given that fit validation is easy (Armstrong, 2012, reports high fit validation using a table of random numbers for variables with stepwise regression analysis), the present study demonstrates how to evaluate the effectiveness of models constructed by asymmetric algorithms (configurational model testing using additional samples). Paraphrasing McClelland, 1998, p. 335), the critical question is how well the algorithm performs in predicting big-liars in additional samples; the same issue applies for the separate models constructed to predict high truth-tellers.

5.6. Limitations and suggestions for future research

This study examines the DDB Needham Life Style Surveys of 1998 as the database for testing the configural theory. These data are viewable as being outdated and non-representative of today’s (2017) big-liars and truth-tellers. The study examines only Americans; the findings are, therefore, questionable as to their generalizability worldwide. Future studies should include data from other cultures and countries.

As secondary data from the DDB Needham Life Style Survey was used, the present study is limited to the variables assessed in the survey. Future studies can research generation Y members and can include lying in the online world (i.e., social network websites such as Google plus and Facebook) apart from other contexts. Overall, future research needs to validate the findings in the present study with newer data and additional scales and account for additional variables such as race,

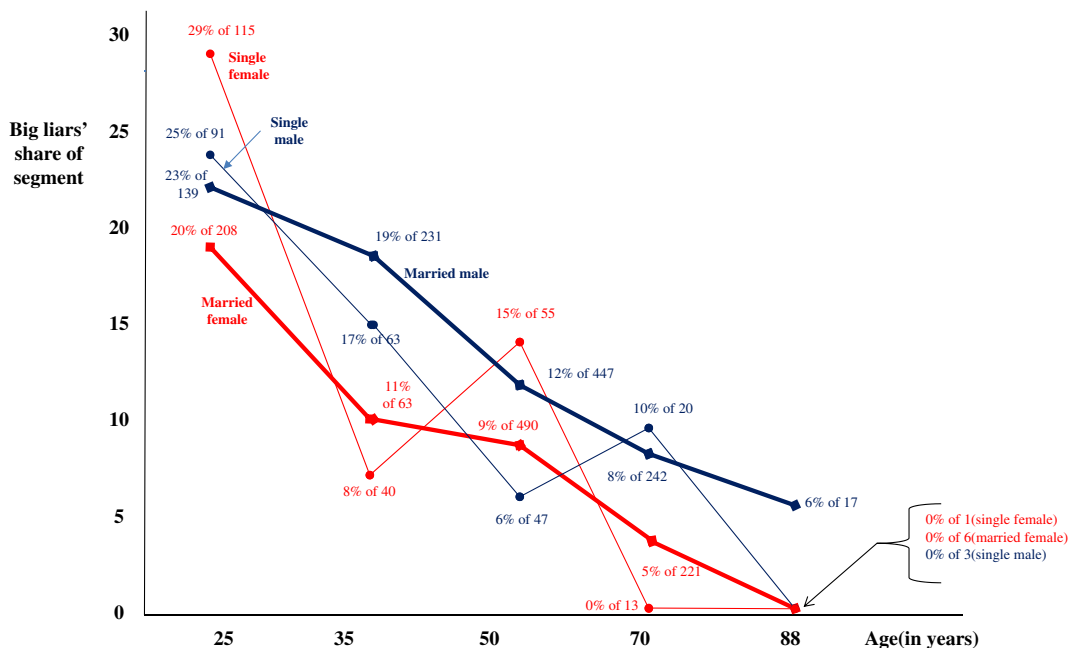


Fig. 4. Cross-tab demographic screening model of big liars.

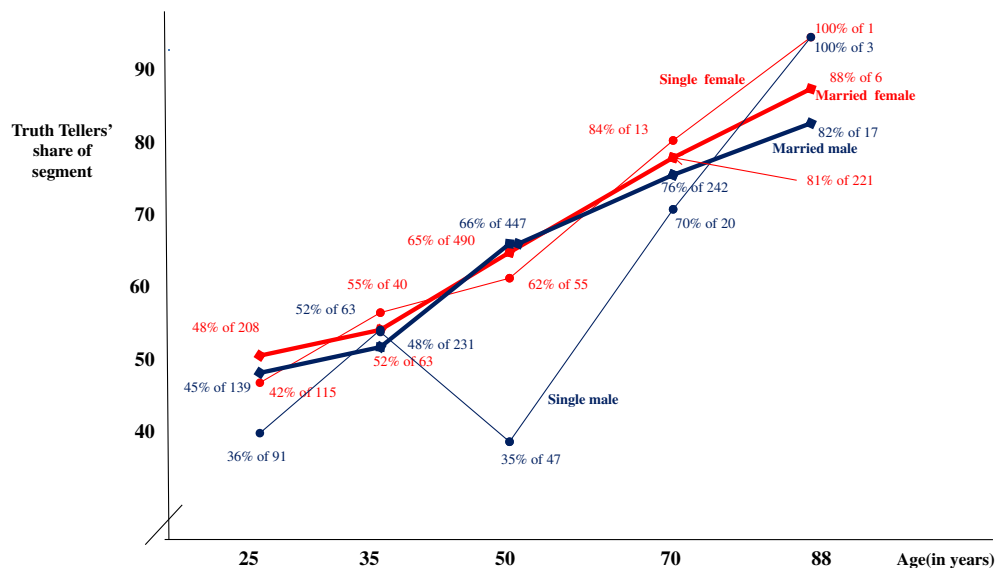


Fig. 5. Cross-tab demographic screening model of truth tellers.

region, and profession. Creative true experiments that are longitudinal in design are necessary to estimate the relative impact of big-liars to give big-liars the opportunity truly representative of the impact of big-lying behavior—Madoff-size lying outcomes.

6. Conclusion

Theoretical models of big-liars and testing such models using self-report data represent a start to understanding lying in everyday life. The use of self-reports makes such research exploratory only. The study of falsely reporting behavior done and falsely reporting behavior not done by comparing records of survey responses with separate records of actual behavior done and not done is possible (e.g., Woodside & Wilson, 2002). Additional large-scaled field studies that combine reports on own behavior with separate record-keeping of actual behavior are necessary for deep understanding and description of the SES and social behavior configurations indicating big-liars accurately. The present study serves as a rough cut of what such models are likely to include. Asymmetric configurational models of big-liars separately from models of truth-tellers will be necessary for making progress in achieving high predictive accuracy in testing the models with additional samples.

References

- Ariely, D. (2013). *The honest truth about dishonesty*. New York: Harper Perennial.
- Armstrong, J. S. (1979). Advocacy and Objectivity in science. *Management Science*, 25, 423–428.
- Armstrong, J. S. (2012). Illusions in regression analysis. *International Journal of Forecasting*, 28, 689–694.
- Bauer, R. (2016). The things we do: the high price of cheating a little. Downloaded on October 2, 2016 at <http://blogs.worldbank.org/publicsphere/things-we-do-high-price-cheating-little>
- Bok, S. (2011). *Lying: Moral choice in public and private life*. New York: Vintage.
- Cook, V. J., Jr., & Mindak, W. A. (1984). A search for constants: The “heavy user” revisited! *Journal of Consumer Marketing*, 1(4), 79–81.
- Corkery, M. (2016). Wells Fargo fined \$185 million for fraudulently opening accounts. Downloaded on September 24, 2016 at <http://www.nytimes.com/2016/09/09/business/dealbook/wells-fargo-fined-for-years-of-harm-to-customers.html>
- Crimmins, J., & Callahan, C. (2003). Reducing road rage: The role of target insight in advertising for social change. *Journal of Advertising Research*, 43, 381–389.
- 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, 979–995.
- Ekman, P. (1996). Why don't we catch liars? *Social Research*, 63, 801–817.
- Ekman, P. (2009). Lie catching and micro expressions. In C. Martin (Ed.), *The philosophy of deception* (pp. 118–137). Oxford University Press: New York, NY.
- Ekman, P., & O'Sullivan, M. (1991). Who can catch a liar? *American Psychologist*, 46, 913–920.
- Ekman, P., O'Sullivan, M., & Frank, M. G. (1999). A few can catch a liar. *Psychological Science*, 10(3), 263–266.
- Falk, R., & Greenbaum, C. W. (1995). Significance tests die hard. *Theory and Psychology*, 5, 75–98.
- Feeley, T. H., & Young, M. J. (2000). Self-reported cues about deceptive and truthful communication: The effects of cognitive capacity and communicator veracity. *Communication Quarterly*, 48(2), 101–119.
- Feldman, R. S., Tomasian, J. C., & Coats, E. J. (1999). Nonverbal deception abilities and adolescents' social competence: Adolescents with higher social skills are better liars. *Journal of Nonverbal Behavior*, 23, 237–249.
- Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, 54(2), 393–420.
- Francis, L. J., Pearson, P. R., & Kay, W. K. (1988). Religiosity and lie scores: A question of interpretation. *Social Behavior and Personality: An International Journal*, 16(1), 91–95.
- Gigerenzer, G. (2004). Mindless statistics. *The Journal of Socio-Economics*, 33, 587–606.
- Gigerenzer, G., & Brighton, H. (2009). Homo heuristics: Why biased minds make better inferences. *Topics in Cognitive Science*, 1, 107–143.
- Halevy, R., Shalvi, S., & Verschuere, B. (2014). Being honest about dishonesty: Correlating self-reports and actual lying. *Human Communication Research*, 40(1), 54–72.
- Hayashi, A., Abe, N., Fujii, T., Ito, A., Ueno, A., Koseki, Y., ... Mori, E. (2014). Dissociable neural systems for moral judgment of anti-and prosocial lying. *Brain Research*, 1556, 46–56.
- Holan, A. D., & Qiu, L. (2015). 2015 Lie of the year: The campaign misstatements of Donald Trump. December 21st, 2015 at 11:25 a.m. Downloaded on September 24, 2016 at <http://www.politifact.com/truth-o-meter/article/2015/dec/21/2015-lie-year-donald-trump-campaign-misstatements/>
- Hsiao, J. P., -H., Jaw, C., Huan, T. -C., & Woodside, A. G. (2015). Applying complexity theory to solve hospitality contrarian case conundrums. *International Journal of Contemporary Hospitality Management*, 27, 608–647.
- Hubbard, R. (2016). *Corrupt research: The case for reconceptualizing empirical management and social science*. CA: Sage: Thousand Oaks.
- Lazarsfeld, P. F. (1937). Some remarks on typological procedures in social research. *Zeitschrift fur Sozialforschung*, 6, 119–139.
- Levine, T. R., Park, H. S., & McCornack, S. A. (1999). Accuracy in detecting truths and lies: Documenting the “veracity effect”. *Communication Monographs*, 66, 125–144.
- Levine, T. R., & Bond, C. F., Jr (2014). Direct and indirect measures of lie detection tell the same story: A reply to ten Brinke, Stimson, and Carney (2014). *Psychological Science*, 25, 1960–1961.
- Loeber, R., Green, S. M., Lahey, B. B., & Stouthamer-Loeber, M. (1991). Differences and similarities between children, mothers, and teachers as informants on disruptive child behavior. *Journal of Abnormal Child Psychology*, 19(1), 75–95.
- Mazar, N., & Ariely, D. (2006). Dishonesty in everyday life and its policy implications. *Journal of Public Policy and Marketing*, 25, 117–126.
- McClelland, D. C. (1998). Identifying competencies with behavioral-event interviews. *Psychological Science*, 9, 331–339.
- Pajunen, K. (2008). Institutions and inflows of foreign direct investment: A fuzzy-set analysis. *Journal of International Business Studies*, 39, 652–669.
- Perfetto, R., & Woodside, A. G. (2009). Extremely frequent behavior in consumer research: Theory and empirical evidence for chronic casino gambling. *Journal of Gambling Studies*, 25, 297–316.
- Ragin, C. (2008a). User's guide to fuzzy-set/qualitative comparative analysis. downloaded on September 26, 2016 at <http://www.u.arizona.edu/~cragin/fsQCA/download/fsQCAManual.pdf>
- Ragin, C. C. (2000). *Fuzzy-set social science*. University of Chicago Press.
- Ragin, C. C. (2008b). *Redesigning social inquiry: Fuzzy sets and beyond*. Wiley Online Library.

- Ragin, C. C. (2009). Qualitative comparative analysis using fuzzy sets (fsQCA). In B. Rihoux, & C. Ragin (Eds.), *Configurational comparative methods* (pp. 87–122). Thousand Oaks, CA: Sage.
- Ragin, C. C., & Davey, S. (2014). *Fs/QCA [computer program], version 2.5*. Irvine, CA: University of California.
- 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*, 2–25.
- Shaw, J., Porter, S., & ten Brinke, L. (2013). Catching liars: Training mental health and legal professionals to detect high-stakes lies. *The Journal of Forensic Psychiatry & Psychology, 24*, 145–159.
- Smith, F. (2010). Madoff Ponzi scheme exposes "the myth of the sophisticated investor". *University of Baltimore Law Review, 40*, 215–283. Available at: <http://scholarworks.law.ubalt.edu/ubl/vol40/iss2/3>.
- Trafimow, D., & Marks, M. (2015). Editorial. *Basic and Applied Social Psychology, 37*, 1–2.
- Twedt, D. W. (1964). How important to marketing strategy is the "heavy user"? *Journal of Marketing, 28*(000001), 71 (Pre-1986).
- Vrij, A. (2000). *Detecting lies and deceit: The psychology of lying and implications for professional practice*. Wiley.
- Vrij, A. (2004). Why professionals fail to catch liars and how they can improve. *Legal and Criminological Psychology, 9*, 159–181.
- Vrij, A. (2008). *Detecting lies and deceit: Pitfalls and opportunities*. John Wiley & Sons.
- Vrij, A., Granhag, P. A., & Mann, S. (2010). Good liars. *The Journal of Psychiatry & Law, 38*, 77–98.
- Weick, K. E. (1987). Organizational culture as a source of high reliability. *California Management Review, 29*, 112–127.
- Woodside, A. G. (2008). Antisocial behavior: profiling the lives behind road rage. *Marketing Intelligence & Planning, 26*, 459–480.
- Woodside, A. G. (2016). The good practices manifesto: Overcoming bad practices pervasive in current research in business. *Journal of Business Research, 69*, 365–381.
- Woodside, A. G., & Wilson, E. J. (2002). Respondent inaccuracy. *Journal of Advertising Research, 42*, 7–18.