**A Mouthful of Diamonds and a Pocketful of Secrets:
Mapping Concealment and Its Normative Foundations**

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Abstract

Despite the importance of concealing information as a way to establish boundaries between the self and others, avoid stigma, and define the situation, sociology is missing a comprehensive understanding of what people conceal, as well as a general account of concealment that is broadly applicable to many types of concealable matters. In this paper, we address these gaps in knowledge in two ways. First, we examine a wide range of concealable topics, and investigate individual- and group-level differences in what people conceal from friends and family. Second, we propose that a norm of concealment motivates concealment across a range of situations and matters. Using data from a general population survey of U.S. adults ($N = 4,092$), we find that a norm of concealment strongly predicts counts of concealment as well as membership in unique subgroups of concealers. Our findings constitute a general explanation of what motivates individuals to conceal from close others, and a way to augment and synthesize the literature.

Introduction

The ways in which individuals conceal information inform many fundamental sociological processes. Concealment is used to establish boundaries between the self and others, avoid stigma, and define the situation (Simmel 1950; Shapiro 2005; Goffman 1959, 1963; Cowan 2014; Talwar and Crossman 2011; Nippert-Eng 2010; Schilke and Rossman 2018). Concealment also restricts flows of information, precludes social influence, and generates misinformation and false consensus (Kitts 2003; Cowan 2014; Cowan and Baldassarri 2018). Consequently, understanding why individuals conceal is a key goal of social science research.

In explaining concealment, much attention has been paid to the social meaning and shared rules regarding the matter being concealed. Scholars have focused on how actors conceal specific things as a way to avoid stigma and shame (e.g., abortion), or how matters deemed as private—such as sexual preferences—motivate individuals to conceal from others (Doan and Mize 2020; Goffman 1959, 1963; Westin 1967; Kitts 2003; Zerubavel 2006; Nippert-Eng 2010; Cowan 2014). Concealment, in other words, has largely been studied as a matter-driven strategy.

In this paper, we take a different approach, and examine the social construction of concealment in-and-of-itself. Because concealment is an effective tool for pursuing socially proscribed behaviors, concealment itself may be considered wrong, and subject to normative sanctions. We examine the nature of norms surrounding concealment, and test whether a norm of concealment predicts self-reported concealment across different matters. We first investigate whether a norm of concealment exists, and determine the type of norm governing concealment in terms of its conditionality, consensus, intensity, and polarity (Jasso and Opp 1997; Robbins et al. 2022). Second, we examine whether norms predict individual- and group-level differences in what people conceal from friends and family across an array of topics. This analysis adds to what

we know about concealment by examining whether people consider concealment right or wrong, and by explaining variation in concealment that occurs between groups *and* individuals.

The paper is organized as follows. We define concealment and summarize prior work, including research on lying, obfuscation, secrecy, and selective disclosure. Next, we outline a way to understand concealment across a variety of matters and topics. With general population survey data, we then model self-reports of concealment, and identify five unique latent subgroups of concealers. We find that a norm of concealment strongly predicts counts of concealment as well as latent class membership.

Literature Review

Definition of concealment

We define concealment as the deliberate withholding of information from one or more people (Buller and Burgoon 1996; Afifi et al. 2005), which encompasses such behaviors as collusion, lying, obfuscation, secret keeping, and selective disclosure (Buller and Burgoon 1996). Concealment can be thought of as a process that includes concealment intentions, which bring about a concealment attempt. If the attempt is successful, it generates information gaps between the concealer and the person who is the target of concealment (Grigoryeva 2021). Concealment can differ as a function of acceptability (lying may be less socially acceptable than secrecy), the matters being concealed (some matters require false narratives rather than mere omission), and the degree of participation (some forms of concealment require active, rather than passive, maintenance). In spite of this variation, all forms of concealment constitute strategies of intentionally denying someone knowledge (Bueller and Burgoon 1996; Grigoryeva 2021). The aim of the present paper, then, is to model concealment across a range of topics, regardless of the strategies used (e.g., lying, obfuscation, secret keeping, etc.).

Prior work on concealment

Much of what we know about concealment stems from in-depth studies of a particular concealable matter, usually featuring topics that are stigmatized, personal, or private. Building from Erving Goffman's (1959, 1963) seminal work, some sociological research examines secrets and lies as a way to avoid stigma and define social reality for others. Work in this area investigates the dynamics of concealing stigmatized behaviors like abortion (Cowan 2014), teen sex (Mollborn 2017), meat-eating in vegetarian communes (Kitts 2003), sexual identities (Doan and Mize 2020), and the illegal exchange of services (Schilke and Rossman 2018). Similarly, other work examines the impact of anticipated negative reactions to disclosure—such as a lack of empathy—on decisions to conceal (Small 2017; Slepian and Kirby 2018). This area of research finds that individuals manipulate information in order to evade punishment and avoid unwanted reactions, and that doing so fosters pluralistic ignorance about the proliferation of stigmatized behaviors (Kitts 2003; Zerubavel 2006; Cowan 2014; Mollborn 2017; Cowan and Baldassarri 2018).

Other sociological research examines concealment as a means to assert personal ownership and control—and limit access—over a matter (Marx and Muschert 2007; Nippert-Eng 2010; Anthony et al. 2017; Westin 1967; Margulis 2003). Scholars from this tradition view concealment of private matters, such as personal finances, as an expression of existing norms and ideas about ownership, personal property, and rights of access (Nippert-Eng 2010; Baghai 2012; Westin 1967; Margulis 2003). Key contributions of this work include highlighting the impact of ownership rights, surveillance capacity, and economic relations on decisions to conceal.

A third approach, the antisocial perspective, can be found in criminology. According to this perspective (Stouthamer-Loeber 1986; Gottfredson and Hirschi 1990), concealment is

viewed as an antisocial behavior and a symptom of low self-control, which is a trait-like propensity toward impulsivity and self-interest. Unlike the stigma and privacy accounts, which assume that concealment is strategically enacted, the antisocial perspective treats concealment as an act of immediate self-gratification subject to little deliberation. Empirical research in this area investigates the concealment of socially sanctioned behaviors (e.g., cheating, theft, etc.), and shows that low self-control individuals conceal to a greater extent than others (Gottfredson and Hirschi 1990; Grigoryeva 2018).

In sum, stigma avoidance, privacy, and low self-control are three common explanations of concealment in the social sciences, where each explanation accounts for specific types of concealable matters. Despite significant knowledge generated by each research program, we still do not know whether motivations to conceal in general—irrespective of what is being concealed—exist, and what these motivations might look like. Little is known about whether patterns of concealment exist apart from matter-specific trends. To contribute to the existing literature on concealment, we empirically investigate concealment across a range of topics, identify distinct subgroups of concealers, and test theoretical propositions about the act of concealment—rather than concealment as it relates to a particular subject, matter, or topic. We specifically examine whether concealment itself is guided by norms, and if such norms motivate concealment in personal relationships.

The Present Research

The first aim of our paper is descriptive. Using a general population survey of U.S. adults, we provide information about the topics most commonly concealed from friends and family, how many topics individuals report concealing, and whether our sample consists of distinct subgroups of concealers. We also measure the norm of concealment in the United States,

and describe its degree of consensus, conditionality, intensity, and polarity. The second aim of our paper is confirmatory. We examine whether the norm of concealment predicts the number of topics individuals conceal from friends and family as well as membership in the various subgroups of concealers.

We propose that individuals reference costs to concealment that arise from *social norms* when making decisions about whether to conceal. A social norm is commonly defined as an agreed upon rule about a particular behavior that is buttressed by social sanctions (Coleman 1990; Hechter and Opp 2001; Bicchieri 2006; Horne 2009; Jasso and Opp 1997; Ostrom 2000; Horne and Mollborn 2020).¹ Norms include considerations of whether one *ought* or *ought not* to behave a particular way, as well as perceptions of what others should or should not do with respect to a focal action (Bicchieri 2006; Hechter and Opp 2001).² Those who violate a social norm are frequently punished via social disapproval, guilt, or shame, while those who follow a norm tend to reap rewards like kudos, pride, or increased social standing (Willer 2009). Individuals can be the target of a norm (those to whom the rule applies), the enforcer of a norm (those who enforce the rules and ultimately benefit from the norm), both the target *and* the enforcer, or neither (those to whom the rule does not apply) (Coleman 1990). In addition to these core features, norms vary along a number of other dimensions. Norms also differ in terms of (a) the proportion of the population that agrees with the norm, (b) the extent to which group

¹ Following Bicchieri (2016), we include anticipated social sanctions in our conceptualization of sanctions.

² Behavior that is commonly practiced, but is not clearly subject to social approval or disapproval, is governed by *descriptive* norms, while behavior that is motivated by social (dis)approval (or “oughtness”) is governed by *injunctive* norms (Cialdini et al. 1990). With injunctive norms, individuals are compelled to act a certain way, and willing to sanction (or be sanctioned for) transgressions, because such behaviors are defined as the right way to act (Bicchieri 2006; Coleman 1990; Hechter and Opp 2001). When a sense of oughtness is strong enough for a focal actor to experience negative emotions as a result of non-compliance, that individual has *internalized* a social norm.

members are willing to sanction those who violate the norm, (c) the intensity of beliefs and emotions surrounding the norm, and (d) whether situations to which the norm applies are conditional or unconditional (Horne et al. 2015; Jackson 1966; Jasso and Opp 1997; Robbins et al. 2022; Rossi and Berk 1985).

Because little empirical work has investigated the normative foundations of concealment (Horne et al. 2015; Hoyle et al. 2020), it is unclear whether a norm prescribing or proscribing concealment exists in the United States, and how intense or conditional this norm might be. Social scientists who study falsification and selective disclosure often assume that concealment is strongly proscribed, and that disclosing information is generally prescribed (Ryan 2006; Bicchieri et al. 2019). These expectations reflect popular moral proscriptions against concealment, such as the religious commandment “thou shalt not lie” (under any circumstance). We propose that, in many situations, a norm proscribing concealment exists because it serves as a *metanorm*. Metanorms are norms that reward or punish norm enforcers (Horne 2009). Because metanorms reduce the costs associated with sanctioning, they undermine the second-order free-rider problem and facilitate norm enforcement. In contrast to common metanorms aimed at norm enforcers, we argue that the norm of concealment is a metanorm aimed at *norm targets*. If a norm target breaks a rule, then metanorms against concealment should motivate the target to disclose their initial violation to others at the risk of incurring sanctions. For concealable behaviors governed by norms (e.g., thou shalt not kill), a norm of concealment dictates what targets of a norm should or should not do if they violate a norm (e.g., If thou killed, thou shalt not lie). Our goal is to examine whether people think that it is right or wrong to conceal in-and-of-itself, irrespective of the matter being concealed. If situation- and matter-specific

considerations are the only motivating factors behind concealment, such as stigma or privacy, then social norms governing concealment should have little motivating power.

Yet, concealment is extremely commonplace. Experimental and survey research shows that only a small proportion of individuals tell the truth and fully disclose (Gneezy 2005; Slepian et al. 2017). This suggests that a norm of concealment in the United States may lack consensus or have little motivating power. Additionally, because individuals tend to conceal more when it benefits others (Erat and Gneezy 2012), the norm may vary depending on who benefits from concealment: the concealer or other people. Thus, we aim to identify whether a norm of concealment exists in the United States. If so, is it prescriptive, proscriptive, or both? Is it conditional upon who benefits from concealment? In terms of intensity, is it relatively weak or strong? And what is the level of consensus?

After having established the character of the norm, we investigate whether such normative considerations impact behavior.³ To test the extent to which norms predict concealment, we employ the Common Secrets Questionnaire (CSQ). The CSQ is a comprehensive list of topics about which individuals keep secrets (Slepian et al. 2017). In order to obtain the most inclusive measures, the categories in the CSQ were developed inductively, by asking 2,000 individuals open-ended questions about the secrets they keep, and then coding these answers into thirty-eight categories. The CSQ includes personal stigmatized topics (abortion), topics that reflect low self-control (addiction, criminal behavior), private information (finances),

³ Other variables can and do account for concealment. When individuals conceal compulsively, mistakenly, or automatically without intention or reflection, they may be ignoring or discounting social norms (Gottfredson and Hirschi 1990). Consequently, if there are subgroups of individuals who conceal many kinds of things, low self-control may be the strongest predictor of membership in these subgroups. We view this as an empirical question, and account for self-control in our models.

and topics of a benign—possibly altruistic—nature (surprises). These measures cover the vast majority of topics that individuals might want to conceal (Slepian et al. 2017).

The CSQ grants us the flexibility to examine whether our key motivating variable—social norms—accounts for concealment across a range of topics. To gain analytical leverage on what topics people conceal and why, we use latent class analysis (LCA). LCA allows us to identify whether there are latent subgroup (or person-centered) differences in what people conceal. Research suggests that some individuals conceal more than others, but group differences in concealment have yet to be examined (Talwar and Crossman 2011; Gneezy 2005; Slepian et al. 2017). It might be the case that some groups of individuals conceal everything or nothing at all, while other groups conceal only certain thematic topics (e.g., dissatisfaction with their personal lives). We also examine whether norms predict membership in these subgroups of concealers.

Data and Methods

Sample

An online survey was coded and administered by Qualtrics to a general population non-probability quota sample of market research panel members in the United States. 4,092 panelists completed the study between the dates of November 14th, 2019 and January 23rd, 2020.⁴ While slight differences exist, benchmark comparisons to the 2020 Current Population Survey (CPS) reveal that the sample characteristics are representative of the U.S. population (see Table 1).⁵ In terms of relative majorities, 52.5 percent of the participants were female, 35.3 percent had a

⁴ To maximize statistical power (given our research budget), we sought 4,000 respondents from Qualtrics. At the end of data collection, Qualtrics provided us with an extra 92 respondents.

⁵ Among the differences we observe, our sample includes an overrepresentation of low-income individuals and non-Hispanic whites.

bachelor's degree or greater, 79.0 percent were non-Hispanic white, and 27.9 percent were between the ages of 18 and 34 ($M = 48.2$, $SD = 17.02$, $\min = 18$, $\max = 96$).

The Qualtrics survey consisted of 11 blocks. Block 1 (consent form), Block 2 (screening question), and Block 3 (sociodemographic characteristics) were anchored at the beginning of the study.⁶ The remaining 8 blocks were shown in random order from respondent-to-respondent. Each block contained a thematic set of questions (e.g., desire for autonomy items, norm of concealment scales, etc.). Participants who completed the study received an incentive based on the length of the survey, their specific panelist profile, and respondent acquisition difficulty. The specific type of compensation varied (e.g., cash, airline miles, etc.). Eligibility was restricted to U.S. adults age 18 and older who (a) voluntarily consented to participate, (b) met quota requirements based on age, gender, and income, and (c) passed a screening question at the beginning of the survey. Those who failed (a), (b), and (c) were prohibited from participating in the study.⁷ The median survey length was approximately 20.5 minutes.

Independent variables

Norm of concealment. Given that norms are multidimensional, we operationalize the various aspects and features of a norm of concealment in the United States. First, following research on differential rates of concealment, we distinguish between two types of motivation: concealment for one's own benefit (self-interested concealment) and concealment for the benefit

⁶ To bolster data quality, we used a screening question at the start of the survey (Berinsky et al. 2014). Respondents who read the question's instructions were told to select the "Other" category to a question about one's favorite meal of the day, and type "Instructions processed". Those respondents who selected this specific, atypical response were eligible to participate in the study.

⁷ The enforced quota constraints for the study were as follows. For age, 18-34 minimum of 25 percent, 34-49 minimum of 20 percent, 50-64 minimum of 20 percent, and 65 plus minimum of 15 percent. For gender, male minimum of 45 percent, and female minimum of 45 percent. For income, \$29,999 or less minimum of 15 percent, \$30,000 to \$74,999 minimum of 30 percent, \$75,000 to \$124,999 minimum of 20 percent, and \$125,000 plus minimum of 15 percent.

of others (altruistic concealment) (Erat and Gneezy 2012). Drawing on Bicchieri's (2006, 2016) conceptualization of norms, we measure each motivation along three dimensions: (1) second-order *normative expectations* of conformity and social sanctioning, or ego's belief that others think it is right or wrong for ego to conceal; (2) *empirical expectations*, or ego's belief about the proportion of the population that conceals information, which captures descriptive properties of a norm and behavioral regularities in the population; and (3) ego's *preferences* for concealment, or the internalized degree to which ego "ought" or "ought not" to follow a norm of concealment (Hechter and Opp 2001; Opp 2013).⁸ We measure the first and third dimensions using unfolding bipolar scales, ranging from "completely right" to "completely wrong" with a "neither right nor wrong" middle category (reverse coded). We operationalize the second dimension with a 0 to 100 visual analogue scale, which measures the respondents' beliefs about the percentage of the population that would conceal information from others. With these six indicators, we use full information maximum likelihood confirmatory factor analysis (FIML-CFA) to construct a latent factor score of the norm of concealment ($\alpha = .746$, $M = 0$, $SD = .670$, $\min = -1.65$, $\max = 1.57$, $N = 4,091$), where higher values indicate a stronger norm prescribing (or approving of) concealment.

Control variables. Our models account for a host of demographic and social psychological variables (see Table A1 in the Appendix). We control for self-reported gender, age, race-ethnicity, marital status, level of education, region, and per capita household income among others. Because many religions explicitly prohibit concealment, we control for the

⁸ Note that we measure self-reports of *subjective* norms; that is, norms as they are perceived by respondents. We argue that this is a valid measure of social norms since (a) measurement tools in the social sciences commonly probe subjective norms with self-reports (Horne et al. 2013; Jasso and Opp 1997; Opp 2002; Robbins et al. 2022), and (b) Bicchieri's (2006, 2016) definition of a social norm rests on collectively shared subjective expectations and preferences, thereby bolstering the face validity of our measures.

respondent's religious denomination, religiosity, religious satisfaction, religious community, religious attendance, and frequency of prayer. In terms of social psychological controls, we use the General Causality Orientations Scale (GCOS) to control for the impact of different motivational orientations. This scale includes various aspects of the environment that motivate individuals to act, including intrinsic motivation, extrinsic factors, and lack of motivation (Deci and Ryan 1985). We also measure low self-control using nine items from the classic Grasmick and Bursik scale (Grasmick et al. 1993). The items selected reflect dimensions of self-control that are most accounted for by the general low self-control factor: impulsivity, risk-seeking, emotional volatility, and self-interest (Ward et al. 2015). We also account for how much respondents value autonomy, since a desire for autonomy may impact norm compliance *and* concealment (Grigoryeva 2021; Westin 1967). Desire for autonomy is measured with eight survey items drawn from the Desirability of Control Questionnaire (Burger and Cooper 1979; Gebhardt and Brosschot 2002), which measures an individual's desire for independence and internal locus of control. Finally, we control for political party affiliation and political ideology.

Dependent Variable

For the present study, we use a short-form version of the Common Secrets Questionnaire (CSQ), originally created by Michael Slepian and colleagues (2017). The CSQ was developed inductively, by asking respondents open ended questions about what secrets they kept, and classifying common types of secrets (Slepian et al. 2017). This measure has high test-retest reliability and external validity, and offers a more comprehensive and data-driven approach than prior measures of secrecy and concealment (Slepian et al. 2017; Slepian and Moulton-Tetlock 2019). The full battery of thirty-eight items was shortened to twenty-six items in order to reduce

respondent fatigue, as the CSQ was part of a larger research study on secrecy.⁹ The 26-item measure, however, was designed to include all concealable matters covered by the long-form 38-item measure.

The respondents were asked if they had concealed information from a friend or a family member in the past year. If the respondents answered “Yes”, they were then prompted to choose as many of the twenty-five concealed topics as they deemed applicable (plus an “other” option yielding a total of twenty-six possible categories). The topics included hurting someone, addiction, hurting oneself, violation of trust, as well as topics about romantic and sexual behavior and preferences, finances, mental health, surprises, pregnancy and abortion, sexual and gender orientation, family details, and work dissatisfaction (see Table A2 in the Appendix for a full list of items and their descriptions). With these twenty-six items, we follow scaling methods used by criminologists (e.g., Matsueda et al. 2006) and constructed a row-sum count of concealed topics over the past year ($M = 2.118$, $SD = 2.764$, $\min = 0$, $\max = 25$, $N = 3,830$).

Following other studies (McDonald et al. 2020), our measure assesses the proportion of individuals who have concealed a given topic from friends and family in the past year. We do not, by contrast, measure the degree of misinformation that exists for a given topic (i.e., the proportion of people who conceal A, given that A has occurred). Conditioning on the occurrence of a concealable topic is appropriate for some—but not other—matters considered here (e.g., behaviors such as cheating may occur *because* a person has decided to conceal). We consider the implications of our measurement approach in greater detail in the discussion section.

⁹ In addition to secret keeping, the wording of the question was changed to include lying, avoiding discussion, or otherwise concealing information. This was done to measure concealment broadly regardless of the strategy used to conceal.

While we capture concealment of events over the past year, the events themselves could have transpired at any time. This means that individuals could report concealment of an act which has happened years ago, or report concealing information about something that may transpire in the future. Memory recall by survey respondents is imperfect. Salient or significant instances of concealment are more likely to get reported than minor ones¹⁰, and recent events are more accurately recalled than prior events (Beckett et al 2000). Yet, we are confident that the CSQ is a valid and meaningful—if imperfect—measure of concealment since the correlation between self-reports of concealment and observed concealment is high (Halevy et al. 2014), and since any recall bias would affect all participants similarly (Jaspers et al. 2009).

Modeling Strategy

To investigate the link between norms and concealment, we estimate a regression model predicting concealed topics over the past year. In particular, we use negative binomial regression to model the count of concealment (and to account for overdispersion).¹¹

After establishing that norms are associated with counts of concealment, we turn to the task of identifying subgroups of concealers. Because we are interested in categorizing people into different types of concealers, we use latent class analysis (LCA) to identify unmeasured class membership among respondents (Collins and Lanza 2009; Lazarsfeld and Henry 1968; McCutcheon 1987). LCA is a mixture modeling approach, like latent curve growth analysis,

¹⁰ In this way, respondents may be more likely to report the type of concealment we are attempting to explain: non-trivial concealment.

¹¹ Estimates from an intercept-only negative binomial regression rejected the null hypothesis that the dispersion parameter is zero, $\chi^2(1) = 3557.86, p < .001$, indicating that negative binomial regression is preferred over Poisson regression. Likewise, comparing the AIC and BIC of an intercept-only zero-inflated negative binomial regression (AIC = 14989; BIC = 15008) to a standard negative binomial regression (AIC = 14987; BIC = 14999) indicates that the standard estimation technique is preferred over zero-inflated estimation.

where the aim is to model heterogeneity between persons in a population. It does this by analyzing patterns of responses, finding common “types” or “classes”, and probabilistically assigning individuals to classes (Muthen and Muthen 2017). This results in subgroups of individuals who are similar to each other in a class but distinct from those in other classes. We use common fit statistics in selecting the most appropriate model for the data, such as the BIC and Lo-Mendell-Rubin likelihood ratio test (see the results section and Supplemental Materials online for more details). After identifying the number of classes with LCA, we then finish with conditional LCA in which latent class membership is predicted as a function of the norm of concealment and control variables. We use multinomial logistic regression to model the conditional LCA. All regression analyses were estimated in Stata 15.2, while the LCA was computed in Mplus 8.2 (Muthen and Muthen 2017).

Given the longstanding debate about how to address non-response error (Allison 2002; Arel-Bundock and Pelc 2018; Pepinsky 2018), we present models using listwise deletion. Models estimated using multiple imputation ($m = 50$) can be found in the Supplemental Materials online. The results are largely consistent across all models.

Results

Descriptive results

Because there is little work exploring the norm of concealment in the general population, we first review and summarize our key independent variable. We then provide a descriptive analysis of what individuals in the general population conceal or keep secrets about.

Norm of concealment. We present histograms of each indicator used to measure the norm of concealment scale (see Figure 1). Starting with second-order normative expectations, we can see that the relative majority of respondents believe that others think it is completely or

somewhat wrong for them to conceal information for their own benefit (~ 42 percent; panel A). This plurality switches, however, when the goal of concealment is for the benefit of others (panel B): most respondents believe that others think it is completely or somewhat right to conceal under these conditions (~ 42 percent). In either case, a substantial portion of respondents are neutral with respect to the norm; that is, they report that it is neither right nor wrong to conceal (~ 30 percent of respondents). Panels A and B show that the norm of concealment—at least with respect to second-order normative expectations—is bipolar (a mix of prescriptive, proscriptive, and nonexistent), where polarity is conditional on whether concealment is altruistic or self-interested. Normative expectations regarding concealment are also moderately intense, with significant disagreement (or lack of consensus) over whether people should or should not conceal for the benefit of themselves or others.

Panels C and D in Figure 1 reveal information about the empirical expectations of others' behavior, or descriptive norms. Panel C shows that the vast majority of respondents (86.5 percent of the sample) believe that 50 percent or more of the general population would conceal information for their own benefit. Respondents are less likely to think that people would conceal information for the benefit of others (see panel D), but nonetheless believe that concealment for the benefit of others is widespread. These results imply that most people believe that others lie, keep secrets, and/or distort information for their own and others' benefit. The descriptive norm, then, is one in which people expect concealment on the part of others.

Panels E and F in Figure 1 assess personal obligations to conceal or not conceal information. Panel E shows that the relative majority of respondents think that it is wrong to conceal information for their own benefit (~ 46 percent). Panel F, by contrast, shows that the relative majority think that it is right to conceal information for the benefit of others (~ 34

percent). Like second-order normative expectations (panels A and B), a large proportion of respondents do not hold a norm (~ 38 percent in panel E; ~ 34 percent in panel F), and believe that it is neither right nor wrong to conceal. Taken together, panels A, B, E, and F indicate that the norm of concealment in the general population is moderately intense, bipolar, and lacking strong consensus. Notably, with regard to self-interested concealment, respondents expect others to act *against* normative expectations.¹²

Concealment. We now examine the distribution of topics concealed from friends and family over the past year. To start, we provide descriptive statistics of the count variable. Roughly 31 percent of the sample *did not* report concealing one of the twenty-five topics over the past year. The remaining 68.59 percent of the sample concealed at least one topic. The median number of concealed topics was 1, while the mean and standard deviation were 2.11 and 2.76, respectively. This indicates that the distribution of the count variable is positively skewed, and that a minority of individuals concealed many topics from friends and family.

Next, we investigate whether—and to what extent—some topics are more commonly concealed than others. Figure 2 shows that “finances” are the most common topic concealed over the past year, with about 21 percent of the sample concealing this type of information, because financial experiences are ubiquitous, considered private, and are easy to conceal in the United States (Nippert-Eng 2010; Wherry et al. 2019). The next most common concealed topics are those about “personal discontent” and “family details”: roughly 17 percent of the sample concealed these topics. In part due to the relative rarity of such events, the most uncommon

¹² For covert matters, this is a common finding. For example, the United States has one of the highest rates of tax compliance in the world, precisely because taxpaying is normative and viewed by many as a civic and moral duty (Williamson 2017; Robbins and Kiser 2020). Yet, many Americans incorrectly believe that other taxpayers are not paying their fair share (Campbell 2009). Because it is difficult to accurately observe the tax compliance of other taxpayers, norms surrounding tax compliance exhibit an incongruence between empirical and normative expectations (Williamson 2017).

concealed topics are “abortion” and “pregnancy”, with only 2 percent of the sample concealing these topics over the past year.¹³ In terms of relative majorities and patterns across topics, Figure 2 shows that topics dealing with crime and deviancy (e.g., “other-harm”, “drug use”, “illegal”, etc.) are less commonly concealed than topics about dissatisfaction and disaffection (e.g., “social discontent”, “personal discontent”, “mental health”, etc.), private affairs (e.g., “finances” and “family detail”), and trivial or benign matters (e.g., “surprise”).

Predicting concealment

We now examine whether concealment is a function of social norms. Table 2 presents results from a negative binomial regression model predicting counts of concealment over the past year. We find that the norm of concealment is associated with concealment in personal relationships. Specifically, a one-unit increase in the norm of concealment scale is associated with a 1.312 factor increase in the count of concealment over the past year. Note that the norm of concealment ranges from proscription at low values (i.e., norm *against* concealment) to prescription at high values (i.e., norm *encouraging* concealment). As the norm becomes more prescriptive, respondents conceal to a greater extent. Figure 3 presents predicted counts of concealment over the past year, which illustrates the strong predictive power of the norm of concealment.

Latent classes of concealment

One of our aims is to determine whether meaningful subgroups of actor types exist in the population. Drawing on prior research (Stouthamer-Loeber 1986; Gottfredson and Hirschi 1990;

¹³ The 2017 pregnancy rate across women aged 15 to 44 was 8.7 percent. The 2017 U.S. estimates of abortion rates across women of all ages were between 1.1 and 1.4 percent (Maddow-Zimmet and Kost 2021; Kortsmitt et al. 2020).

Talwar and Crossman 2011), the subgroups we expect to find consist of persistently high concealers (individuals who conceal everything) and persistently low concealers (individuals who conceal nothing). Given prior work linking groups of individuals to specific types of concealment (Goffman 1963; Wherry et al. 2019; Cowan 2014; Mollborn 2017), we also expect to observe topical concealers (individuals who conceal information about sex and romance for instance). We employed LCA to categorize people into different types of concealers and to identify unmeasured class membership among respondents. After exploring different model estimates and assessing estimates of model fit across k -classes of models, $k = 1, \dots, 7$ (see the Supplemental Materials online for a discussion of LCA model selection), we settled on a latent 5-class solution for concealment.

Figure 4 depicts the five classes. As expected, two of these, C#1 (Persistently high concealer) and C#5 (Persistently low concealer), characterize groups of individuals who have a high or low probability of concealing just about every topic, respectively, with some variation within classes. In C#1, persistently high concealers have a low probability of concealing information about Abortion and Pregnancy (though the probability of concealing these topics is still higher for C#1, relative to other classes), but a high probability of concealing most other topics (especially Romantic desires and Personal discontent). By contrast, persistently low concealers have a low probability of keeping secrets about any of the twenty-six topics (probabilities ranging between 0 and .1).

The other three latent classes—C#2 (Discontent concealer), C#3 (Sex and romance concealer), and C#4 (White lie concealer)—are topical. In C#2, Discontent concealers have a high probability of concealing information about Personal discontent, Mental health, and Finances, with a moderately low probability of concealing information about Work discontent

and Surprise. Likewise, in C#3, Sex and romance concealers have a relatively high probability of keeping secrets about Romantic desire, Romantic discontent, Infidelity, and Sexual behavior. Finally, in C#4, White lie concealers tend to keep secrets about benign and private matters, such as Surprise, Family detail, and Finances. Overall, the LCA reveals that the majority of individuals (56.79 percent) are classified as C#5 (Persistently low concealer), while the class with the fewest classified members (2.40 percent) is C#1 (Persistently high concealer). These findings are consistent with prior literature suggesting a smaller class of persistent concealers (Gneezy 2005; Gottfredson and Hirschi 1990). The findings also indicate that class membership is not solely determined by the extent to which people conceal. Class membership is also determined substantively by the topic being concealed: romance and sex, discontent, and benign topics inform membership in subgroups.

Conditional latent class analysis

The final set of models examine whether the latent classes of concealers are a function of norms. To answer this question, we extracted respondents' latent class membership. We then used multinomial logit models to estimate the conditional probability of membership in class k as a function of the norm of concealment and control variables (Jung and Wickrama 2008).

The model estimated in Table 3 shows that the norm of concealment accounted for membership in latent classes of concealers. Tests of joint significance revealed that the overall effect of norms on class membership is statistically significant, $\chi^2(4) = 52.43, p < .001$. Figure 5 shows that as the norm becomes more prescriptive (or as individuals subscribe to a norm favorable to concealment), the probability of membership in C#2 (Discontent concealer), C#3 (Sex and romance concealer), and C#4 (White lie concealer) increases, while the probability of membership in C#5 (Persistently low concealer) decreases. The association between the norm of

concealment and membership in C#1 (Persistently high concealer) is negligible. These results suggest that, consistent with the antisocial perspective, individuals who conceal information about everything are unmotivated or undeterred by social norms. Instead, the norm regulates concealment of benign and private matters, matters of romance and sex, as well as topics concerned with discontent. Finally, individuals who abstain from all forms of concealment are much more likely to subscribe to a norm *against* concealment.

While norms are not associated with membership in C#1 (persistently high concealer class), two control variables strongly predicted membership in this class. First, echoing criminological work on the link between low self-control and concealment, low self-control individuals were more likely to be members of the persistently high concealer class (C#1).¹⁴ Likewise, younger individuals were more likely to be members of the persistently high concealer class (C#1).

Taken together, we find that social norms predict individual concealment, and explain observed group heterogeneity in concealment. We identify five unique subgroups of concealers, and show that concealment does not merely consist of individuals who differ with respect to the *breadth* of their concealment (i.e., conceal all or nothing). Instead, people differ by *what* they conceal as well, and we find that the norm of concealment predicts membership in most—but not all—of these subgroups: those who abstain from concealment, regardless of the topic, subscribe to a proscriptive norm. On the other hand, low self-control—and not the norm of concealment—motivates concealment for those individuals who conceal more across all topics.

Discussion

¹⁴ Low self-control individuals and younger individuals were also less likely to be members of C#5 (Persistently low concealer).

What does concealment look like in the United States, and why? To answer these questions, we used data from a general population survey of 4,092 U.S. adults to map the topics individuals conceal from others and identify the normative foundations of concealment. We found that most people have concealed something from friends and family in the past year, and that the average number of concealed topics was two. Reflecting their ubiquity in social life and their normative designations as private, personal finances, family matters, and dissatisfaction with one's circumstances were the topics most commonly concealed from friends and family (Nippert-Eng 2010; Wherry et al. 2019). We also discovered five unique subgroups of concealers, ranging from individuals who conceal information about every topic, to individuals who conceal information about certain topics (e.g., sex and romance), to individuals who conceal information about very few (if any) topics. Negative binomial regression and multinomial logistic regression models revealed that the norm of concealment strongly predicted counts of concealment as well as latent class membership. Our results support several conclusions.

First, we find that concealment in personal relationships is multidimensional: people differ both in *how much* they conceal, and also in *what* they conceal from others. Our person-centered analysis accounted for previously unexplored heterogeneity in concealing behavior that exists in the United States, revealing five different subgroups of concealers. Individuals who tend to be forthcoming and honest about everything (persistently low concealers) constitute a different subgroup than individuals who tend to conceal and lie about everything—including stigmatized, antisocial, private, altruistic, and benign matters (persistently high concealers). And both of these subgroups are distinct from classes of individuals who selectively conceal information about certain types of topics (such as sex and romance, and personal discontent). While our research supports prior work showing that much of the population can be divided into two classes of

concealers—those who are honest and those who conceal (Gneezy 2005; Gottfredson and Hirschi 1990)—we provide a more nuanced picture of concealment. There is a sizable proportion of individuals in the population (40.81 percent) who are not forthcoming about some topics, like sex, romance, and finances, but also who do not necessarily lie and keep secrets about everything. These individuals are spread across three separate subgroups distinguished by the quality—rather than the quantity—of concealment. To our knowledge, this is the first paper to examine and identify these sorts of latent class differences in concealment. Beyond providing a better understanding of patterns of concealment, information about subpopulations of concealers can help researchers match their samples to target populations, and evaluate the generalizability of findings.

Second, concealment has robust normative foundations, where the norm of concealment varies in its polarity, intensity, and conditionality. We found that, contrary to prior assumptions (Bicchieri et al. 2019), there is no consensus about concealment as universally wrong. In contrast, concealment is ubiquitous, and considered wrong only under certain conditions: people disapproved—and expected others to disapprove—of concealment that benefits the self, but approved—and expected others to approve—of concealment when it is done for the benefit of others. In other words, the norm of concealment (a) is not intense, where individuals do not feel strongly one way or the other about concealment; (b) exhibits conditionality, where moral judgements depend on who benefits from concealment (be it the self or others); and (c) displays a lack of consensus.

However, the norm of concealment strongly and reliably predicts self-reported concealment. Individuals reference the normative foundations of concealment when deciding whether to falsify or selectively disclose information—of any kind or type—to others. Our

findings suggest that people conceal information for the benefit of others, not just because they are being altruistic (although this likely matters as well), but because they believe that there are social rules mandating and rewarding altruistic concealment. In other words, when all else is equal, the disclosure of *specific* information will vary to the extent that individuals believe it is *generally* right or wrong to conceal.

These findings underscore the power of social norms. We find that concealment—a behavioral strategy that helps individuals evade social sanctions—is, itself, normatively governed. That the norm of concealment can motivate individuals to reveal otherwise unobservable behaviors and subject themselves to the possibility of sanctions, underscores the explanatory reach of social norms and their capacity to affect conformity with social rules (Horne and Mollborn 2020; Horne 2009; Willer 2009). Our findings suggest that some metanorms extend beyond steering the behavior of norm enforcers, and may govern the behavior of norm targets as well, yielding further insight into how metanorms maintain social order.

Third, the process of deciding to conceal may be different for those who indiscriminately conceal across all matters. Individuals who conceal everything are not motivated by the norm of concealment, but do exhibit disproportionately lower self-control. These findings offer support for the link between low self-control and concealment (Gottfredson and Hirschi 1990), and suggest that concealment arises from dual processes: executive functioning and evaluation of sanctions and rewards on one hand, and impulsivity and immediate self-gratification on the other (Talwar and Crossman 2011). Concealment that is socially appropriate (white lies) or limited to specific topics (sex or social discontent) may be a function of deliberation and strategy (Gneezy 2005; Erat and Gneezy 2012; Afifi et al. 2005; Talwar and Lee 2002). Concealing everything, by contrast, may be motivated by impulsivity, habit, or lack of coping strategies (Gottfredson and

Hirschi 1990; Talwar and Crossman 2011). Our findings also suggest that the explanatory scope of norms may be limited to the types of concealment that are more selective, deliberative, and situationally sensitive.

Limitations and directions for future research

A few limitations are worth noting. Our analysis features self-reports of prior behavior, rather than direct observations of concealment. The consequence of this measurement strategy is elevated response bias, which is common to research on sensitive topics. In spite of the increased likelihood of measurement error, we argue that survey-based self-reports of concealment are an ideal, if imperfect, method for measuring concealment. Criminologists, for instance, consistently observe convergence in self-reports of crime with administrative records and victimization data (Piquero et al. 2014; Junger-Tas and Marshall 1999), and research on lying indicates similar statistical agreement of measures (Halevy et al. 2014). Existing methods, including lab experiments and ethnographic research, target a narrow range of concealment (in the case of experiments), have difficulty directly observing certain types of concealment like secrets and lies (in the case of ethnography), and often limit population-based inferences (in the case of experiments and ethnography). Our general population survey, by contrast, indirectly measures a broad range of topics for which people can *and* do conceal, and limits social desirability bias by virtue of being a web-based survey (Dillman 2000). Few other methods grant researchers such in-depth knowledge about patterns of concealment in the general population.

The current paper also probes the surface of concealment in the general population. Our version of the CSQ provides the proportion of individuals who have concealed a given topic from friends and family in the past year. It does not reveal the proportion of people who have, for example, had an abortion, and what proportion of those individuals have concealed it from

friends and family. To state it differently, our measurement strategy says more about which topics people conceal, and not necessarily about the misinformation that exists for a given topic (i.e., the proportion of people who conceal A given that A has occurred). Importantly, to the extent that concealment may be due to selection into certain concealable behaviors, our research design offers a conservative test of the norm-concealment link.

While investigating the relationship between the occurrence of potentially concealable behaviors and their concealment is important (Cowan 2014; Kitts 2003), conditioning on prior behavior is not an appropriate way to measure concealment for many of the behaviors considered in this paper. Behaviors may be carried out *because* a person decides to—or successfully does—conceal behavior *a priori* (Grigoryeva 2021). For instance, white collar criminals may attempt embezzlement only after deciding that they will be able to (and are willing to) conceal their theft (Simpson 2013). Establishing the causal order between concealable behavior and concealment is less than straightforward. It is imperative for future research to investigate the link between subjective probabilities of successful concealment and the timing of decisions to conceal, and to identify whether such decisions take place before or after a concealable behavior. Diary surveys of ongoing communication and behavior between individuals may be especially helpful in establishing the timing of decisions, behavior, and actual concealment, while minimizing recall bias.

Our aim was to provide a general explanation of concealment in a sample of U.S. adults. It is an outstanding empirical question whether the norm of concealment similarly motivates concealment in different cultural contexts. While the norm of concealment has not been measured in other settings, a handful of studies in psychology have conducted cross-cultural studies of concealment, and their findings may offer directions for future research. These studies

do not find evidence of cultural differences in how much individuals conceal, but observe cultural variation in what topics people tend to conceal as well as variation in who individuals conceal from (Fu et al. 2007; Heyman et al. 2013). Replicating the current design in other cultural settings will add to our understanding of what people conceal, and why.

Finally, the norm of concealment is one of many factors that can, and do, motivate concealment. Consistent with prior literature linking autonomy to concealment, we found that a desire for autonomy predicts counts of concealment as well as membership in subgroups of concealers (Grigoryeva 2021). The literature shows that other factors, such as characteristics of the targets of concealment, matter as well (Small 2017; Cowan and Baldassarri 2018; Grigoryeva 2021). Small (2017) and Cowan and Baldassarri (2018), for instance, find that a lack of empathy from potential confidants affects *who* is selected for the disclosure of information. Examining the interplay between empathy appraisals, desire for autonomy, and the norm of concealment is an important next step for future research.

Conclusion

We described and explained the extent of concealment across a range of illegal, stigmatized, private, and prosocial behaviors in the United States, something that has not been done previously. Our study discovered unique subgroups of concealers, and identified new sources of, and motivations behind, concealment. We found that *what* and *how much* people conceal characterizes these different subgroups. Our findings show that concealment is ubiquitous, and—despite being both prevalent and covert—is guided by moral and normative considerations.

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Table 1. Comparison of Qualtrics Survey and 2020 Current Population Survey

	Qualtrics	Benchmark	Difference
Household Income			
Less than \$30,000	29.3	17.5	11.8
\$30,000 to \$74,999	41.8	33.1	8.7
\$75,000 to \$124,999	19	24.6	-5.6
\$125,000 Plus	9.9	24.9	-15
Age			
18 - 34	28	29.3	-1.3
35 - 49	24.2	24.3	-.1
50 - 64	26.4	24.9	1.5
65 Plus	21.4	21.5	-.1
Race-Ethnicity			
Non-Hispanic White	79.0	62.8	16.2
Non-Hispanic Black	6.6	11.9	-5.3
Hispanic	7.7	16.7	-9
Non-Hispanic Asian and Pacific Islander	2.6	6.4	-3.8
Non-Hispanic Other race	4.1	2.2	1.9
Education Status			
Less than High School	5.3	9.8	-4.5
High School Equivalent	34.2	28.2	6
Some College or Associate Degree	25	27.7	-2.7
Bachelor's Degree	24.1	21.8	2.3
Graduate Degree	11.4	12.4	-1
Marital Status			
Currently Married	47.8	52.6	-4.8
Separated, Divorced, Widowed, or Single	52.2	47.4	4.8
Sex			
Male	47.5	48.3	-.8
Female	52.5	51.7	.8

Note : Benchmark = 2020 Current Population Survey

Table 2. Results of a Negative Binomial Regression Model
Predicting Concealment

	Coef.	SE
Norm of Concealment	.271***	.031
Desire for Autonomy	.259**	.074
Low Self-Control	.330***	.035
General Causality Orientations Scale		
Autonomy scale	.007	.043
Impersonal scale	.066**	.023
Controlled scale	-.520**	.190
Age	-.018***	.001
Race		
Non-Hispanic white (omitted)		
Hispanic	.030	.074
Black	-.175*	.086
Asian	-.348*	.142
Other race	.091	.212
Two or more races	.117	.131
Gender		
Female (omitted)		
Male	-.148**	.046
Marital status		
Married (omitted)		
Widowed	-.014	.104
Divorced	.108	.073
Separated	.008	.198
Never married	-.072	.055
Cohabiting	.226**	.067
None of the above	.470	.454
ln(per capita household income)	.0007	.026
Level of education		
None (omitted)		
High school diploma	.178	.112
Some college	.209	.117
Bachelor's degree or greater	.242*	.116
Region		
West (omitted)		
Midwest	-.061	.064
South	-.102	.059
Northeast	-.054	.068
Religion		
Protestant (omitted)		
Catholic	-.108	.073
Jewish	-.284	.144
Eastern religion	-.041	.172

Muslim	.542**	.164
Orthodox	-.600*	.269
Other religion	.075	.089
No religion	-.074	.072
Religiosity	.008	.035
Religious attendance	.015	.024
Religious satisfaction	.009	.025
Religious community	.007	.023
Frequency of prayer	-.005	.016
Liberal-conservative scale	-.021	.010
Party affiliation		
Democrat (omitted)		
Independent	.070	.054
Republican	.022	.064
Other political orientation	.579**	.170
Constant	.349	.405
Pseudo R^2	.053	
N	3,013	
α	.670	

* $p < .05$, ** $p < .01$, *** $p < .001$

Note: SE = standard errors. Dispersion modeled as a function of the expected mean. The model also controls for date of completion and survey duration.

Table 3. Results of a Multinomial Logistic Regression Model Predicting Latent Class Membership

	C#1 vs. C#5	C#2 vs. C#5	C#3 vs. C#5	C#4 vs. C#5
Norm of Concealment	.684** (.202)	.458*** (.112)	.487*** (.102)	.384*** (.070)
Desire for Autonomy	1.707** (.544)	.104 (.259)	.786** (.262)	.474*** (.177)
Low Self-Control	1.166*** (.222)	.596*** (.124)	.872*** (.115)	.192* (.083)
General Causality Orientations Scale				
Autonomy scale	-.167 (.296)	.033 (.154)	-.021 (.144)	-.036 (.100)
Impersonal scale	.358* (.156)	.393*** (.085)	.123 (.080)	.046 (.054)
Controlled scale	-2.024 (1.247)	-2.621*** (.695)	-1.693** (.641)	-.232 (.448)
Age	-.045*** (.011)	-.053*** (.006)	-.029*** (.005)	-.020*** (.003)
Race				
Non-Hispanic white (omitted)				
Hispanic	-.254 (.438)	-.163 (.254)	.507* (.227)	.131 (.187)
Black	-.889 (.602)	-.771* (.332)	.159 (.271)	-.005 (.197)
Asian	-.886 (1.102)	-1.378* (.646)	-1.113 (.646)	.380 (.286)
Other race	.674 (1.119)	.156 (.692)	-.024 (.778)	-.166 (.523)
Two or more races	.688 (.703)	.179 (.390)	.157 (.479)	.168 (.337)
Gender				
Female (omitted)				
Male	-.362 (.313)	-.334* (.167)	.209 (.154)	-.300** (.104)
Marital status				
Married (omitted)				
Widowed	-.176 (.1072)	.250 (.440)	.347 (.344)	-.264 (.233)
Divorced	.021 (.652)	.263 (.304)	.321 (.239)	-.209 (.169)
Separated	-12.898 (1030)	.954 (.553)	-.276 (.768)	-.080 (.456)
Never married	-.211 (.382)	.328 (.186)	-.389* (.194)	-.409** (.131)
Cohabiting	.724 (.388)	.367 (.236)	.423* (.214)	.178 (.164)
None of the above	1.861 (1.313)	.596 (1.280)	-19.311 (15568)	-18.256 (7898)
ln(per capita household income)	.102 (.164)	-.073 (.086)	-.095 (.084)	-.001 (.061)
Level of education				
None (omitted)				
High school diploma	-.089 (.614)	1.183* (.470)	.230 (.351)	.271 (.270)
Some college	-.455 (.659)	1.436** (.485)	-.220 (.372)	.187 (.282)

Bachelor's degree or greater	-.296 (.648)	1.602** (.482)	.114 (.369)	.411 (.279)
Region				
West (omitted)				
Midwest	-.429 (.445)	.124 (.234)	-.275 (.213)	.044 (.150)
South	-.311 (.390)	.004 (.221)	-.267 (.193)	.057 (.139)
Northeast	.132 (.418)	.294 (.246)	-.106 (.219)	-.149 (.163)
Religion				
Protestant (omitted)				
Catholic	-.696 (.435)	-.428 (.224)	.010 (.189)	-.062 (.129)
Jewish	-13.045 (.487)	-.435 (.573)	-.353 (.555)	.251 (.288)
Eastern religion	-.878 (1.136)	-.347 (.581)	-.027 (.576)	-.408 (.415)
Muslim	1.628* (.641)	.247 (.715)	.576 (.562)	.029 (.476)
Orthodox	-14.142 (1216)	-.360 (.749)	-.810 (.875)	-.783 (.671)
Other religion	.501 (.515)	.263 (.296)	.214 (.296)	-.105 (.220)
No religion	-.048 (.486)	-.097 (.251)	-.040 (.237)	-.114 (.167)
Religiosity	.182 (.237)	.215 (.128)	-.100 (.115)	.085 (.081)
Religious attendance	.141 (.168)	.052 (.088)	.062 (.079)	.069 (.054)
Religious satisfaction	-.158 (.172)	.014 (.090)	.025 (.083)	-.020 (.057)
Religious community	.231 (.142)	-.084 (.085)	.007 (.075)	.007 (.051)
Frequency of prayer	-.088 (.121)	-.080 (.059)	-.016 (.055)	-.038 (.038)
Liberal-conservative scale	-.062 (.063)	-.086* (.039)	-.0007 (.034)	.004 (.025)
Party affiliation				
Democrat (omitted)				
Independent	-.016 (.362)	.363 (.186)	-.052 (.185)	-.130 (.128)
Republican	-.200 (.403)	.085 (.240)	.021 (.208)	-.096 (.147)
Other political orientation	2.418** (.704)	1.311* (.585)	1.462** (.517)	.319 (.523)
Constant	-4.349 (2.464)	-1.065 (1.328)	-1.271 (1.271)	-1.032 (.929)

* $p < .05$, ** $p < .01$, *** $p < .001$

Note : Relative log-odds (standard errors). $N = 3,013$. The model also controls for date of completion and survey duration.

Figure 1. Histograms of Indicators of the Norm of Concealment Scale

Note: CW = completely wrong, SW = somewhat wrong, Neither = Neither right nor wrong, SR = Somewhat right, CR = completely right. Respondents' second-order normative expectations about concealing information for respondent's own benefit (A), respondents' second-order normative expectations about concealing information for the benefit of others (B), respondents' empirical expectations that people conceal information for their own benefit (C), respondents' empirical expectations that people conceal information for the benefit of others (D), respondents' personal obligations to conceal information for their own benefit (E), and respondents' personal obligations to conceal information for the benefit of others (F).

Figure 2. Proportion of Respondents Concealing each Category of Concealment over the Past Year

Figure 3. Predicted Counts of Concealment by the Norm of Concealment Scale

Note: Predicted counts and 95% CIs of the number of secrets held in the past year as a function of the norm of concealment scale ($N = 3,013$). Estimates derived from Table 2.

Figure 4. Latent Classes of Concealment

Note: A latent 5-class solution from a latent class analysis of concealed topics ($N = 3,830$). C#1 in red: Persistently high concealer = 2.40 percent of respondents ($N = 92$); C#2 in blue: Discontent concealer = 9.06 percent of respondents ($N = 347$); C#3 in green: Sex and romance concealer = 9.09 percent of respondents ($N = 348$); C#4 in orange: White lie concealer = 22.66 percent of respondents ($N = 868$); C#5 in purple: persistently low concealer = 56.79 percent of respondents ($N = 2,175$).

Figure 5. Plots of Predicted Probabilities into Latent Classes of Concealment

Note: Predicted probabilities and 95% CIs of membership in C#1 (A), C#2 (B), C#3 (C), C#4 (D), and C#5 (E) as a function of the norm of concealment scale ($N = 3,013$). Estimates derived from Table 3.

Appendix A

Table A1. Sample Descriptive Statistics

Name	Definition	Mean	SD	Min/Max	N
<i>Dependent variable</i>					
Concealment	Row-sum count of twenty-six items from the Common Secrets Questionnaire (Slepian et al. 2017)	2.118	2.764	0/25	3830
<i>Independent variables</i>					
Norms of concealment	6-item latent factor score of norms of concealment ($\alpha = .746$) (1) Most people feel that it is right or wrong for you to conceal information for your own benefit, (2) Most people feel that it is right or wrong for you to conceal information for the benefit of others, (3) What percentage of the population would conceal information for their own benefit, (4) What percentage of the population would conceal information for the benefit of others, (5) How right or wrong is it for you to conceal information for your own benefit, and (6) How right or wrong is it for you to conceal information for the benefit of others.	0	.670	-1.65/1.57	4091
Desire for autonomy	8-item latent factor score of desire for autonomy ($\alpha = .432$) (1) The events in my life are mainly determined by my own actions, (2) I am not in control of most things that occur in my life, (3) I prefer a job where I have a lot of control over what I do and when I do it, (4) I enjoy political participation because I want to have as much of a say in running government as possible, (5) I try to avoid situations where someone tells me what to do, (6) I would prefer to be a leader rather than a follower, (7) Others usually know what is best for me, and (8) I enjoy making my own decisions.	0	.291	-1.59/.61	4090
<i>Control variables</i>					
Low self-control	9-item short-form latent factor score of low self-control ($\alpha = .775$) (1) I often do whatever brings me pleasure here and now, even at the cost of some distant goal, (2) Sometimes I will take a risk just for the fun of it, (3) I often act without thinking through all the alternatives, (4) Excitement and adventure are more important to me than security, (5) I will try to get the things I want even when I know it is causing problems for other people, (6) When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset, (7) I lose my temper pretty easily, (8) People would say that I have iron self-discipline, and (9) Sometimes I can't stop myself from doing something, even if I know it is wrong.	0	.662	-1.15/1.98	4091
General Causality Orientations Scale	Short-form (12-item, 4 vignette) General Causality Orientations Scale (Deci and Ryan 1985)				
Autonomy scale	4-item latent factor score of GCOS's autonomy scale ($\alpha = .478$)	0	.502	-2.17/.90	4083
Impersonal scale	4-item latent factor score of GCOS's impersonal scale ($\alpha = .581$)	0	.967	-2.12/2.18	4083
Controlled scale	4-item latent factor score of GCOS's controlled scale ($\alpha = .422$)	0	.119	-.27/.31	4086
Age	Age in years	48.20	17.02	18/96	4092
Race					
Non-Hispanic white (omitted)	Non-Hispanic white respondent	.790	---	0/1	4067

Hispanic	Non-white Hispanic respondent	.077	---	0/1	4067
Black	Non-Hispanic black respondent	.066	---	0/1	4067
Asian	Non-Hispanic Asian respondent	.026	---	0/1	4067
Other race	Other race	.012	---	0/1	4067
Two or more races	Two or more races	.027	---	0/1	4067
Gender					
Female (omitted)	Female respondent	.525	---	0/1	4092
Male	Male respondent	.475	---	0/1	4092
Marital status					
Married (omitted)		.478	---	0/1	4073
Widowed		.050		0/1	4074
Divorced		.094		0/1	4075
Separated		.013		0/1	4076
Never married		.244		0/1	4077
Cohabiting		.115		0/1	4078
None of the above		.003	---	0/1	4079
ln(per capita household income)		9.881	.977	4.82/12.47	3963
Level of education					
None (omitted)	Less than a high school diploma	.053	---	0/1	4066
High school diploma	High school diploma, GED, or equivalent	.342	---	0/1	4066
Some college	Some college or Associate's degree	.250	---	0/1	4066
Bachelor's degree or greater	Bachelor's degree, Master's degree, Professional degree, or Doctorate	.353	---	0/1	4066
Region					
	United States Census Bureau Regions				
West (omitted)	WA, OR, CA, ID, NV, MT, WY, UT, AZ, CO, NM	.180	---	0/1	4090
Midwest	ND, SD, NE, KS, MN, IA, MO, WI, IL, MI, IN, OH	.246	---	0/1	4090
South	OK, TX, AR, LA, KY, TN, MS, AL, MD, DE, WV, VA, NC, SC, GA, FL	.387	---	0/1	4090
Northeast	NY, PA, NJ, ME, VT, NH, MA, CT, RI	.184	---	0/1	4090
Religion					
Protestant (omitted)		.438	---	0/1	4018
Catholic		.182	---	0/1	4018
Jewish		.025	---	0/1	4018
Eastern religion		.013	---	0/1	4018
Muslim		.010	---	0/1	4018
Orthodox		.006	---	0/1	4018
Other religion		.063	---	0/1	4018

No religion		.260	---	0/1	4018
Religiosity	4-point scale of "How religious do you consider yourself to be?", from "not at all" to "very"	1.357	1.075	0/3	4018
Religious satisfaction	5-point scale of satisfaction with religious services, from "not at all" to "very much"	1.767	1.528	0/4	3840
Religious community	6-item scale of frequency of taking part in religious activities, from "never" to "more than once a week"	1.238	1.528	0/5	3948
Religious attendance	6-point scale of frequency of attending religious services, from "never" to "more than once a week"	1.677	1.709	0/5	3980
Frequency of prayer	6-point scale of frequency of prayer, from "never" to "several times a day"	2.644	1.990	0/5	3899
Liberal-conservative scale	9-point bipolar scale, from "extremely liberal" to "moderate" to "extremely conservative"	3.986	2.568	0/8	3754
Party affiliation					
Democrat (omitted)	Respondent answered strong, moderate, or closer to Democrat on unfolding scale	.387	---	0/1	3903
Independent	Respondent answered independent	.289	---	0/1	3903
Republican	Respondent answered strong, moderate, or closer to Republican on unfolding scale	.303	---	0/1	3903
Other political orientation	Respondent answered other political orientation	.020	---	0/1	3903

Table A2. Short-Form Common Secrets Questionnaire (CSQ)

Coding	Survey item
Other-harm	Hurting another person emotionally or physically
Drug use	Using or being addicted to illegal drugs
Addiction	Being addicted to other things
Illegal	Engaging in something illegal other than using drugs
Self-harm	Physically harming yourself
Abortion	Having an abortion
Violate trust	Violating someone's trust
Romantic desire	Having romantic desires about someone
Romantic discontent	Being unhappy in a romantic relationship
Infidelity	Committing sexual or emotional infidelity
Social discontent	Disliking a friend
Personal discontent	Being dissatisfied with yourself
Mental health	Mental health issues
Work cheating	Cheating or doing something improper at work or school
Work discontent	Being dissatisfied with work or school
Surprise	Planning a surprise for someone
Hobby	Having a certain hobby or possession
Hidden relationship	Prior relationship history
Family detail	A detail about your family
Pregnancy	Pregnancy
Sexual orientation	Sexual orientation/gender identity
Sexual behavior	Sexual behavior
Finances	Finances
Preference	A belief or preference other than listed above
Trauma	Having a traumatic experience other than listed above
Other-open-ended	Other (please specify)

Note : Survey items shown in response to the survey question "Have you concealed information from a friend or family member in the past year? (for example, kept a secret from, hid something, or lied to)". If yes, "What topic did you conceal information about?"

Supplemental Materials

A Mouthful of Diamonds and a Pocketful of Secrets: Mapping Concealment and its Normative Foundations

Contents

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1 Latent Class Analysis

1.1 Analytic strategy

LCA. We used latent class analysis (LCA) to identify subgroups of concealers among respondents (Collins and Lanza 2009; Lazarsfeld and Henry 1968; McCutcheon 1987). LCA is mixture modeling approach, like latent curve growth analysis, where the aim is to model heterogeneity between persons in a population. It does this by analyzing patterns of responses, finding common “types” or “classes”, and probabilistically assigning individuals to classes (Muthen and Muthen 2017). This results in subgroups of individuals who are similar to each other in a class but distinct from those in other classes. The particular goal of LCA is to identify heterogeneous subgroups of concealers who constitute different, unmeasured classes of individuals.

Our LCA can thus be described by the following equation:

$$\pi_{A,\dots,Z\Delta}^{A,\dots,Z\Delta} = \sum_{\delta} \pi_{\delta}^{\Delta} \pi_a^{A|\Delta}, \dots, \pi_z^{Z|\Delta} \quad (1)$$

where Δ is the latent class variable, π_{δ}^{Δ} is the size of class δ , $A, \dots, Z$ are topics of concealment, and, for example, $\pi_a^{A|\Delta}$ is the probability that topic A takes on value a in the latent class δ . Equation 1 describes the probability of observing any combination of values $a, \dots, z$ as depending solely on the differences in latent class sizes (π_{δ}^{Δ}) combined with how different these classes are in terms of the observed topics of concealment. Within the classes, the variables are assumed conditionally independent, which is reflected in the product $\pi_a^{A|\Delta}, \dots, \pi_z^{Z|\Delta}$. The LCAs were estimated with full information maximum likelihood with robust standard errors (FIML) in Mplus 8.2. The maximum number of iterations was set to 5000, the maximum number of iterations for the EM algorithm was set to 500, the number of initial stage random starts was set to 100, the number of final stage optimizations was set to 10, and the number of initial stage iterations was set to 10.

1.2 Model selection

Following (Collins and Lanza 2009), we determined the best-fitting latent class solution based on statistical criteria, parsimony, and interpretability. Statistically, we relied on five criteria: (1) the Bayesian information criteria (BIC), which provides a relative gauge of model fit for competing model solutions with different numbers of parameters; (2) an entropy measure that ranges from 0 to 1, with higher entropy values indicating less classification error and better latent class separation; (3) a Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT), which computes a likelihood ratio test for $k - 1$ (H_0) versus k classes (H_a). A p -value less than .05 suggests that a k class model is a statistically significant improvement over a $k - 1$ class model; (4) a Vuong-Lo-Mendell-Rubin Likelihood Ratio test, which like the LMR-LRT computes a likelihood ratio test for $k - 1$ (H_0) versus k classes (H_a); and, (5) posterior probabilities of latent class membership, with higher probabilities indicating less classification error among individuals within their respective latent classes. For both the entropy measure and average probabilities of class membership, values closer to 1 indicate good model fit. To evaluate parsimony and interpretability, we rely on verbal summaries of the various latent class solutions.

A total of seven models are shown in Table S1. We can see that the one-class solution yields the highest BIC, while the five-class solution yields the lowest BIC. Although the BIC suggests that the five-class model is the optimal solution, it is important to note that the BIC represents only one criterion. Like other fit statistics, the BIC favors a greater number of latent classes as the sample size increases (Collins and Lanza 2009). As a result, we turn to entropy and the two likelihood ratio tests (i.e., VLMR-LRT and LMR-LRT). Except for the entropy score, we can see that the VLMR-LRT and LMR-LRT support conclusions drawn from the BIC: the five-class solution is statistically different from the four-class solution, but the likelihood ratio tests for the six-class solution are statistically non-significant (indicating that the six-class solution is not an improvement over the five-class solution).

Statistically, the optimal solution appears to be the five-class solution, which is further supported by the posterior probabilities of latent class membership. Except for C#4, Table S2 shows that the posterior probabilities of latent class membership on the diagonals are between .721 and .933 for the five-class solution. The posterior probability of C#4 is .616, which indicates some classification error for this subgroup. Note that the latent class solutions with the diagonal posterior probabilities closest to 1 are the one-, two-, and three-class solutions. Statistically, however, these solutions fit the data worse than the five-class solution. Also note that the posterior probabilities on the diagonals dramatically decrease for the six- and seven-class solutions.

Although not shown, we inspected the types of classes to emerge between the four-, five-, and six-class solutions. It is not until the five-class solution that we observe the “white lie concealer” subgroup. A four-class solution includes the “persistently high concealer”, “discontent concealer”, and “sex and romance concealer”, but lumps the “white lie concealer” and “persistently low concealer” together. Likewise, the six-class solution yields classes similar to those observed in the five-class solution, but includes a new “persistently moderate concealer” subgroup. In this new subgroup, individuals appear to conceal just about every topic but at slightly higher probabilities than the “persistently low concealer”. Note that only 6 percent of respondents are classified in this new class, which appears to add little to our understanding of subgroups of concealers.

Taken together, we selected the five-class solution for several reasons. First, the five-class solution is supported by various theories of concealment: models in criminology, economics, and psychology predict that much of the population can be divided into two distinct classes of concealers—those who are honest and those who conceal (Gneezy 2005; Gottfredson and Hirschi 1990; Slepian et al. 2017)—while research in sociology identifies groups of individuals who conceal certain matters and topics (Anthony et al. 2017;

Cowan 2014; Cowan and Baldassarri 2018; Kitts 2013; Mollborn 2017; Schalet 2011; Small 2017; Wherry et al. 2019). Second, the extra classes in the higher-order solutions provide no additional theoretical knowledge beyond the five-class solution. Third, the five-class solution has the best combination of fit statistics (i.e., BIC, entropy, likelihood ratio tests, and posterior probabilities). Therefore, the five-class solution has the best balance of model fit and classification error, it is more parsimonious than the higher-order solutions (i.e., six and seven), and its interpretability is supported by theory.

Table S1. Fit Indices for Latent Class Models of Concealment

	1 Class	2 Class	3 Class	4 Class	5 Class	6 Class	7 Class
BIC	53430	48605	47936	47794	47786	47862	47967
Entropy		.844	.814	.781	.696	.708	.723
VLMR-LRT		$p < .001$	$p < .001$	$p = .003$	$p = .026$	$p = .098$	$p = .696$
LMR-LRT		$p < .001$	$p < .001$	$p = .003$	$p = .027$	$p = .099$	$p = .697$

Note : VLMR-LRT = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test; LMR-LRT = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test. Both the VLMR-LRT and LMR-LRT compute likelihood ratio tests for $k - 1$ (H_0) versus k classes.

Table S2. Classification Probabilities for the Most Likely Latent Class Membership (Column) by Latent Class (Row)

	C#1	C#2	C#3	C#4	C#5	C#6	C#7
1-Class LCA							
Latent Class #1	1.000						
2-Class LCA							
Latent Class #1	.866	.134					
Latent Class #2	.021	.979					
3-Class LCA							
Latent Class #1	.848	.152	.000				
Latent Class #2	.005	.848	.147				
Latent Class #3	.000	.044	.956				
4-Class LCA							
Latent Class #1	.746	.059	.191	.004			
Latent Class #2	.184	.709	.095	.012			
Latent Class #3	.034	.008	.959	.000			
Latent Class #4	.041	.070	.000	.889			
5-Class LCA							
Latent Class #1	.902	.038	.058	.002	.000		
Latent Class #2	.007	.746	.068	.156	.022		
Latent Class #3	.008	.072	.721	.148	.051		
Latent Class #4	.000	.038	.026	.616	.320		
Latent Class #5	.000	.003	.004	.061	.933		
6-Class LCA							
Latent Class #1	.924	.071	.000	.005	.000	.000	
Latent Class #2	.017	.739	.092	.075	.074	.003	
Latent Class #3	.000	.010	.679	.029	.016	.266	
Latent Class #4	.002	.047	.176	.736	.026	.013	
Latent Class #5	.000	.041	.219	.042	.583	.115	
Latent Class #6	.000	.000	.086	.001	.003	.910	
7-Class LCA							
Latent Class #1	.929	.015	.000	.001	.055	.000	.000
Latent Class #2	.004	.703	.000	.133	.098	.061	.001
Latent Class #3	.000	.000	.929	.002	.000	.056	.013
Latent Class #4	.000	.015	.041	.709	.039	.171	.025
Latent Class #5	.006	.016	.006	.063	.744	.101	.064
Latent Class #6	.000	.002	.286	.029	.011	.641	.030
Latent Class #7	.000	.000	.182	.033	.035	.144	.607

Note : Posterior probabilities of latent class membership on the diagonals in **bold**.

2 Multiple Imputation

2.1 Multiple imputation with chained equations

For our negative binomial and multinomial logit regression models, we handled missing data via multiple imputation by chained equations (MICE). MICE was used as many of the imputed variables take on nominal or ordinal values. Because of this, FIML estimation was abandoned. Note that FIML for limited dependent variables requires numerical integration, which is computationally intensive for a large number of dimensions. As the number of independent variables with missing data increases, so too do the dimensions required for numerical integration.

The following variables were imputed using MICE (percent missing in parentheses): self-control (0.02), norm of concealment (0.02), desire for autonomy (0.05), region (0.05), GCOS-Autonomy Scale (0.10), GCOS-Controlled Scale (0.15), GCOS-Impersonal Scale (0.22), marital status (0.46), race (0.61), level of education (0.64), religion (1.81), religiosity (1.81), religious attendance (2.74), ln(per capita household income) (3.15), religious community (3.52), party affiliation (4.62), frequency of prayer (4.72), religious satisfaction (6.16), concealment (6.40), five-class solution (6.40), and liberal-conservative scale (8.26). All variables observed in Table A1 were used in the imputation models. Variables with the smallest proportion of missing observations were imputed first followed sequentially by variables with greater amounts of missingness. Age, gender, date of completion, and survey duration were used as auxiliary variables in each imputation model.

2.2 MI estimates

Table S3. Results of Negative Binomial Regression Models Predicting Concealment

	Model 1
	Coef.
Norm of Concealment	.281*** (.028)
Constant	.059 (.361)
Controls	Yes
N	4,092
α	.644
Average RVI	.035
Largest FMI	.107

* $p < .05$, ** $p < .01$, *** $p < .001$

Note : standard errors in parentheses.

Dispersion modeled as a function of the expected mean. Imputed data sets (m) = 50. Multiple imputation by chained equations (MICE) was used as many of the imputed variables take on nominal or ordinal values.

Table S4. Results of Multinomial Logistic Regression Models Predicting Latent Class Membership

	C#1 vs. C#5	C#2 vs. C#5	C#3 vs. C#5	C#4 vs. C#5
Norm of Concealment	.647*** (.176)	.484*** (.099)	.485*** (.094)	.389*** (.063)
Constant	-4.844* (2.000)	-.901 (1.152)	-1.621 (1.096)	-1.744* (.799)

* $p < .05$, ** $p < .01$, *** $p < .001$

Note : Relative log-odds (standard errors). $N = 4,092$. Control variables included in the model.

Imputed data sets (m) = 50. Average RVI = .076, Largest FMI = .264. Multiple imputation by chained equations (MICE) was used as many of the imputed variables take on nominal or ordinal values.

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