The Experience of Secrecy

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The concept of secrecy calls to mind a dyadic interaction: one person hiding a secret from another during a conversation or social interaction. The current work, however, demonstrates that this aspect of secrecy is rather rare. Taking a broader view of secrecy as the intent to conceal information, which only sometimes necessitates concealment, yields a new psychology of secrecy. Ten studies demonstrate the secrets people have, what it is like to have a secret, and what about secrecy is related to lower well-being. We demonstrate that people catch themselves spontaneously thinking about their secrets—they mind-wander to them—far more frequently than they encounter social situations that require active concealment of those secrets. Moreover, independent of concealment frequency, the frequency of mind-wandering to secrets predicts lower well-being (whereas the converse was not the case). We explore the diversity of secrets people have and the harmful effects of spontaneously thinking about those secrets in both recall tasks and in longitudinal designs, analyzing more than 13,000 secrets across our participant samples, with outcomes for relationship satisfaction, authenticity, well-being, and physical health. These results demonstrate that secrecy can be studied by having people think about their secrets, and have implications for designing interventions to help people cope with secrecy.

Keywords: secrecy, concealment, mind-wandering, relationships, well-being

Supplemental materials: http://dx.doi.org/10.1037/pspa0000085.supp

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People keep secrets in all walks of life. They keep them from their friends, partners, family members, and coworkers. In the current work, we demonstrate that secrecy is incredibly common, but sorely understudied and even misunderstood. Nearly everyone has secrets, but prior work has done little to characterize what secrets people commonly have, what having a secret is like, and what is harmful about having secrets. For example, only a handful of articles in the past 50 years of the social psychological literature have secrecy/secret(s) in their titles, those on keeping secrets (Goncalo, Vincent, & Krause, 2015; Lane & Wegner, 1995; Lehmiller, 2009; Wegner, Lane, & Dimitri, 1994) and those on revealing secrets (Kelly, Klusas, von Weiss, & Kenny, 2001; Slepian, Masicampo, & Ambady, 2014; Taylor, DeSoto, & Lieb, 1979; Yovetich & Drigotas, 1999).[1]

We believe two major reasons explain the lack of research on secrecy. First, secrecy seems difficult to study. As researchers, we want to measure and observe the effects of secrets, but by their very nature, secrets are hidden from plain view. Second, and relatedly, we argue that prior work has too narrowly defined secrecy. Bok (1983) defined secrecy as "intentional concealment," and prior treatments of secrecy have consistently used this definition. For instance, secrecy has been described as the deliberate hiding of information from at least one other person (Kelly, 2002), active inhibition of disclosure (Pennebaker, 1989), and intentional deception via an act of omission (Lane & Wegner, 1995).

These definitions call to mind a dyadic interaction, wherein Person A is interacting with Person B, and during that interaction, Person A is actively hiding information from Person B, whether by an act of omission (withholding information, i.e., not sharing a piece of information), an act of commission (deception, i.e., providing false information), or some combination of the two. These definitions suggest an individual has a secret only in the presence of someone from whom he or she is trying to actively withhold the information, and that secrecy cannot take place when one is alone. Correspondingly, secrecy has typically been studied in this way.

Prior Treatments of Secrecy

Of the few experimental studies on secrecy, most utilize what we call a *secrecy-concealment* manipulation. This approach involves recruiting a group of people who all share the same devalued identity, and examining the effects of actively concealing cues

This article was published Online First May 8, 2017.

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[1] Our literature search used search terms of "secret," "secrets," and "secrecy" in the titles of articles in *Journal of Personality and Social Psychology*, *Personality and Social Psychology Bulletin*, *Journal of Experimental Social Psychology*, *Social Psychological and Personality Science*, *Social Cognition*, *Basic and Applied Social Psychology*, *Journal of Applied Social Psychology*, *Social Psychology*, *European Journal of Social Psychology*, and *British Journal of Social Psychology*.

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to this identity in social interactions. For instance, Smart and Wegner (1999) asked women with eating disorders to conceal their disorder (or not) when interacting with a confederate. Using this approach, researchers have established that hiding something during a social interaction—in this case, a stigmatized identity—is tiring, perhaps as a consequence of the simultaneous cognitive processes of monitoring for and suppressing leakages of information (Critcher & Ferguson, 2014; Smart & Wegner, 1999). This approach has demonstrated how the threat and consequences of a concealable stigma's discovery leads to unhealthy vigilance during social interactions (Smart & Wegner, 1999) and results in negative outcomes, including lower interaction quality, increased anxiety, and increased negative self-evaluations (Newheiser & Barreto, 2014; Pachankis, 2007; Quinn & Chaudoir, 2009).

One issue with relying exclusively on the secret-concealment manipulation described above is that the results only generalize to the population of individuals who have that secret (e.g., sexual orientation, an eating disorder). To address this limitation, researchers have employed a second approach that we refer to as a *secrecy-assignment* manipulation. This approach involves inventing rather mundane secrets in laboratory settings and testing for the effect of their concealment (e.g., keep the word "mountain" a secret; Lane & Wegner, 1995). This approach has been used, for example, to establish the effortful process of trying to monitor for leakages of information in social exchanges (see Lane & Wegner, 1995). This approach brings the advantage of experimentally assigning all participants to the same secret, permitting researchers to control the exact nature of the secret and when it is concealed (i.e., in the lab). However, the downside of this approach is that it assigns participants a secret that is likely to be personally trivial compared to the secrets they choose to keep on their own. That is, this approach permits testing for the effects of withholding information that one has been instructed to keep from others, but not the effects of volitionally choosing to keep some piece of personal information secret from others. Moreover, the results obtained using this approach may not generalize beyond the specific secret induced in the laboratory. It seems risky to assume that the effect of withholding the word "mountain" from others within a social interaction is no different than the effect of choosing to keep one's infidelity a secret from a spouse.

For our purposes, it is important to highlight that both of the aforementioned manipulations of secrecy—secret concealment and secret assignment—implicitly assume secrecy is harmful because of its taxing effects in social interactions (e.g., processes of concealment and vigilance toward information leakages). We propose that by conceiving of secrecy as an act of concealment that occurs during the course of social interactions, researchers run the risk of overlooking important *intra*personal dynamics and the broader context in which secrecy occurs. Prior conceptions of secrecy (as only happening within *inter*personal interactions) have constrained how secrecy has been studied, and relatedly what we know about secrecy. In this paper, we introduce a broader conception of secrecy and demonstrate its implications. Moreover, we introduce a method to examine the many secrets people have, and utilize paradigms that enable generalizations far beyond a specific population or secret.

A New Theory of Secrecy

In their seminal social psychological work on secrecy, Lane and Wegner (1995) suggested that, in principle, "secrecy is something one can do alone in a room" (p. 237). Whereas the authors suggested this form of secrecy would be a marginal one, we are inspired by it, and believe it is a major one. That is, we suggest the most common form secrecy takes is a spontaneous thought about one's secret outside of relevant social interactions (i.e., in moments when it is irrelevant to the task at hand). We propose that a fundamental redefinition of secrecy is required to make headway on learning what secrecy is like and what is harmful about secrecy.

A Broader Definition of Secrecy

In the current work, we define secrecy as an *intention* to conceal information from one or more individuals. Importantly, and marking a critical departure from conceptions of secrecy as active concealment, an *intention* to keep information secret exists even when the person from whom the secret is being kept is not physically present.

The conception of secrecy as the intention to conceal information from one or more individuals has important, novel features. First, it does not reference how people keep a secret. Contrary to prior treatments of secrecy and lay intuition, we suggest that keeping information hidden during a social interaction may not be the defining feature of secrecy. Suggesting secrecy is equivalent to inhibiting information within a conversation is problematic because this kind of social inhibition is not unique to secrecy. People inhibit aspects of speech during social interactions for a myriad of reasons, including norms of politeness, political correctness, or self-presentation, none of which require an explicit intention to conceal personal information from others.

For instance, imagine a White and a Black college student are tasked with discussing issues related to race (e.g., campus diversity). Even without changing his or her offered opinion on the conversation topic, a White student in this context may be more careful in articulating opinions, requiring inhibition of one's natural responses and conversation style. Indeed, this exact situation is fatiguing (Richeson & Trawalter, 2005). This social interaction may require inhibition, but it would seem odd to suggest it is an example of secret keeping.

Or imagine an individual is introduced to someone who was recently hired by the company she works for, and something about the interaction makes her ponder her new coworker's sexual orientation. Simply asking her new coworker a question about his sexual orientation would be inappropriate, so she *inhibits* what she considers an innocent inquiry. To suggest she is keeping a secret from her coworker would seem off the mark; rather, she is conscious of what is appropriate to ask others in this context.

Instead of focusing on inhibition, our definition focuses on the *intent* to conceal information from one or more individuals. We suggest the intention to conceal, and not the concealment itself, is central to secrecy. We offer one last example. Many academics have found themselves in a situation where the intent to conceal does not require actual concealment: during interviews for academic faculty positions. A job candidate may wish to conceal the fact that he or she has no other interviews, and even prepares responses for the feared question, "Where else are you interviewing?" The job candidate may intend to conceal this information,

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but then, on the big day, is never asked. He or she may never need to actively conceal this information, and yet we propose this job candidate still has a secret.

We also suggest the conception of secrecy that we propose here is more consistent with the timeline of secrets. We believe an individual *has* a secret the moment he or she decides to withhold information about an episode or act from another person. The secret exists from that point in time, often before the individual is in the presence of someone from whom they wish to conceal the secret. The shift from active concealment to the intention to conceal changes the focus of when and where secrecy takes place. It allows secrecy to start before concealment ever happens (e.g., if someone commits infidelity while on a business trip, and intends to keep the secret, one has the secret immediately, days before one might interact with one's spouse). This redefinition of secrecy suggests that secrets that do not necessitate frequent concealment may still be thought about frequently, which may be harmful to one's well-being.

A Broader View of Secrecy

Our new conception of secrecy allows for another avenue by which secrecy may be harmful—people might find their minds have a penchant for wandering to their secrets. And, importantly, repeatedly catching oneself thinking about one's secrets in irrelevant moments could prove just as harmful as actively concealing them within social interactions.

Though the colloquial use of the term "mind-wandering" connotes a random meandering, scholars have increasingly noted the mind is particularly likely to distract itself from ongoing tasks with thoughts about unresolved personal concerns (Klinger, 2013; Mason, Bar, & Macrae, 2007; Song & Wang, 2012; Stawarczyk et al., 2013; Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011; Wilson et al., 2014). This body of evidence is consistent with the possibility that people frequently catch themselves thinking about an undisclosed health problem while washing the dishes, about a secret infidelity while stuck in traffic, and so forth. Given that people are estimated to spend between a third and half of their waking life entertaining these off-task thoughts (Kane et al., 2007; Killingsworth & Gilbert, 2010), it follows logically that secret-related thoughts should frequently return to people's thinking.

We suggest that for many categories of secrets, people frequently catch themselves *spontaneously* thinking about the secret *outside* of concealment settings more frequently than they work to actively conceal the secret in relevant social interactions. Such a result would suggest that one of the problems with having secrets is that they distract us from current activities. Thus, a commitment to withhold information about an episode may increase the accessibility of the episode in memory and thus the likelihood that people spontaneously think about the event. Furthermore, to the extent that the secret serves as a reminder that one is being disingenuous, a random thought about it could lead to feelings of inauthenticity, and thereby decrease feelings of well-being (see Ryan & Deci, 2001).

If one studies secrecy from the broader perspective of what it is like to *have* a secret, rather than narrowly focus on what it is like to *keep* a secret, then it follows that there may be avenues other than active concealment through which secrecy harms well-being. We suggest that one such avenue might be mind-wandering to the secret outside of concealment settings, which could prove just as harmful as actively concealing secrets, if not more. The current work considers secrecy in this broader sense, and uniquely compares these two routes through which secrecy could harm well-being. Put more simply, we examine what secrets people have, what is it actually like to have a secret, and to what effect. In sum, we define secrecy as the intention to conceal information from at least one other person. Sometimes this intention will not need to be acted on, which in no way changes the fact that one wishes to keep the information secret. If active concealment of secrets is relatively infrequent, and not a necessary component to having a secret, it may not be the key reason secrets have deleterious effects on well-being.

Mind-Wandering

Mind-wandering represents a decoupling between the locus of one's attention and the processing of information related to a current goal (Smallwood & Schooler, 2006). Mind-wandering episodes are triggered by the presence of internal (e.g., Smallwood, Fishman, & Schooler, 2007) or external cues (e.g., Thomson, Besner, & Smilek, 2013) that are irrelevant to the task at hand.

The Nature of Mind-Wandering

Several scholars have attempted to measure and describe where the mind wanders in off-task moments. For instance, people frequently drift from thinking about a current task to thinking about the future. Although some of this spontaneous future thinking entails simulating possible future episodes (e.g., Mason, Bar, & Macrae, 2007; Smallwood, Nind, & O'Connor, 2009; Smallwood, Schooler, Turk, Cunningham, Burns, & Macrae, 2011), a sizable portion of it appears to include thinking about unresolved issues and outstanding intentions (cf. Current Concern Theory; Klinger, 1987; see also Mason & Reinholtz, 2015). People catch themselves mind-wandering to intentions they committed to pursue in the past that to this point remain unfulfilled, whether they be trivial needs (e.g., replace the empty carton of milk) or more substantive ones (e.g., pay overdue bills). As Klinger highlights, committing to the pursuit of a goal is a discrete event that changes people. It makes them more sensitive to cues in their internal or external environment that are related to the goal (e.g., Bargh, 1997; Bruner, 1957; Liberman, Förster, & Higgins, 2007; Higgins & King, 1981; Hoelscher, Klinger, & Barta, 1981; Srull & Wyer, 1989) and, critically, it also leads to increased mind-wandering to the goal (e.g., Klinger, 1978; Stawarczyk et al., 2013; Stawarczyk et al., 2011), especially if the goal is important (Klinger, 2014).

The finding that people frequently and unintentionally recall unfulfilled goals and unresolved personal concerns dovetails with evidence that intentions have a special processing status in memory. For instance, Anderson (1957) argued that unfulfilled goals require less rehearsal to maintain in memory than other information. Similarly, prospective memory researchers have long maintained that intentions have a heightened accessibility in memory, and that this special status translates to a heightened sensitivity to cues in the environment that are related to the to-be-fulfilled goal (Gollwitzer, 1996; Gollwitzer & Moskowitz, 1996; Goshke & Kuhl, 1996; Koriat, Ben-Zur, & Nussbaum, 1990; Lewin, 1951), and biases memory retrieval processes toward accessing goal-related information in memory (Ach, 1935; Martin & Tesser, 1996).

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To the extent that it competes with a current activity for limited mental resources, mind-wandering episodes hurt ongoing task performance (Casner & Schooler, 2014; Galéra et al., 2012; Mason et al., 2007; Mrazek et al., 2012; Schooler et al., 2004; Szpunar et al., 2013). Mind-wandering may also have affective consequences (Klinger, 2013; Poerio & Smallwood, 2016; for review, see Mason, Brown, Mar, & Smallwood, 2013). There is evidence that negative affect frequently follows from failures to control attention (e.g., Carriere, Cheyne, & Smilek, 2008; Cheyne, Carriere, & Smilek, 2006), and frequent mind-wandering predicts negative affect (Killingsworth & Gilbert, 2010; Mar, Mason, & Litvack, 2012; Stawarczyk, Majerus, Van der Linden, & D'Argembeau, 2012).

Although mind-wandering may influence an individual's mood independent of the topic of the intruding thought, there is reason to think that the content of what people reflect on matters. For instance, catching your mind wandering to an outstanding goal that may not be met (e.g., a quarterly sales goal, losing 10 pounds for your wedding, etc.) or that is inherently aversive (e.g., a tooth that needs to be fixed, a pile of dirty dishes, etc.) may worsen one's mood (Ruby, Smallwood, Engen, & Singer, 2013; Smallwood, 2013; Watkins, 2008). If the mind wanders toward feelings of unresolved social rejection, this would also serve to worsen mood (Killingsworth & Gilbert, 2010; Mar et al., 2012). Indeed, the vast literature on depression suggests that the tendency to passively and repetitively think about negative feelings predicts both the onset and the length of depressive episodes (cf., Just & Alloy, 1997; Nolen-Hoeksema, 2000; Roberts, Gilboa, & Gotlib, 1998). Additionally, negative moods are associated with increased mind-wandering (e.g., Smallwood et al., 2003; Smallwood, O'Connor, & Heim, 2005). To the extent that a negative mood directs individuals' attention to their concerns and worries, this will only increase the mental spotlight on those and related worries (Poerio, Totterdell, & Miles, 2013; Segerstrom, Stanton, Alden, & Shortridge, 2003; Smallwood, Fitzgerald, Miles, & Phillips, 2009).

Current theorizing about mind-wandering emphasizes that it is not inherently maladaptive; rather, it has some adaptive properties, some of which directly relate to the tendency for people to mind-wander to unresolved issues and goals. Remembering to perform outstanding goals is considered the most common everyday memory failure (cf. Harris, 1984; McDaniel & Einstein, 2007), and there is evidence that mind-wandering to outstanding goals confers mnemonic advantages. Mason and Reinholtz (2015) demonstrate that mind-wandering to an unresolved intention increases the likelihood of successfully seizing future chances to realize the aspiration. Indeed, mind-wandering may help individuals refine their goal pursuits by making initially abstract goals more concrete (Medea et al., 2016; Ruby, Smallwood, Sackur, & Singer, 2013). Mind-wandering, for instance, facilitates creative problem-solving (Baird et al., 2012), reminiscent of early suggestions that incubation enhances insight (Schooler & Melcher, 1995).

Mind-wandering can also increase positive affect when it involves positive contents. Mind-wandering toward rewarding and meaningful aspects of one's social relationships can promote feelings of connectedness and even love (Poerio, Totterdell, Emerson, & Miles, 2015, 2016a, 2016b). Likewise, mind-wandering can be a source of entertainment for people when it occurs while they are forced to perform dull tasks, or restricted to impoverished sensory environments (Fisher, 1987; Molstad, 1986; Singer, 1961). Under these circumstances mind-wandering may be associated with heightened activity in the brain's reward regions, at least among people who enjoy doing it (see Mason et al., 2013).

Mind-Wandering, Secrecy, and Authenticity

The mind is prone to wander toward unfulfilled goals, outstanding intentions, unsolved problems, and unresolved personal concerns. Secrecy maps onto these aspects as secrets concern the intention to withhold information from others, and thus are an outstanding intention, and may concern unresolved personal issues that require problem solving. Thus, there are many reasons to expect the mind to wander toward thoughts of secrets, and this may be a major experience people have with secrecy.

We predict that the frequency of mind-wandering to a secret will have important implications for well-being. Although we acknowledge that when people mind-wander to secrets, this may involve mind-wandering to negative events, wherein frequent thinking about negative episodes should diminish mood (e.g., Poerio et al., 2013), and although we agree that noticing that one's attention has strayed from where it was tasked can be frustrating and thus also diminish one's mood (e.g., Schooler et al., 2011), we also argue that mind-wandering specifically to secrets can hurt well-being outside of these affective routes.

That is, we propose that mind-wandering to secrets (relative to other negative life events) will have an added and very unique downside: It reminds people that they are being inauthentic. Secrets are, fundamentally, information we intend to hold back from the people who populate our social worlds. Holding back this personal information, the very information we normally share and disclose—to connect with others and reveal who we are and what we are like—should serve only to make us feel that we are holding back part of ourself, and being inauthentic.

Although intuition might lead one to assume that mind-wandering to a secret might predict lower well-being only through worsening mood, such a hypothesis presumes a strictly hedonic conception of well-being. It is becoming increasingly recognized that well-being is also significantly based in eudaimonic elements (i.e., finding meaning, living in accordance with one's authentic self; Ryan & Deci, 2001). We believe that mind-wandering to secrets diminishes this aspect of well-being. Mind-wandering to one's secrets, particularly those from close others, is a reminder that one is holding back from those close others, and thus not upholding relationship standards and values, which are central aspects of felt authenticity (e.g., Lopez & Rice, 2006).

Overview and Methodological Approach

The current work puts forth a new theory of secrecy. We define secrecy as the intention to conceal information, which suggests that secrecy can take place outside of active concealment. We suggest that a desire to keep information secret may not only lead people to conceal within social interactions but also lead them to experience more frequent thoughts about the secret outside of concealment settings (i.e., outside of relevant social interactions).

From this theory, we derive novel predictions: First, people catch themselves mind-wandering to secrets outside of relevant concealment settings more frequently than they encounter social situations that necessitate active concealment of secrets. Second, the frequency with which people mind-wander to their secrets

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predicts lower well-being, independent of the frequency with which they actively conceal their secrets. Before directly testing these predictions, we first developed a method to uncover the categories of secrets people commonly keep.

The Current Work

In the first three studies, we provide participants with 38 common categories of secrets as identified with a new method (described below), and ask participants to indicate whether they have ever had the requisite experience and, if so, if it is a secret. This approach allows participants to easily indicate whether they have multiple secrets (from these common categories), and allows us to provide the first comprehensive data on the frequencies with which people have common secrets (Studies 1–3).

Studies 2 and 3 present exact replications of Study 1, but then include additional measures that ask participants how frequently they mind-wander to and conceal each of these secrets, and to what extent each of these secrets influence well-being. Study 2 finds that participants mind-wander to secrets in irrelevant settings (i.e., outside of concealment contexts) more than they conceal such secrets within social interactions, and moreover, when entering both as simultaneous predictors of well-being, only the former (and not the latter) predicts lower well-being. Study 3 then provides an exact replication of this finding (i.e., mind-wandering to secrets is more common and consequential than concealing secrets), but also finds this effect above a variety of statistical controls, and demonstrates the results extend to predicting lower physical health. Studies 4–5 demonstrate the current effects in a multi-international sample (i.e., over a hundred people hailing from over 29 different countries), demonstrating the effects are not specific to the population drawn from in Studies 1–3.

In a second set of studies, rather than constrain analyses to relatively common secrets, we ask participants to simply recall a current secret, allowing them—if they so desire—to think about an idiosyncratic secret they have. Moreover, these studies include not only cross-sectional approaches, but also longitudinal approaches, demonstrating effects over time (Studies 6–7). These studies also extend our findings to a new outcome, examining downstream results on relationship quality. Again, these studies find that what seems to be most harmful in having a secret is not episodes of active concealment, but instead frequency of mind-wandering to the secret.

Finally, Studies 8–10 present a more nuanced test of secrecy's contributions to well-being, examining a variety of contexts and the role of affect and authenticity. Yet again, these studies reveal that what is most harmful about secrecy is having one's mind wander to it frequently, not instances of having to conceal it. Moreover, the results demonstrate a route through which mind-wandering to secrets predicts lower well-being, independent of both state and trait negative affect. Unlike a hedonic model of well-being, a eudaimonic model of well-being focuses on how feelings of meaning and authenticity predict happiness (Ryan & Deci, 2001). Although secrets can concern negative events, what is more central is the intent to conceal from others. We find mind-wandering to this intent (vs. other negative self attributes) predicts feeling one is being inauthentic, which predicts lower-well-being, over and above other affective factors.

Participant Population and Setting

Two of our studies recruit, in-person, a diverse sample of tourists in a major metropolitan area, and eight studies use diverse online samples. This is in contrast to prior work on secrecy that often uses undergraduate participants. Not only are undergraduate samples "weird" (e.g., highly educated, wealthy; Henrich et al., 2010), their secrets can involve their relatively unique experiences (e.g., secrets about "drinking/partying"; Vangelisti, 1994).

Additionally, prior work on secrecy has been conducted in laboratory settings wherein participants may not feel entirely comfortable revealing their secrets. For these reasons, the current investigation largely conducts our studies in an anonymous online forum (Amazon's Mechanical Turk; MTurk), which has data quality equivalent to that of university undergraduate populations for short questionnaire-based research (Paolacci & Chandler, 2014; Paolacci, Chandler, & Ipeirotis, 2010). As a result, our samples are more representative of the U.S. population than are undergraduate samples (Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011). Our participants are more diverse, and therefore have a more diverse set of experiences about which they keep secret than typical undergraduate samples.

Furthermore, the online medium we use allows for complete anonymity when asking participants to recall their secrets. Laboratory studies conducted in person diminish anonymity and thereby comfort in revealing personal information, which presents problems in trying to ascertain what secrets people have and to what effect.

Studies 1–3: Having Versus Keeping Secrets: Frequencies, Well Being and General Health

Method

The Commons Secrets Questionnaire (CSQ). In the first set of studies, we provide participants with a list of categories of secrets, and ask whether they have each secret. An initial study surveyed 2,000 participants about a current secret they were keeping, from which common secrets emerged. We developed a questionnaire to measure the extent of secrecy across these common secrets (see Appendix).

We briefly outline the methods for identifying the categories of secrets. First, 1000 participants (539 male, 460 female, 1 unreported; M_{age} = 31.64 years, SD = 12.00) were asked to describe a secret that they were keeping. A trained research assistant reviewed all 1,000 responses and formulated an initial list of categories of secrets from these responses, with the goal of creating categories that were not too overly narrow, nor too broad, allowing us to capture important differences between categories.

During the course of classifying the secrets by the initial categories, categories were adjusted and revised. This process was repeated until a set of categories seemed to best capture the data, bringing similar responses into the same category, while also drawing distinctions that seemed meaningful to participants. For example, rather than make specific categories for different types of theft (e.g., shoplifting from a store vs. stealing money out of a known person's wallet), we simply labeled all such cases as "theft," which seemed to place participants into an informative category that captured meaningful similarities for participants who

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recalled such secrets. While such theft is unlawful, from participants' responses these were mostly small offenses in participants' views (e.g., receiving too much change at a counter), compared with other more serious offenses (e.g., committing fraud, driving while intoxicated). When a category was as frequent as a broader category it could fall in, we correspondingly gave it its own category to reflect its relative frequency. Thus, for this example, one category was "theft" (whether from a store, or a person) and another was "illegal" (more serious unlawful offenses that were not small instances of stealing). Of course, these could all constitute one category of unlawful behavior, but our choice about category creation was data-driven in the sense that if a category seemed frequent and distinct in participants' minds, then it received its own category. Likewise, the use of illegal drugs could be placed into the "illegal" category, but from participants' responses, it was the actual substance use that seemed significant (not simply that it was illegal, but that it was a mind-altering substance), and thus drug use also received its own category.

To provide one last example, it seemed clear form participants' responses that there was a distinction to be made between types of infidelity, whereby a line can be drawn between sexual behavior with someone other than one's partner and nonsexual behavior with someone other than one's partner (e.g., flirting, being very emotionally close with an ex-partner), and hence two categories were created, labeled "sexual infidelity" and "emotional infidelity" (which could also simply be called "non-sexual infidelity," but instead, labels were chosen from a more data-driven approach; i.e., this is a term participants tended to use).

After arriving at a final set of 38 categories, and coding the data accordingly, a second coder coded the 1,000 responses per those categories, and agreement (84.40%) was high. The category lines of course could be drawn in different places ad infinitum; that said, ongoing work suggests the category lines fit the data well. Most relevant for the current work is that agreement (82%) remained high when applying the coding scheme to a second dataset from which the coding was not derived ($N = 1000$; 532 male, 466 female, 2 unreported; $M_{age} = 31.28$ years, $SD = 10.56$).

The resulting categories of secrets, gathered from the 2,000 participants, are far more comprehensive than prior typologies of secrets.[2] The categories of secrets were: harming someone, drug use, a habit or addiction, theft, committing an illegal act, self-harm, having an abortion, an experience of trauma, telling a lie, violating someone's trust, romantic desire, romantic discontent, extra-relational thoughts, emotional infidelity, sexual infidelity, being the "other woman" or "other man" (i.e., in a relationship with someone who is themselves in a committed relationship), social discontent, physical discontent, mental health, cheating at work or school, poor performance at work or school, profession discontent, a marriage proposal, a surprise, a hobby, a hidden (monogamous) relationship, a family detail, pregnancy, sexual orientation, sexual behavior, not having sex, a preference, a belief or ideology, finances, secret (current or former) employment, an ambition, a counternormative behavior, and a personal story.

It is important to recognize that this measure does not capture every kind of personal secret (that would be impossible). Rather, we focused on common secrets. It is worth noting that one class of secrets that were not captured were other peoples' secrets. People in some cases are aware of others' secrets, and are keeping those secrets on behalf of others. These might operate very differently, and thus for a first take on secrecy we focus on the more common form of secrecy that people experience, which is the personal secrets people keep (we discuss how other kinds of secrets may differ in the General Discussion). In sum, these categories of secrets are data-driven and provide a first glimpse into the secrets people keep, but there are plenty other kinds of secrets worthy of study.

Study 1 method. In Study 1, we administered the Common Secrets Questionnaire (CSQ) to 200 participants ($M_{age} = 34.24$ years, $SD = 11.39$; 63% female[3]). The CSQ provides participants with a description of a set of experiences and asks respondents to indicate per each experience whether they have ever had it and, if so, if it is a secret. Response options were (a) never had the described experience, (b) have had the experience, but never kept it a secret, (c) have had the experience and once kept it a secret, but it is no longer secret, (d) have had the experience and keep it a secret from some people, and (e) have had the experience and keep it a secret from everyone. The exact wording ensured participants retrieved the most fitting secret for each of the 38 categories (see Appendix for exact wordings).

Study 2 method. Study 2's procedure was identical to that of Study 1 with one exception: after completing the Study 1 procedure, 200 participants ($M_{age} = 33.03$ years, $SD = 10.34$; 53% female) completed additional measures. Specifically, after the Study 1 procedure, per each secret participants indicated currently having, we asked them in a counterbalanced order (a) how many times in the past 30 days they were *not* with the person or persons from whom they were keeping the secret, but found themselves spontaneously thinking about it, and (b) how many times in the past 30 days they were interacting with the person or persons from whom they were keeping the secret, and felt they had to hide the secret from the individual (i.e., withhold the information in a social interaction).

To be clear, when we measure mind-wandering to one's secrets, we measure spontaneously thinking about a secret when it is *irrelevant* to the task at hand, that is, when one is *outside* of a concealment setting, and thus in this specific sense this would *never* occur during acts of concealment.

Lastly, we assessed well-being with a single item. We asked participants the extent to which keeping this secret affected their life and well-being on a scale ranging from −6 (*has made my life and well-being worse*) to 6 (*has made my life and well-being better*), with the midpoint 0 (*has had no effect on my life and well-being*).

Study 3 method. Study 3 recruited 200 participants ($M_{age} = 33.72$ years, $SD = 10.47$; 62% female) on MTurk, and was

[2] Prior typologies have been constructed using undergraduate samples and therefore consist primarily of secrets about sexual behaviors, romantic relationships, and instances of interpersonal alienation (Kelly et al., 2001). Other typologies capture broader motivations for keeping secrets (e.g., "offenses," "sins," "sorrows," "worries," Lane & Wegner) and not categories of secrets.

[3] The Study 1 computer program, by a programming error, did not record gender (Study 2 replicated this error). Consequently, when the program and procedure was replicated for Study 2, this programming error was also included. To recover this information, a large-scale study asked for participants' gender and age. When a participant's I.P. address and age matched, we assumed it was the same person, and thus recovered their gender. We recovered 63 Study 1 participants' gender (and 81 Study 2 participants' gender). The reported percent breakdowns on these samples are provided as estimates of the overall samples.

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identical to Study 2, but with additional control variables, and an additional outcome measure. To streamline presentation of the results, we report the results for what the studies have in common, demonstrating how Study 3 replicates Study 2. We then report the method and results of the additional Study 3 measures (see Study 3 Method Continued), which reveal that the prior analyses are robust to a variety of controls, and extend to a new outcome (in Study 3).

Results

Frequencies of secrets (Studies 1, 2 and 3). Recall that the items administered in Study 1 were identical to the items administered in the first parts of Studies 2 and 3, which thus constitute exact replications. To make it easy to compare results across the three studies, we concurrently report the findings from all three.

Extent of secrecy. Of the 200 participants in each study, 8 (Study 1), 8 (Study 2), and 5 (Study 3) indicated they did not *currently* have at least one of the 38 categories of secrets. Of remaining participants, 4, 5, and 3 (Studies 1, 2, 3, respectively) also indicated having *never* having had any of the categories of secrets. Thus, 96%, 96%, and 97.5% of the participants currently had a secret from at least one of the 38 categories identified with the CSQ, and only 2%, 2.5%, and 1.5% of participants indicated never having had any of the categories of secrets.

Participants have had approximately 20 of the 38 categories of experiences, 13 of which are currently secret, 4 of which were never secret, and 3 of which were once a secret but not any longer; the frequencies are highly reliable (see Table 1).

Frequency by secret. We next examined how frequently participants report having each secret. Figure 1 illustrates the frequency with which participants report having each of the 38 secrets aggregated across Studies 1–3 (see supplemental material for frequencies broken down by study). For each secret, we plotted the results by extent of secrecy (e.g., currently secret from all people; experienced but never secret, etc.) and sorted the secrets by the frequency with which participants reported currently keeping the secret from everyone. In each study, extra-relational thoughts, sexual behavior, a lie, and romantic desire are consistently the top secrets shared with no one, whereas abortion, sexual orientation, and marriage proposals are infrequently kept entirely to oneself.

Interpreting the results depicted in Figure 1 is complicated by the fact that some experiences are relatively rare. For example, many participants report having used illegal drugs or abused legal ones ("drug use"), but far fewer report having had an abortion. Thus, examining the likelihood of participants forming an intention to withhold the information from others, conditioned on actually having the experience, would be informative. This is plotted in aggregated form in Figure 2 (and broken down by study in the supplemental material). When restricting our analyses to participants who reported having had the relevant experience, extra-relational thoughts, a particular sexual behavior, and emotional infidelity are the secrets people most often keep to themselves, whereas drug use, work discontent, and surprises for other people are rarely kept entirely to oneself.

Mind-wandering versus hiding secrets, and well-being (Studies 2 and 3). The results thus far provide the first comprehensive glimpse into the contents and extent of people's secrecy. Addressing the latter is possible because the novel approach we adopted here allows participants to indicate that they have multiple secrets. Confirming that this design feature is desirable, and the commonality of secrecy, participants report that they currently have 13 of the 38 secrets on average (five of which they have never told someone about).

Studies 2 and 3 had an additional aim of measuring the frequency with which participants mind-wandered to (outside of concealment settings) and concealed (in social interactions) their secrets, and testing whether these frequencies predicted participants' well-being. We hypothesized that people think about secrets outside of concealment settings more frequently than they find themselves in social interactions that necessitate actively withholding the information. Furthermore, independent of the frequency with which people actively conceal a secret during a social interaction, we predict the more they spontaneously think about the secret outside of concealment settings, the lower their well-being will be.

Mind-wandering frequency is greater than concealing frequency.

Identifying outlying responses. Given that free responses of estimated frequencies are unbounded, we first examined whether responses were normal; they were not (Kolmogorov–Smirnov $D = .48$, $p < .0001$). We thus used the adjusted boxplot to identify outliers. The adjusted boxplot uses a robust skewness estimator to generate representations of the data, and outliers are identified without making parametric assumptions about the distribution of the data (Hubert & Vandervieren, 2008).[4]

For Study 2 [Study 3 in brackets], this method yielded a frequency cutoff of 62 [93]. The 7 [10] participants who had indicated thinking of or hiding secrets more than 62 [93] times in a month were considered outliers (excluding 30 [12] responses in total, across 7 [10] participants, leading to a loss of only 0.57% [0.44%] of the data).[5] We excluded another 32 [32] responses because something other than a numeric response to the frequency question was entered and thus could not be submitted to analysis.

Analyzing frequencies. We were thus left with 5,272 [5,226] responses for the 2,636 [2,613] secrets (from 192 [195] participants currently with secrets) for analysis. Rather than conduct a paired *t*-test,[6] which does account not for multiple participants reporting frequencies for multiple secrets, we analyzed the data via multilevel modeling.

[4] Standard-deviation based exclusion is problematic because the *SD* used to determine the cutoff is itself biased by extreme outliers (Hubert & Vandervieren, 2008; Seo, 2006). For highly skewed distributions, the adjusted boxplot method is more appropriate than the Tukey boxplot (or other methods based in *SD*s or interquartile ranges; Seo, 2006). When using other approaches, many points exceed the whiskers and are erroneously declared as outliers.

[5] Replacing the outlying responses with the cutoff point identified by the adjusted boxplot or the maximum value below the cutoff, leads to the same pattern of results and significance. We also find the same patterns of results and significance when using more standard outlier based-rules that use either *SD*s or interquartile ranges.

[6] For the interested reader, paired *t*-tests show the same pattern as multilevel modeling results, whereby people mind-wander to secrets more than they conceal them: Study 2 $t(2,623) = 18.19$, $p < .001 \times 10^{-12}$; Study 3 $t(2,601) = 14.05$, $p < .001 \times 10^{-12}$. We also note here that $.001 \times 10^{-12}$ is the smallest p value that can be calculated by the R software package.

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Table 1
Descriptives for Extent of Secrecy for 38 Categories of Secrets

Mean response frequencies of 38 categories of secrets	Study 1 *M* (*SD*)	Study 2 *M* (*SD*)	Study 3 *M* (*SD*)	Study 4 *M* (*SD*)	Study 10 *M* (*SD*)
Currently secret from all people	5.74 (5.10)	5.69 (5.59)	5.14 (4.65)	3.11 (3.25)	4.89 (4.90)
Currently secret from some people	7.52 (5.19)	7.57 (5.15)	8.01 (5.38)	9.74 (5.96)	6.80 (4.91)
Former secrets	2.91 (3.38)	2.53 (2.96)	3.01 (3.16)	3.31 (2.87)	2.41 (2.89)
Experienced, but never secret	4.30 (4.03)	4.44 (4.00)	4.67 (3.70)	5.22 (4.06)	4.33 (3.72)
Never had the experience	17.79 (7.76)	17.76 (7.76)	17.19 (7.26)	15.57 (6.63)	20.21 (7.70)

We implemented a multilevel mixed model predicting frequency from response-type (mind-wander = 1 vs. conceal = 0), a fixed factor, entering participant and category of secret as random factors. By treating category of secret as a random factor, we can generalize the findings to non-observed categories of secrets in the same way researchers treat participants as a random factor to generalize beyond participants in the study sample (see Judd, Westfall, & Kenny, 2012).[7]

Conducting this analysis revealed a significant effect in both studies, such that when accounting for random variance from participants and categories of secrets, we estimate that Study 2 participants, in a given month, conceal their secrets within social interactions 1.77 times (intercept), whereas they spontaneously think about them outside of concealment settings 4.24 times (intercept plus slope); intercept = 1.77, $b = 2.47$, 95% CI [2.14, 2.79], $SE = 0.17$, $t = 14.91$, $p < .001 \times 10^{-12}$.

These results replicated in Study 3: in a given month, participants concealed their secrets within social interactions 2.44 times (intercept), whereas they spontaneously think about them outside of concealment settings 4.82 times (intercept plus slope); intercept = 2.44, $b = 2.38$, 95% CI [1.95, 2.81], $SE = 0.22$, $t = 10.91$, $p < .001 \times 10^{-12}$.

Although these multilevel analyses provide unstandardized coefficients that are readily interpretable as estimates of frequencies, count outcomes are more appropriately analyzed with a Poisson model (rather than a Gaussian model). Both count outcomes replicate with Poisson models (i.e., R function glmer with family poisson); Study 2, intercept = −0.24, $B = 0.89$, 95% CI [0.86, 0.93], $SE = 0.02$, z = 51.05, $p < .001 \times 10^{-12}$; Study 3, intercept = 0.06, $B = 0.61$, 95% CI [0.58, 0.64], $SE = 0.01$, z = 42.49, $p < .001 \times 10^{-12}$. Converting B (log-likelihood) to incidence ratios, the multilevel Poisson models estimated people mind-wandered to their secrets 2.44 and 1.84 times more than they concealed their secrets, Studies 2 and 3, respectively.

Summary. By permitting participants to indicate they have multiple secrets (of the 38 categories surveyed), we managed to collect data on 2,636 secrets in Study 2, and 2,613 secrets in Study 3, from, respectively, 192 and 195 participants currently with at least one of the 38 categories of secrets from the 200 recruited. As discussed above, because we treat category of secret as a random factor, we can conceptually generalize the current results to the larger universe of unsampled secrets. One corollary of this approach is that vastly different kinds of experiences are included here, which might encompass significant secrets, but also trivial secrets, thereby weakening the effect. Thus, in later studies we specifically test significant secrets.

Seeking conclusions about how much people mind-wander to secrets and conceal them, in general, these analyses *conceptually and empirically generalize across the variability of category of secrets*. That said, we also plot these results by category of secret. Figures 3 and 4 presents Studies 2 and 3 data, respectively, plotting the results by category of secret, which also reveals that, overwhelmingly, people mind-wander to secrets outside of concealment settings more than they conceal them within social interactions. All but one of the secrets across the two studies (i.e., surprises) were mind-wandered to (outside of concealment settings) more than concealed (within social interactions).

Mind-wandering (but not concealing) frequency predicts lower well-being. Finally, we turned our attention to testing whether variability in the frequency with which people mind-wander to a secret (outside of concealment settings) predicts the variability of the influence of the secret on well-being, controlling for the frequency of concealing secrets within social interactions. We tested this with a multilevel mixed model, with frequency of mind-wandering to and concealing as fixed factors, and participant and category of secret as random factors. This analysis revealed that for both Studies 2 and 3, the more participants mind-wandered to their secret outside of concealment settings, the more they felt the secret hurt their well-being, whereas we found no such relationship with frequency of concealing secrets (see Table 2).

Treating category of secret as a random factor, and examining frequencies of mind-wandering and concealing simultaneously, we find that frequency of mind-wandering to secrets outside of concealment settings (but not concealing within social interactions) uniquely predicts lower well-being.

Study 3 Method Continued

To streamline the presentation of our results, we described earlier the methods and results of Study 3 that paralleled the design of Study 2. Study 3, however, had additional measures, described here.

Additional controls. One aim of Study 3 was to address any concern that the observed relationship between diminished well-being and frequent mind-wandering reflects the existence of unaccounted-for third variables. To address this concern, Study 3 attempts to measure and account for third variables that might cause both mind-wandering and discontent. In particular, we ex-

[7] We used the R package lme4 to implement mixed-effects models (Bates, Maechler, Bolker, & Walker, 2015). To calculate p values, we used the R package lmerTest to run lme4 models through Satterthwaite approximation tests, which estimate degrees of freedom (to scale model estimates to best approximate the F distribution; Kuznetsova, Brockhoff, & Christensen, 2013). We use these methods for all multilevel modeling in the current work; $.001 \times 10^{-12}$ is the smallest p value that can be calculated by the R software package.

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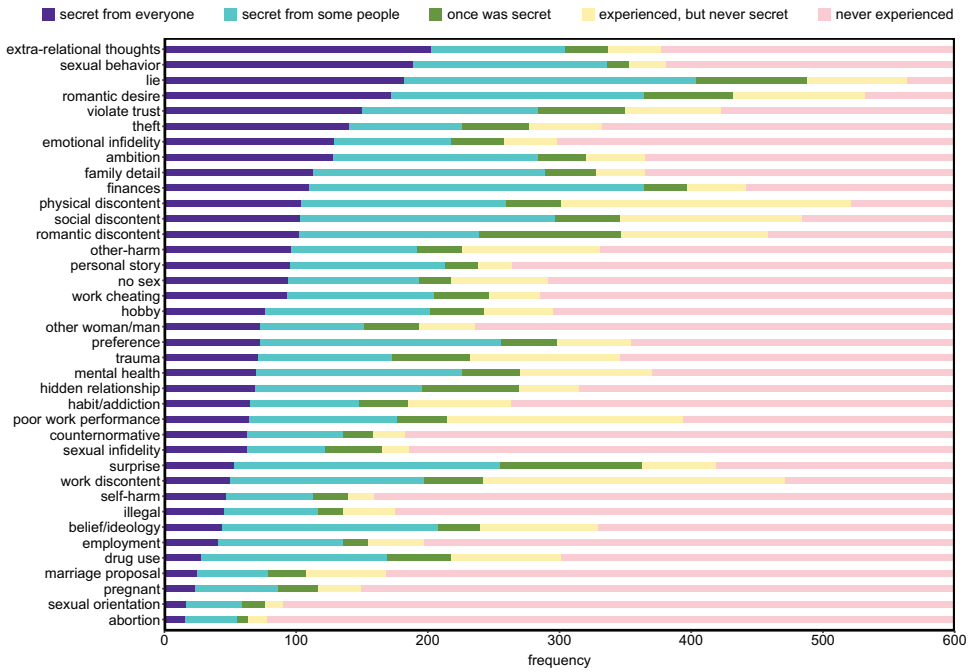

Figure 1. Frequency with which Studies 1–3 participants ($N = 600$) report having each of the categories of secrets. "Never experienced" for hobby, family detail, sexual orientation, sexual behavior, preference, belief/ideology finances, employment, ambition, counternormative, and personal story should not be taken as never having had those experiences, but rather claiming, "I have never had something related this that people tend to keep secret." (cf. Parts 1 and 2 of the CSQ, Appendix). See the online article for the color version of this figure.

amined whether the relationship between increased mind-wandering and diminished well-being exists even after we control for a secret's perceived importance (1 = *not at all important* to 7 = *very important* ($M = 3.39$, $SD = 2.17$, 95% CI [3.31, 3.47]), and perceived deviance (1 = *very rare – I think many people do not have this experience* to 7 = *very common—I think many people have this experience* ($M = 5.38$, $SD = 1.69$, 95% CI [5.31, 5.44]). We predicted increased perceived importance and deviance of the secret to predict lower well-being. We thus recoded perceived commonness as perceived deviancy, such that both variables were scored in line with our predictions (i.e., higher ratings on both to predict lower well-being).

Current versus former secrets. Recall that in Studies 2 and 3, after indicating which of the 38 categories of secrets they currently have, participants answered follow-up questions about each of their current secrets. What was unique about Study 3 is that participants were also asked to answer these exact same questions about *former* secrets (i.e., those marked as not currently secret but formerly secret). One benefit of examining the impact of a former secret on well-being is it permits disentangling the consequences of having an experience (e.g., an abortion) from the consequences of having a secret, because the former is held constant whereas the latter is allowed to vary.

Physical health. Finally, we measured participants' general physical health, with the widely used RAND 36-Item Health Survey (Hays et al., 1993). This was done so that we could test whether outcomes of current secrets on well-being extended to predict diminished health (both a general scale of physical health, and a secondary scale of socioemotional limitations caused by lower health).

Predictions. By presenting Study 3 analyses earlier with the variables that were also collected in Study 2, we demonstrated earlier that Study 3 replicated Study 2. Below, we report analyses with these additional variables to demonstrate how Study 3 also extended Study 2.

We predicted, independent of concealment frequency, that frequency of mind-wandering to secrets (outside of concealment contexts) would still predict lower well-being, even after accounting for perceived importance and deviance of the secret. Moreover, we predicted that this relationship between frequency of mind-wandering to the secret and lower well-being would actually explain a link between having a current (vs. former) secret on well-being. Lastly, we predicted the effect of secrecy on well-being to predict lower health.

Study 3 Results Continued

Additional controls. Recall Studies 2 and 3 found that people catch themselves thinking about their secrets outside of relevant concealment settings more frequently than they encounter social situations that necessitate active withholding of the information, and the frequency of the former (but not the latter), predicted lower well-being.

We tested whether the Study 3 results on current secrets hold when we control for perceived importance and deviancy, employing the same multilevel modeling approach as before. Along with

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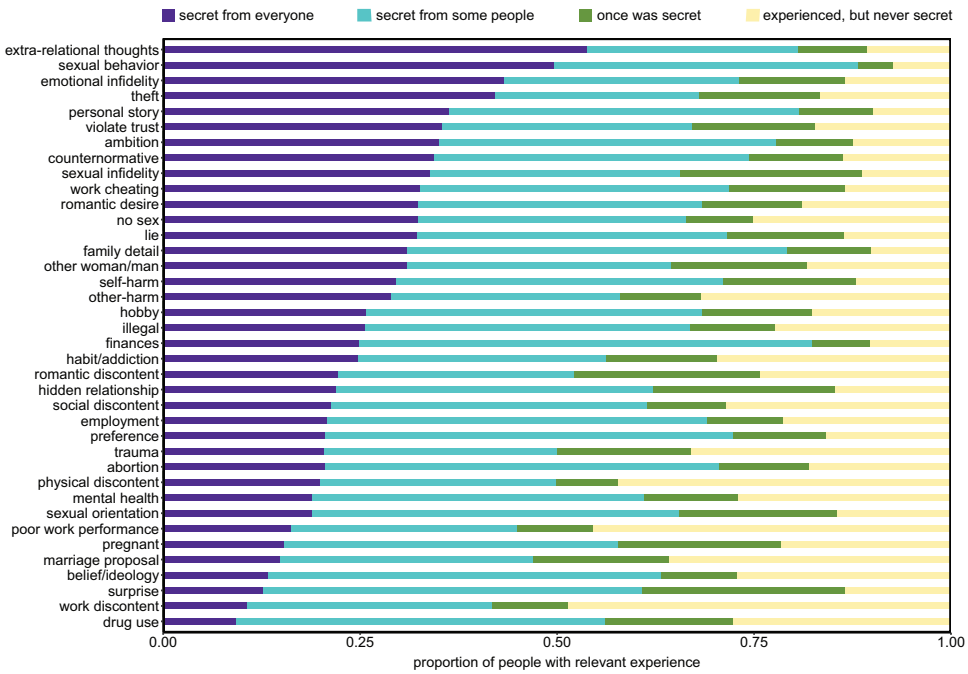

Figure 2. Proportion of Study 1–3 participants with a secret, among those who have had the requisite experience. See the online article for the color version of this figure.

mind-wandering and concealing frequency, we entered these two variables as simultaneous predictors of well-being from current secrets (see Table 3). The importance of the secret and the deviancy of the secret predicted lower well-being. Critically, the frequency of mind-wandering to the secret still predicted lower well-being, when we controlled for these other two effects. By contrast, the frequency of concealing the secret still did not predict well-being (see Table 3).

Current versus former secrets. Also recall that we asked each of the above follow-up questions for curent secrets (N = 2629), as well as for former secrets (N = 601), permitting us to test whether participants mind-wandered to current secrets more than former secrets. First, unsurprisingly, participants reported having to conceal current secrets within social interactions more than former secrets, b = 1.16, 95% CI [0.63, 1.69], SE = 0.27, t = 4.31, p = .00002. Importantly, the results also confirm that participants catch their mind's wandering to current secrets more frequently than they catch them wandering to former secrets, b = 1.63, 95% CI [0.89, 2.37], SE = 0.38, t = 4.30, p = .00002.

Indirect effect of a current secret on well-being. These findings suggests a mediational model, whereby increased frequency of mind-wandering might explain the link between having a current (vs. former) secret and lower well-being. We tested mind-wandering and concealing frequencies as simultaneous mediators to examine each indirect effect, independent of the other.

Testing for a unique indirect effect through mind-wandering. Conducting a multilevel mediation (with 1000 iterations) confirmed that current secrets (vs. former secrets) predict lower well-being through frequent mind-wandering to them outside of concealment settings (independent of how much participants concealed the secret within social interactions), M indirect effect = −0.039, 95% CI [−0.073, −0.010]. This effect also existed above the effects of perceived importance and deviancy, M indirect effect = −0.025, 95% CI [−0.050, −0.001].

Testing for unique indirect effect through concealing. There was no parallel indirect effect through concealing (when controlling for how much participants mind-wandered to the secret), M indirect effect = −0.010, 95% CI [−0.031, 0.008], including when we also controlled for the effects of perceived importance and deviancy, M indirect effect = −0.009, 95% CI [−0.032, 0.017]. Thus, it was frequency of mind-wandering to secrets (and not frequency of concealing secrets) that mediated the relationship of having a current (vs. former) secret and lower well-being.

General health. Finally, we examined health outcomes from the often-used *general health* subscale from the RAND 36-Item Health Survey. Scores range from 0 to 100 (for example, "my health is excellent," "I seem to get sick a little easier than other people" (rev.), M = 67.61, SD = 20.64, 95% CI [67.31, 67.90]). This measure captures judgments of general health. A secondary analysis examined a global average of the secondary items from the Health Survey (i.e., those that do not tap general health, but socioemotional limitations caused by lower physical health, measuring physical functioning, role limitations due to emotional problems, energy/fatigue, social functioning, and pain (scores ranging from 0 to 100; M = 68.06, SD = 18.12, 95% CI [65.54, 70.59]). The results of this secondary analysis replicate the primary analysis [*results from secondary analyses on this alternate measure of health are reported in brackets next to the main analysis*].

Given that well-being varies on the level of secrets and general health at the level of individuals, responses to the health measures and the status of the secret (current or former) were modeled as fixed

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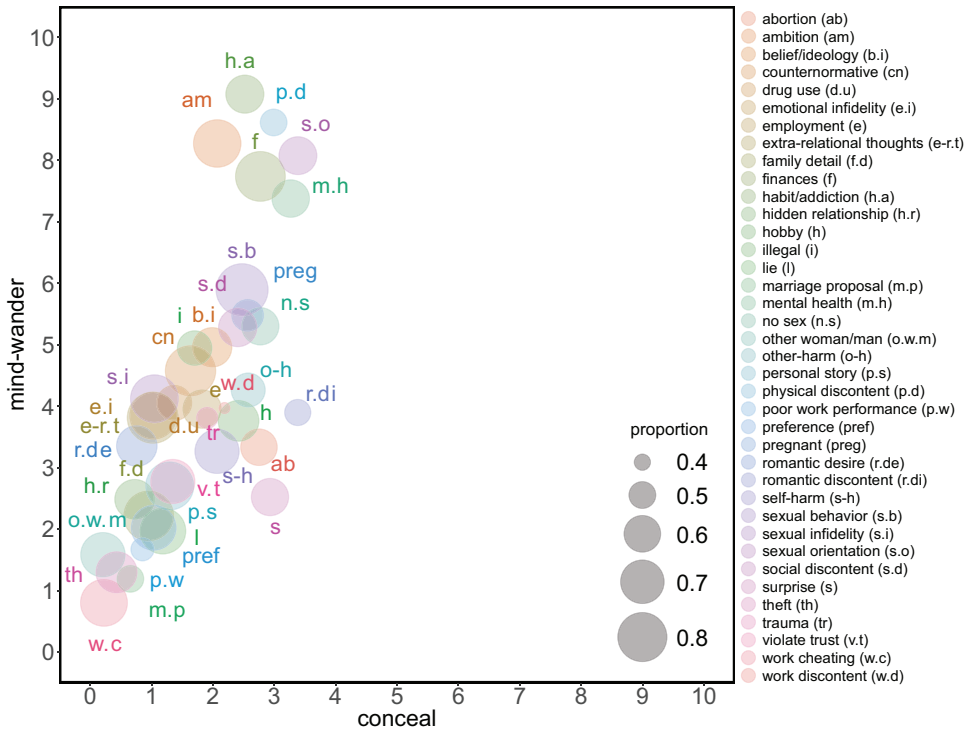

Figure 3. Study 2 mind-wandering by concealing frequency within the past month, across categories of secrets. Of the people who have had that experience, the proportion of them that keep it secret is represented by the diameter of the circles. See the online article for the color version of this figure.

factors and participant and category of secret were modeled as random factors, predicting how each secret impacted well-being. This approach revealed that independent of the status of the secret (current vs. former), frequency of mind-wandering to the secret, $b = -0.02$, 95% CI [−0.03, −0.01], $SE = 0.01$, $t = 4.27$, $p = .00002$ [$b = -0.02$, 95% CI [−0.03, −0.01], $SE = 0.01$, $t = 4.18$, $p = .00003$] predicted lower well-being from each secret, and well-being from the secrets predicted general health (i.e., secret-specific well-being positively predicted overall general health), $b = 0.01$, 95% CI [.003, 0.02], $SE = .004$, $t = 2.61$, $p = .01$ [and global health $b = 0.01$, 95% CI [0.003, 0.02], $SE = 0.004$, $t = 2.57$, $p = .01$].

Thus, diminished well-being from the secret extended to diminished health. In contrast, the frequency with which a secret was concealed within social interactions still in these analyses did not independently predict the effect the secret had on well-being, $b = -0.01$, 95% CI [−0.02, 0.01], $SE = 0.01$, $t = 0.74$, $p = .46$ [$b = -0.01$, 95% CI [−0.02, 0.01], $SE = 0.01$, $t = 0.83$, $p = .41$].

Discussion

Studies 1–3 demonstrate highly reliable rates of secrecy and frequencies of specific secrets, and Studies 2–3 found that people catch themselves thinking about their secrets outside of relevant social interactions more frequently than they find themselves in social exchanges that require they actively conceal the secret from others. Moreover, the frequency of mind-wandering predicted well-being, whereas the frequency of concealing did not (Studies 2–3). Finally, when controlling for the content of the secret, it being a current (vs. former) secret, predicted both increased mind-wandering to the secret and also increased concealing of the secret, but it was only through increased mind-wandering, did current (vs. former) secrets predict lower well-being.

Studies 4 and 5: Replication and Extension to New Sample

Study 4: Frequency of Secret Keeping

Although online mediums have many methodological advantages where the study of secrecy is concerned, it is worth demonstrating that the basic pattern of secrets generalizes to other participant populations. With this in mind, we recruited 200 people ($M_{age} = 32.72$ years, $SD = 14.90$. 63% female) who were picnicking in Central Park (New York City) and administered the Common Secrets Questionnaire (CSQ; Appendix). As can be seen in Table 1 (and Figures 1, 2, 5 and 6), the frequencies of their secret keeping by response type and category of secret were highly similar to that of the participants who were recruited via Mechanical Turk, demonstrating the applicability of the CSQ across multiple participant samples, and that the secrets it captures are commonly kept across different participant samples.

Study 5: Mind-Wandering, Concealing, and Well-Being

Study 4 confirms that the pattern of secrets kept by a multi-international sample of individuals (recruited in Central Park) is

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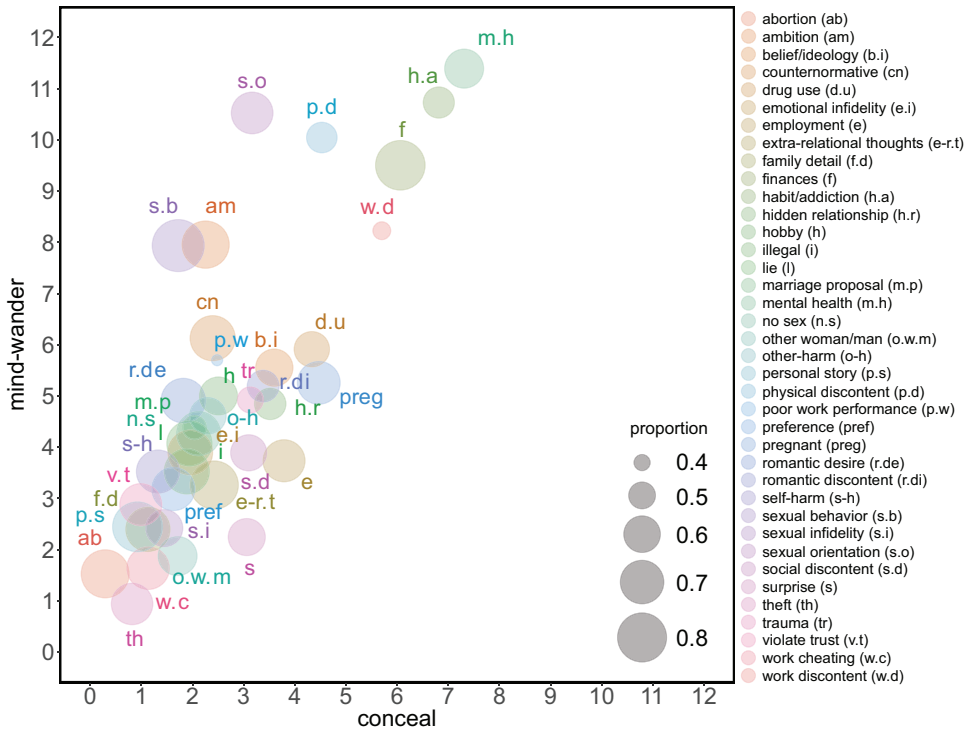

Figure 4. Study 3 mind-wandering by concealing frequency within the past month, across categories of secrets. Of the people who have had that experience, the proportion of them that keep it secret is represented by the diameter of the circles. See the online article for the color version of this figure.

highly similar to those kept by individuals who were recruited via Amazon's Mechanical Turk. However, it leaves open the question of whether the finding that people mind-wander to their secrets more than they withhold them in interactions, and that mind-wandering frequency predicts well-being, generalizes beyond a Mechanical Turk sample.

We thus conducted a second study that involved recruiting participants from Central Park. As with Study 4, the plan was to collect data from 200 participants. Yet over the week of data collection (in November), the temperature had dropped, such that few people were picnicking in the park, yielding only 112 participants before data collection became infeasible (M_{age} = 34 years, SD = 9.46. 56% female).[8] To limit the duration of the study, per the 10 secrets most common from Study 4, we asked whether participants had the secret, and if so, the frequency with which they mind-wandered to and concealed it, as well as the effect of the secret on their well-being, as per Studies 2–3. As with the other studies, the adjusted boxplot method identified outlying responses; 7 responses (0.73% of the data) were removed (i.e., from 5 participants who had indicated thinking of or hiding secrets more than 50 times in a month), yielding 450 secrets to analyze.

Mind-wandering frequency is greater than concealing frequency. A multilevel mixed model, entering participant and category of secret as random factors, and predicting frequency from response-type (mind-wander = 1 vs. conceal = 0) was significant, intercept = 4.47, b = 1.13, 95% CI [0.42, 1.84], SE = 0.36, t = 3.12, p = .002, such that participants concealed their secrets within social interactions 4.47 times in a month (intercept), whereas they spontaneously thought about them outside of concealment settings 5.60 times in a month (intercept plus slope); see Figure 7.

A Poisson model of count outcomes replicates these results [intercept = 0.60, B = 0.23, 95% CI [0.17, 0.28], SE = 0.03, z = 7.81, $p = .001 \times 10^{-11}$; converting B (log-likelihood) to an incidence ratio, estimates that people mind-wandered to their secret 1.25 more times than they concealed them].

Mind-wandering (but not concealing) frequency predicts lower well-being. When entering both as simultaneous predictors, the more a participant mind-wandered to a secret outside of concealment settings, the more it hurt their well-being (M = −0.62, SD = 2.58, 95% CI [−0.84, −0.40]), b = −0.06, 95% CI [−0.10, −0.01], SE = 0.02, t = 2.40, p = .02. Critically, once again, we found no such relationship with frequency of hiding secrets, b = 0.005, 95% CI [−0.05, 0.05], SE = 0.03, t = 0.18, p = .86.

In sum, a group of highly diverse participants (only 32% American, and the remainder visiting New York City from 29 different countries) demonstrate the effect found in the earlier studies: People mind-wander to secrets outside of social interactions more than they conceal secrets within social interactions, and the former but not the latter independently predicts lower well-being.

[8] Participants were 32% American, with the remainder a mix of people visiting New York City from the Argentina, Brazil, Bulgaria, China, Colombia, Ecuador, England, France, Georgia, Germany, Haiti, India, Israel, Ireland, Italy, Jamaica, Japan, Mexico, Netherlands, Peru, Portugal, Russia, Spain, Sweden, Taiwan, Turkey, Venezuela, and Vietnam.

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Table 2
Independent Effects of Mind-Wandering and Concealing Frequencies on Well-Being in Studies 2 and 3

Independent effect on well-being	Multilevel modeling results
Mind-wander (Study 2)	$b = -.02$, 95% CI [−.04, −.01], $SE = .01$, $t = -4.28$, $p = .00002$
Conceal (Study 2)	$b = .005$, 95% CI [−.02, .02], $SE = .01$, $t = .45$, $p = .65$
Mind-wander (Study 3)	$b = -.03$, 95% CI [−.04, −.02], $SE = .010$, $t = -4.95$, $p = .000001$
Conceal (Study 3)	$b = -.01$, 95% CI [−.03, .01], $SE = .01$, $t = -1.17$, $p = .24$

Note. Study 2 well-being $M = .20$, $SD = 2.22$, 95% CI [.11, .28]; Study 3 well-being $M = -.32$, $SD = 2.73$, 95% CI [−.42, −.21].

One might argue that some of the secrets that were the focus of Studies 1–5 were trivial and thus necessitate only infrequent hiding in social interactions. Examining secrets that are clearly meaningful to the people who have them is valuable, and thus Studies 6–9 focus specifically on participants' *significant* secrets. We also employed a longitudinal design to capture more precise, daily estimates of these frequencies.[9]

A second potential issue with Studies 1–5 is they may inadvertently focus on secrets that are being withheld from individuals who are not a part of the participants' regular, daily experience. If people have secrets from family members or friends with whom participants rarely interact—who live in other towns, for instance—it is not surprising that they rarely encounter social situations that necessitate active concealment.

Yet, if participants tend to keep secrets from people with whom they rarely interact, this affirms our argument that the literature has placed too much emphasis on the consequences of actively concealing secrets from others within social interaction. Still, our theory predicts that even for a *frequent* interaction partner, people will catch themselves thinking about the secrets they are keeping from that person more than they encounter social situations that necessitate actively withholding the information from that person, with downstream consequences. Studies 6–9 examine secrets people are currently keeping from people with whom they are in frequent, intimate contact with: their romantic partners.

Study 6: Secrets From Partners

Study 6 had participants identify and report on a *significant* secret that they are keeping from their *partner*. As discussed, because this is a significant secret from someone who is a frequent interaction partner (i.e., one's romantic partner) we reasoned that this approach would be a more conservative test of the hypothesis that people catch themselves thinking about their secrets (outside relevant social exchanges) more frequently than they encounter situations that necessitate the information be actively hidden in a social exchange.

Method

Participants and design. Participants ($N = 150$; 54% female, $M = 31.39$ years, $SD = 9.46$) were recruited on MTurk for a "relationship study," advertised for people who are currently in a committed relationship. Participants reported a significant secret they were currently keeping from their partner, and estimated both the frequency of mind-wandering to it outside of concealment settings, and the frequency of concealing it when interacting with their partner. Those who did not have a secret ($N = 2$), and those who failed either the manipulation ($N = 12$) or honesty checks ($N = 5$) were excluded from the analysis (described below).

Procedure. We first asked participants to report how long they had been with their current partner. Next, participants were told to recall something that they felt guilty about, and were actively hiding from their partner, and then wrote a brief description about the secret (without revealing specific details) to ensure they were truly recalling the secret. As a manipulation check, on the subsequent screen, we asked whether their partner had knowledge of the secret (if they answered "yes," they failed the manipulation check and were excluded from the analyses).

Participants then reported two frequencies (randomly ordered): the number of times within the past 30 days (a) they were not with their partner but spontaneously thought about the secret (*mind-wandering frequency*), and (b) they were interacting with their partner, and had to actively conceal the secret during the interaction (*concealment frequency*).

Results and Discussion

Identifying outlying responses. We employed the same analytic approach to the frequency data as was utilized in the earlier studies. Again, the unbounded responses were skewed (Kolmogorov–

[9] On the topic of estimating these frequencies, participants' recall of the exact frequency of mind-wandering to and concealing a secret in the past 30 days will be imperfect. One study (Klinger, Barta, & Maxeiner, 1980) estimated the correlation of recollections (measured using a Concern Dimensions Questionnaire) with mind-wandering of specific thoughts captured by experience sampling to be about $r = .29$. That said, that study asked participants for only a subset of recollections. More recent work, which asks participants to reconstruct the entire day, shows people's recollections of affect experienced during recalled episodes correlates with affect captured by momentary assessment at *r*s ranging from .76 to .89, with recall of situation-specific thoughts at 91% agreement with momentary assessment (Tweten, Anusic, Lucasm, & Donellan, 2016). We suspect given the discomfort of concealment experiences, these are remembered well. Even if, in contrast, people underestimate the frequency of mind-wandering to secrets, this would work against our mind-wandering versus concealment frequency comparisons. Critically, although experience sampling methods would perhaps yield more reliable *point estimates*, imprecise point estimate would *not* call into question the multilevel modeling results (although it is likely to lead us to underestimate the true effect size). That is, for predicting well-being, the measures need only to capture *within participant variation* across the secrets that they keep. Although frequency estimates will be imperfect, we believe participants should have a good sense which secrets they mind-wander to more than others, and which secrets they conceal more than others. Moreover, any participant individual differences that might covary with a given participants' estimates does not call into question our results given that *secret* is the level of analysis here (i.e., each individual secret was modeled), not person (and random variance from both are accounted for).

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Table 3
Independent Effects on Well-Being From Current Secrets in Study 3

Independent effect on well-being	Multilevel modeling results
Perceived importance	$b = -.09$, 95% CI [−.14, −.04], $SE = .03$, $t = 3.36$, $p = .001$
Perceived deviancy	$b = -.09$, 95% CI [−.15, −.03], $SE = .03$, $t = 2.82$, $p = .005$
Mind-wander frequency	$b = -.03$, 95% CI [−.04, −.01], $SE = .01$, $t = 3.93$, $p = .0001$
Conceal frequency	$b = -.01$, 95% CI [−.02, .01], $SE = .01$, $t = .71$, $p = .48$

Note. *Well-being* $M = -.32$; $SD = 2.73$; 95% CI [−.42, −.21].

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Smirnov $D = .21$, $p < .0001$). We thus examined the data for outliers, using the adjusted boxplot approach (Hubert & Vandervieren, 2008). Three responses (by three participants who indicated mind-wandering to or concealing secrets more than 103 times in the past 30 days) were removed from analyses, dropping only 1.15% of the 262 responses we collected from the 131 participants who passed the manipulation and honesty checks.[10]

Analyzing frequencies. A paired *t*-test demonstrated that in the past month, participants caught themselves thinking about the secret in the absence of their partner ($M = 13.05$, $SD = 19.95$, 95% CI [9.56, 16.54]) more often than they found themselves having to conceal the secret while interacting with their partner ($M = 7.00$, $SD = 15.81$, 95% CI [4.27, 9.73]), $t(127) = 4.85$, $p < .00001$, $d = .43$, 95% CI on $d = (.25, .61)$. Even for *significant* secrets that people are actively keeping from someone with whom they are in *frequent* contact, people still spontaneously think about secrets outside of concealment settings more than they work to conceal them from this other person.

Study 7: Longitudinal Study of Secrets From Partners

One might argue that participants cannot accurately report on frequencies of mind-wandering and concealing from the previous 30 days. Bias in recollections would pose a challenge to interpreting results that compare these means, but not results predicting well-being (see Study 3 Discussion, also footnote 9). In Study 7, we sought more precise frequency estimates of mind-wandering and concealing, utilizing a longitudinal design. As with Study 6, Study 7 focused on *significant* secrets that participants were keeping from a *frequent interaction partner* (i.e., their romantic partner).

Method

We advertised the study on MTurk for people currently in a committed relationship. To ensure the results would not be confounded by day of the week, recruitment was rolling and occurred over the course of seven days. The study was posted at about 7 p.m. EST on each of seven consecutive days, and was limited to approximately 14 people per day ($M = 14.14$; $SD = 3.34$). Over the 7 days, 100 individuals[11] took part in Day 1 of the study (42% female; $M_{age} = 33.81$ years, $SD = 10.30$), wherein participants completed the Study 6 procedure, except participants reported mind-wandering and concealing frequencies for just that day. Five participants failed the manipulation check (i.e., they said their partner was aware of the information they said they were keeping secret), and 10 failed the honesty check (at the end of the study, they admitted they were pretending to be thinking about a secret). Only participants who passed both Day 1 checks were invited to participate in the multi-day study ($N = 85$).

To keep attrition low, participants were paid a monetary bonus if they successfully registered a response on each of the five nights. A total of 80 of these individuals indicated they would participate in the multi-day portion of the study ($M_{age} = 34.06$ years, $SD = 10.69$; 40% female). They were contacted on the subsequent night and asked to report the number of times during the course of the day they (a) experienced spontaneous thoughts about the secret (in the absence of their partner) and (b) concealed the secret while interacting with their partner (randomized order). If a participant successfully completed one day of the survey, the two questions about mind-wandering and concealment frequency were asked on the subsequent night. This process repeated until the participant had provided these frequencies for five days in a row; 62, 54, 52, and 51 completed Days 2, 3, 4, and 5, respectively.[12]

Results

Identifying outlying responses. We employed the same analytic approach to the frequency data that was utilized in the earlier studies (to account for skew; Kolmogorov–Smirnov $D = .25$, $p < .0001$). The adjusted boxplot method identified a cutoff of 10. Thus, four responses from four participants who indicated thinking of or hiding secrets more than 10 times in a single day, were considered outliers, dropping only 0.67% of the data.[13]

Analyzing frequencies. Given that we have multiple observations per participant, we implemented a series of multilevel mixed models to test whether people mind-wandered to their secret more than they concealed it from their partner, analyzing all

[10] All participants provided numeric responses to the prompts. Replacing the three outlying responses, which ranged from 165 to 1000, with the cutoff point identified by the adjusted boxplot (103) or the maximum value below the cutoff (100) leads to the same pattern of results and significance.

[11] We note here that 100 participants were recruited for the longitudinal study to keep costs down for the somewhat more expensive longitudinal multi-day design. Other studies in this part of the paper were conducted first, recruiting always 150 participants for sufficient power (for a within-subjects design). Subsequently, we developed the habit of always collecting 200 participants per study, which is thus the recruitment used for all other studies.

[12] We contacted participants through MTurk so that we never collected their email addresses.

[13] Six responses, 0.10% of the data, could not be included because something other than a numeric response was given. Also, replacing the four outlying responses, which ranged from 12 to 20, with the cutoff point identified by the adjusted boxplot (10, which was also the maximum value meeting the cutoff) leads to the same pattern of results and significance.

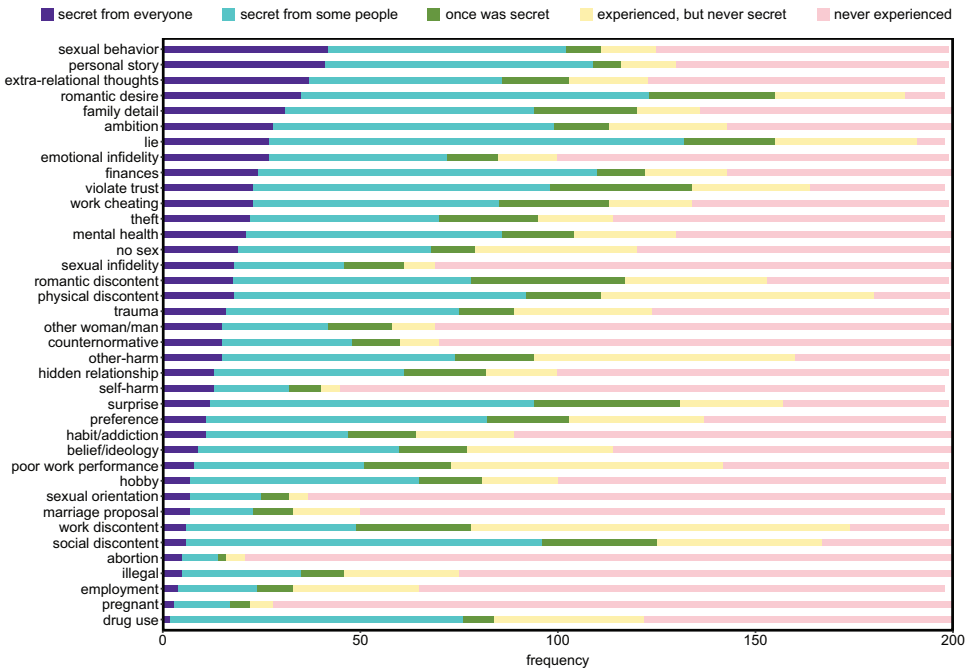

Figure 5. Frequency with which participants report having each of the categories of secrets, recruited in Central Park (Study 4). "Never experienced" for hobby, family detail, sexual orientation, sexual behavior, preference, belief/ideology finances, employment, ambition, counternormative, and personal story should not be taken as never having had those experiences, but rather claiming, "I have never had something related this that people tend to keep secret." (cf. Parts 1 and 2 of the CSQ, Appendix). See the online article for the color version of this figure.

participants' data (i.e., not summing over days, nor only analyzing responses by participants who made it to Day 5). We report Gaussian models which yield readily interpretable coefficients of count outcomes, but also Poisson models in brackets, the latter of which are more appropriate for count outcomes (and we convert the latter log-likelihood coefficients to incidence ratios).

Day as random factor. We first predicted frequency from response type (mind-wander = 1, conceal = 0) as a fixed factor, and participant and day number as random factors. This analysis revealed a significant effect, intercept = 0.92, $b = 1.17$, 95% CI [0.98, 1.36], $SE = 0.10$, $t = 11.69$, $p < .001 \times 10^{-12}$, accounting for random variance from participants and day number, participants conceal their secret from their partner an estimated 0.92 times a day (intercept), whereas they mind-wandered to their secret an estimated 2.09 times a day (i.e., the intercept plus the slope). [Poisson model, intercept = −0.44, $B = 0.90$, 95% CI [0.75, 1.05], $SE = 0.08$, z = 11.89, $p < .001 \times 10^{-12}$; converting B (log-likelihood) to an incidence ratio, estimates that people mind-wandered to their secret 2.46 more times than they concealed them)].

Day as fixed factor. We then re-ran the model, but entered day number as a fixed (rather than random) factor. Again, we found a main effect of mind-wandering to secrets more than concealing secrets, intercept = 0.68, $b = 1.17$, 95% CI [0.98, 1.36], $SE = 0.10$, $t = 11.85$, $p < .001 \times 10^{-12}$ [Poisson model, intercept = −0.64, $B = 0.90$, 95% CI [0.75, 1.05], $SE = 0.08$, z = 11.84, $p < .001 \times 10^{-12}$; people mind-wandered to their secret 2.45 more times than they concealed it].

We also found a main effect of day, whereby frequencies increased as the days progressed, $b = 0.08$, 95% CI [0.01, 0.15], $SE = 0.04$, $t = 2.25$, $p = .02$ [Poisson model, $B = 0.07$, 95% CI [0.02, 0.12], $SE = 0.03$, z = 2.55, $p = .01$; independent of the day of the study, mind-wander/conceal frequency increased 1.07 times per day].

Perhaps having to monitor these frequencies over the days led participants to think about and hide their secrets more often. Critically, when a paired t-test restricted analysis to *Day 1*, participants still mind-wandered to their secrets more than they concealed them, $t(78) = 5.10$, $p = .000002$.

Testing for an interaction with day. Finally, we re-ran the above model once more, but now including the day and response-type interaction term, revealing no significant interaction, intercept = 0.76, interaction $b = 0.05$, 95% CI [−0.08, 0.19], $SE = 0.07$, $t = 0.78$, $p = .43$ [Poisson model, intercept = −0.57, interaction $B = 0.03$, 95% CI [−0.07, 0.14], $SE = 0.05$, z = 0.61, $p = .54$]. The extent to which people mind-wandered outside of concealment settings to their secret more than they concealed it in social interactions did not change across the days (see Figure 8).

Discussion

Study 7 results show that even for *significant* secrets that people are actively keeping from someone with whom they are in *frequent* contact, people mind-wander to their secrets twice as often as they work to conceal them from this person. By using a longitudinal design that sampled participants' experiences on a daily basis, this

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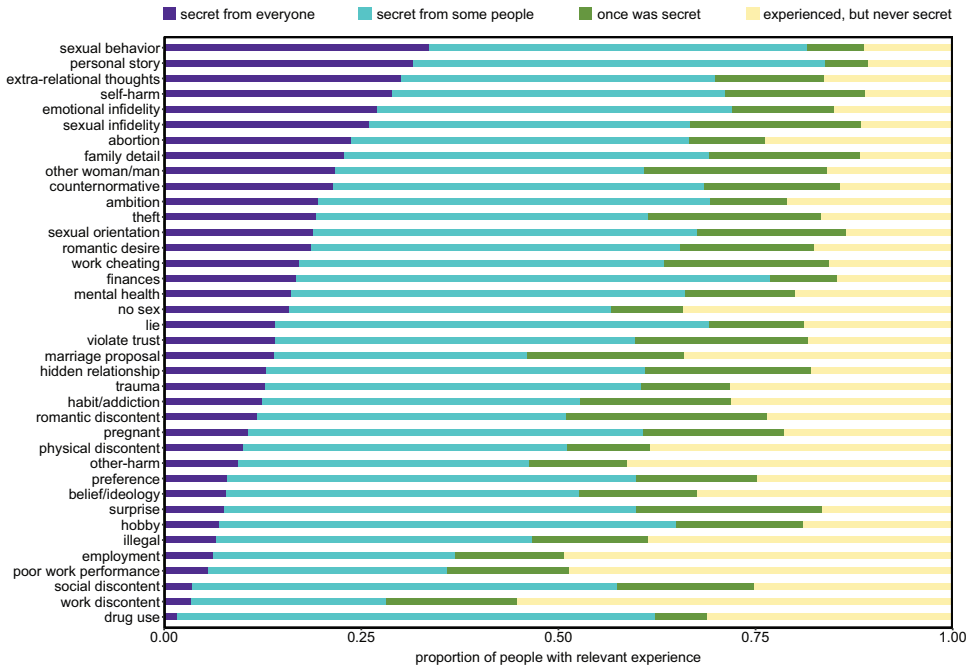

Figure 6. Proportion with a secret, relative to others who have had the same experience, recruited in Central Park (Study 4). See the online article for the color version of this figure.

study provides some assurance that people reliably mind-wander to their secrets more than they actually conceal them during social interactions.

We posited that having a secret not only predicts increased concealment within social interactions, but also increased mind-wandering to the event or episode outside of concealment settings. Using a cross-sectional approach, Study 2 (2,636 secrets), Study 3 (2,613 secrets), Study 5 (450 secrets), and Study 6 (131 secrets kept from partners) converged on the finding that people catch themselves thinking about their secrets in irrelevant settings more than they encounter situations that necessitate hiding them (Studies 1 and 4 did not measure mind-wandering and concealing frequencies). One potential flaw of the prior studies is that they asked participants to report on frequencies from the previous 30 days and thus may be based on a distorted or flawed recollection. Study 7, however, assuaged this concern by using a longitudinal design, whereby participants reported their frequencies on a daily basis, across multiple days.

Our second major prediction was that the more frequently people mind-wander to a secret, the lower their well-being. Indeed, the earlier studies found that the frequency of mind-wandering to secrets, but not concealing secrets, predicted lower well-being. The first part of the paper examined the relationship between mind-wandering to secrets and well-being by having people report on all the secrets that they currently have (of a set of common secrets). Studies 6–7, in contrast, examined, per participant, a single significant secret kept from a significant other, but did not examine well-being. The next study, Study 8 combines both approaches, whereby participants focused on a single *significant* secret, and we examine well-being.

Study 8: Secrets From Partners and Well-Being

In Study 8, we again implement the conservative test of our prediction—that people mind-wander to secrets more frequently than they conceal them—by asking participants to identify a secret that they were keeping from someone with whom they frequently interact (their romantic partner).

Study 8 also tested whether secrets diminish relationship quality, and if they do so by increasing mind-wandering versus concealment within social interactions. In exploring outcomes on well-being, Study 8 examined two alternative hypotheses. We suggest that mind-wandering to a secret from one's partner will be associated with increased feelings of inauthenticity, which will predict lower well-being (tested in Study 9). Before turning to this prediction, Study 8 examined two alternative routes. Possibly having a secret predicts lower relationship satisfaction simply because participants have an explicit lay theory that secrets are detrimental for relationships. Alternatively, frequency of mind-wandering to secrets may predict lower well-being through negative affect. We measure participants' lay theories of the influence of the secret on their relationship as well as experienced affect to test these alternative hypotheses.

Method

Participants and design. We recruited participants ($N = 150$; 59% female, $M = 34.64$ years, $SD = 10.27$) on MTurk for a "relationship study" advertised for people currently in a committed relationship. The procedure was identical to Study 6, except that we included additional measures (e.g., affect, secrecy lay theory, relationship quality, and well-being) and a broader prompt. Studies

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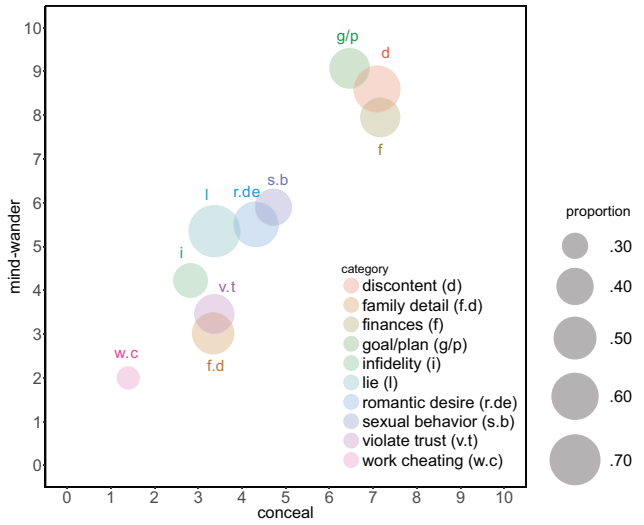

Figure 7. Mind-wandering by concealing frequency within the past month, across categories of secrets (participants recruited in Central Park; Study 5). Proportion of people who have that secret is represented by the diameter of the circles. It was essential to shorten the procedure to have any chance of volunteers completing the study, while lounging in Central Park. To do so, we asked questions per 10 categories of secrets (all that could be fit on one page). We arrived at 10 categories for Central Park data collection by drawing from the most common secrets from the first set of 200 participants collected in Central Park (Study 4), irrespective of whether kept to oneself or selectively shared, and focusing on only specific categories, thus excluding the two general categories "counternormative" and "personal story." To maximize the likelihood that participants would have these secrets, we also combined categories (e.g., creating one discontent category, one infidelity category, broadening ambition to goal/plan). See the online article for the color version of this figure.

6–7 asked participants to specifically recall something they felt guilty about and were keeping secret. Study 8, however, simply asked participants to recall something significant they were keeping secret.

As in Study 6, participants estimated the frequency with which they caught themselves thinking about the secret when not with their partner, and the frequency with which they encountered social situations that required that they actively conceal the secret from their partner. They also reported the affect they experienced while mind-wandering to the secret, and that while concealing the secret in interactions with their partner. Finally, we measured a lay theory of secrecy, relationship quality, and well-being (satisfaction with life). Participants who reported having no secrets ($N = 14$) and those who failed either the manipulation ($N = 8$) or honesty ($N = 2$) checks were excluded (described below).

Procedure. As in Study 6, we first asked participants how long they had been with their current partner. Next, we asked them to recall a significant secret they were actively keeping from their partner, using the same instructions that were utilized in Study 6 (but asking for a significant rather than a guilty secret). As a manipulation check, on the subsequent screen, participants were asked whether their partner had knowledge of the secret they had just reported (if they answered "yes," they failed the manipulation check and were excluded from the analyses).

Participants then reported two frequencies (counterbalanced order): the number of times, within the past 30 days, (a) they were not with their partner, but spontaneously thought about the secret (*mind-wandering frequency*), and (b) they were interacting with their partner and had to actively conceal the secret during the interaction (*concealment frequency*).

Participants also completed two, randomly ordered PANAS scales (Watson, Clark, & Tellegen, 1988). We asked them to think of the times in the past 30 days when (a) they were not with their partner but spontaneously thought about the secret, and how they felt when this happened (using the PANAS; *mind-wandering affect*); (b) they were interacting with their partner and had to actively conceal the secret during the interaction, and how they felt when this happened (using the PANAS; *concealment affect*). The order of the two frequency and the two affect measures were counterbalanced across participants such that half the time, frequency was assessed first, and half the time, affect was assessed first.

Next, to assess participants' lay theory of their secret, we asked them to indicate if keeping the secret harmed or benefitted the relationship (1 = *very much harms my relationship* to 7-*very much benefits my relationship*, the midpoint, 4 = *neither harms nor benefits my relationship*). We then asked participants how (a) close they felt to their partner, and how (b) satisfied they were in their relationship (1-*not at all* to 7-*very*). Participants then completed the Satisfaction with Life Scale (Diener et al., 1985), a widely used measure of well-being (e.g., "In most ways my life is close to my ideal," from 1 = *strongly disagree* to 7 = *strongly agree*; $\alpha = .94$). Finally, participants completed the honesty check from Study 6.

Results and Discussion

Frequency of mind-wandering and concealing. We analyzed the frequency data as in the earlier studies. The adjusted

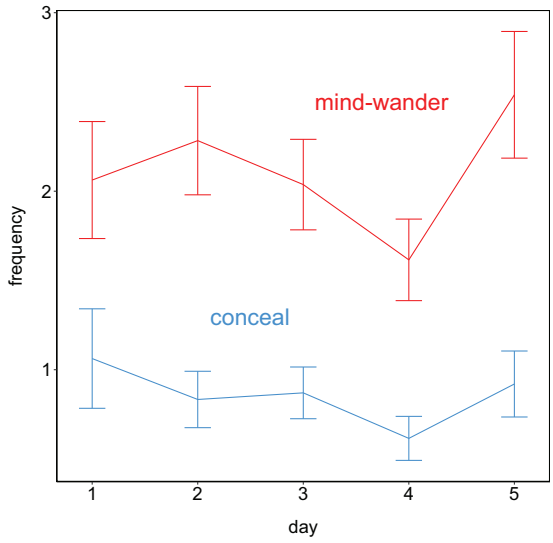

Figure 8. Mind-wandering and concealing frequency of secrets from partners, over days in Study 7. See the online article for the color version of this figure.

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boxplot approach (to account for skew; Kolmogorov–Smirnov $D = .41$, $p < .0001$) yielded a cutoff of 130. Thus, two responses, from two participants who indicated thinking of or hiding secrets more than 130 times in a month, were considered outliers, constituting 0.79% of the 252 responses collected from the 126 participants who passed the manipulation and honesty checks.[14] A paired *t*-test revealed that, once again, participants estimated mind-wandering to the secret significantly more in the preceding month ($M = 14.87$, $SD = 22.07$, 95% CI [10.95, 18.79]) than having to conceal the secret while interacting with their partner ($M = 5.89$, $SD = 12.29$, 95% CI [3.72, 8.06]), $t(123) = 4.62$, $p = .00001$, $d = .41$, 95% CI on d (.23, .60).[15]

Well-being. As with the prior studies, when entering both as simultaneous predictors, frequency of mind-wandering to the secret predicted lower well-being (i.e., satisfaction with life), $b = -0.01$, $SE = 0.01$, 95% CI [−0.03, −0.001], $t(121) = -2.13$, $p = .04$; whereas we found no independent effect of frequency of concealing, $b = -0.003$, $SE = 0.01$, 95% CI [−0.03, 0.02], $t(121) = -0.24$, $p = .81$.

This result was not driven by the lay theory that secrecy hurts relationship quality. First, endorsing this lay theory did not predict well-being, $b = 0.11$, $SE = 0.10$, 95% CI [−0.08, 0.30], $t(124) = 1.15$, $p = .25$. Second, entering this lay theory along with the two frequencies did not alter the results; when accounting for this lay theory, still only mind-wandering frequency predicted lower well-being [lay theory $b = 0.01$, $SE = 0.09$, 95% CI [−0.17, 0.20], $t(120) = 0.15$, $p = .88$; mind-wandering $b = -0.02$, $SE = 0.01$, 95% CI [−0.03, −0.01], $t(120) = -2.82$, $p = .006$; concealing $b = -0.004$, $SE = 0.01$, 95% CI [−0.03, 0.02], $t(120) = -0.36$, $p = .72$].

Relationship quality. Perceived closeness with one's partner and satisfaction with the relationship correlated highly, $r = .88$, $p < .0001$. We thus averaged the two, yielding an index of *relationship quality*. Frequency of mind-wandering to the secret predicted lower relationship quality, $b = -0.02$, $SE = 0.01$, 95% CI [−0.03, −0.01], $t(121) = -2.89$, $p = .005$, whereas we found no independent effect of frequency of concealing, $b = -0.004$, $SE = 0.01$, 95% CI [−0.03, 0.02], $t(121) = -0.38$, $p = .70$.

Affect from mind-wandering and concealing. Participants reported that an act of secret concealment led to less positive affect ($M = 1.81$, $SD = .80$, 95% CI [1.67, 1.95]) compared to a mind-wandering episode involving a secret ($M = 1.99$, $SD = .94$, 95% CI [1.83, 2.16]), $t(125) = 3.04$, $p = .003$, $d = .27$, 95% CI on d (.09, .45), but that concealing the secret ($M = 2.372$, $SD = 1.034$, 95% CI [2.190, 2.554]) did not lead to more negative affect than mind-wandering to the secret ($M = 2.366$, $SD = 0.999$, 95% CI [2.1897, 2.542]), $t(125) = 0.11$, $p = .91$, $d = .01$, 95% CI on d (−.16, .18).

One might wonder whether the effect of mind-wandering on well-being and on relationship quality were driven by affect. We reconducted analyses on well-being and relationship quality with the inclusion of the affect measures. And critically, in both reanalyses, the only significant predictor of well-being (satisfaction with life) and relationship quality was frequency of mind-wandering to the secret, not frequency of concealing, nor any of the measures of affect (see Table 4).

Study 9: Secrets From Partners, Authenticity, and Well-Being

An existing body of work suggests that mind-wandering to negative or aversive material should worsen mood. Although secrets are not inherently negative, it is true that most of the secrets that people report keeping are negative. This begs the question: Is there anything unique about mind-wandering to secrets, or is it the case that mind-wandering to any negative topic would yield the same results? Whereas Study 8 found that mind-wandering (but not concealing) frequency predicted lower well-being (independent of affect), Study 9 tested this alternative hypothesis more directly by comparing the effect of keeping a secret from a partner to the effect of negative personal information that is not secret, controlling for the valence of both.

As discussed, intuition might lead one to assume that mind-wandering to secrets leads to diminished well-being because it involves thinking back to a negative event. It is important to point out that this alternative hypothesis assumes a hedonic basis of well-being. Yet, it is becoming increasingly recognized that well-being is composed of hedonic elements (i.e., feeling good, positive valence) as well as eudaimonic elements (i.e., finding meaning, living in accordance with one's authentic self; for a review see, Ryan & Deci, 2001). We propose that the effect of frequency of mind-wandering to secrets predicting lower well-being is not reducible only to mind-wandering to affectively negative content.

That is, although secrets may often deal with negative events or episodes, they are not the same as such events and episodes. Instead, we propose that what is unique about secrecy is the intent to conceal. We suspect that, relative to thinking of known negative information, thinking of a secret will be associated with feelings of inauthenticity. That is, thoughts of one's secret should be associated with the feeling of holding back from one's partner and not upholding relationship standards and values, central aspects of felt authenticity (Ryan & Deci, 2001; Lopez & Rice, 2006; Sheldon & Elliot, 1999; Wood et al., 2008). We test this hypothesis in Study 9.

A second goal of Study 9 was to test the role of two other variables. Specifically, two important variables come to mind when thinking about the relationships between secrecy, mind-wandering and well-being. First, one could argue that these effects emerge because people are trying to suppress thoughts about their secrets. We proposed many reasons for why a secret might return to one's thoughts (e.g., outstanding goals and intentions, unsolved problems, and unresolved personal concerns). Another reason a secret may come to mind is from trying to *not* think about it (and ironic thought intrusions; Wegner, 1994). Are the present effects just effects of things people try to not think about, or is there something unique about secrecy leftover when capturing suppression attempts? We measured suppression attempts to examine this question.

Finally, one might argue that the observed effect of mind-wandering frequency and well-being is a relationship based not in

[14] Replacing the two outlying responses with the cutoff point identified by the adjusted boxplot (130), or the maximum value under the cutoff (100), both led to the same pattern of results and significance.

[15] Levene's test demonstrated the variances were significantly different, $F = 10.68$, $p = .001$.

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Table 4
Study 8, Independent Effects of Affect From Mind-Wandering and Concealing, and Their Frequencies

	Multilevel modeling results
Independent effect on well-being	
Mind-wander frequency	$b = -.01$, 95% CI [−.03, −.001], $SE = .01$, $t(119) = -2.09$, $p = .04$
Conceal frequency	$b = -.002$, 95% CI [−.03, .02], $SE = .01$, $t(119) = -.20$, $p = .84$
Mind-wander positive affect	$b = .01$, 95% CI [−.42, .44], $SE = .22$, $t(119) = .05$, $p = .96$
Conceal positive affect	$b = .22$, 95% CI [−.30, .74], $SE = .26$, $t(119) = .82$, $p = .41$
Mind-wander negative affect	$b = .08$, 95% CI [−.39, .54], $SE = .23$, $t(119) = .34$, $p = .74$
Conceal negative affect	$b = -.13$, 95% CI [−.60, .34], $SE = .24$, $t(119) = -.57$, $p = .57$
Independent effect on relationship quality	
Mind-wander frequency	$b = -.02$, 95% CI [−.03, −.003], $SE = .01$, $t(119) = -2.38$, $p = .02$
Conceal frequency	$b = -.01$, 95% CI [−.03, .02], $SE = .01$, $t(119) = -.44$, $p = .66$
Mind-wander positive affect	$b = -.20$, 95% CI [−.62, .22], $SE = .21$, $t(119) = -.93$, $p = .35$
Conceal positive affect	$b = .04$, 95% CI [−.47, .55], $SE = .26$, $t(119) = .15$, $p = .88$
Mind-wander negative affect	$b = -.13$, 95% CI [−.58, .33], $SE = .23$, $t(119) = -.55$, $p = .58$
Conceal negative affect	$b = .15$, 95% CI [−.31, .61], $SE = .23$, $t(119) = .63$, $p = .53$

Note. Well-being $M = 4.53$, $SD = 1.53$, 95% CI [4.26, 4.79]; Relationship quality $M = 5.59$, $SD = 1.57$, 95% CI [5.32, 5.86].

the effect of having a secret, but rather a third variable: trait neuroticism. The more one is prone to negative affect, the more one might have lower well-being and also frequently mind-wander to a secret. Thus, another aim of Study 9 was to rule out the possibility that we are observing a relationship between mind-wandering and well-being simply because neurotic people both mind-wander more and have comparatively lower well-being.

Method

Participants and design. We recruited participants ($N = 200$; 50% female, $M = 37.19$ years, $SD = 12.64$) on MTurk for a "relationship study" advertised for people currently in a committed relationship. The procedure was similar to Study 8, but with notable modifications. Half of participants were randomly assigned to recall something significant they were keeping secret from their partner (as per Study 8). The other half were, however, randomly assigned to recall a piece of personal information that was significant, negative, and undesirable and importantly, something about which their partners were aware.

As in Study 8, all participants estimated the frequency with which they caught themselves thinking about this information when not with their partner, and the frequency with which they encountered situations that required that they actively conceal the information from their partner.

Finally, we measured feelings of authenticity, well-being (satisfaction with life), the valence of the information, suppression attempts, and trait neuroticism. Participants who reported having nothing to recall in response to the prompt ($N = 5$) and those who failed either the manipulation ($N = 8$) or honesty ($N = 1$) checks were excluded.

Procedure. As in Study 8, we first asked participants how long they had been with their current partner. Next, participants who were randomly assigned to the secret condition were asked to recall a significant secret they were actively keeping from their partner, using the same instructions that were utilized in Study 8 (i.e., to think about something secret from their partner, specifically something their partner did not know and that they were purposefully keeping secret). Participants in the known negative information condition were asked to recall personal information about which their partner was aware that was significant, negative, and undesirable.

As a manipulation check, on the subsequent screen, participants were asked whether their partner had knowledge of the information they had just reported. If they answered "yes," when in the secrecy condition, or "no" when in the negative known information condition, they failed the manipulation check and were excluded from the analyses.

Participants then reported two frequencies (counterbalanced order): the number of times, within the past 30 days, (a) they were not with their partner, but spontaneously thought about the information they described (*mind-wandering frequency*), and (b) they were interacting with their partner and chose to actively conceal the information during the interaction (*concealment frequency*). Just like with a secret, negative known information may be mind-wandered to with some frequency. Likewise, even negative information about which a partner is aware may sometimes be concealed. For instance, if one has a bad habit that one's partner is aware of, one might seek to conceal having had engaged in that habit (to avoid being reprimanded by one's partner or lectured again on the importance of breaking the habit).

Next, participants completed a three-item measure of authenticity, adapted from Wood, Linley, Maltby, Baliousis, and Joseph (2008): "I feel that I am not being fully authentic with my partner," "I feel that I am holding back some of the 'real me' from my partner," and "I feel that I am not fully upholding our relationship standards and values" from 1 (*not at all true*) to 7 (*very much true*), reverse scored toward authenticity ($\alpha = .90$), capturing critical elements of authenticity (e.g., the "real me" being known and living up to one's standards values; Ryan & Deci, 2001; Sheldon & Elliot, 1999; Wood et al., 2008).

Participants then completed the Satisfaction with Life Scale (Diener et al., 1985), a widely used measure of well-being that involves participants rating their agreement with various statements (e.g., "In most ways my life is close to my ideal"; from 1 = *strongly disagree* to 7 = *strongly agree*; $\alpha = .91$). Next, participants reported the valence of the recalled information (from 1 = *very negative* to 7 = *very positive*), reverse scored to

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provide a measure of the negativity of the example they retrieved. They then reported the frequency with which they try to not think about the information or push it out of their mind (from 1 = *not at all* often to 7 = *very often*). Lastly, participants rated their agreement to the eight items from the Big Five Inventory that measure trait neuroticism (e.g., "I worry a lot"; from 1 = *strongly disagree* to 7 = *strongly agree*; John & Srivastava, 1999).

Results

Secrets versus known negative personal information. We first examined how secrets and negative known personal information compared on valence and desire to suppress thoughts. Secrets were less negative ($M = 4.65$, $SD = 1.63$, 95% CI [4.33, 4.97]) than the negative known personal information ($M = 5.41$, $SD = 1.18$, 95% CI [5.15, 5.66]), $t(179.12) = -3.66$, $p = .0003$, $d = -0.54$, 95% CI on $d = (-0.83, -0.24)$.[16] However, people attempted to suppress thoughts about secrets ($M = 3.89$, $SD = 1.90$, 95% CI [3.51, 4.27]) no more often than negative known personal information ($M = 4.03$, $SD = 1.79$, 95% CI [3.65, 4.42]), $t(184) = -0.53$, $p = .60$, $d = -0.08$, 95% CI on $d = (-0.37, 0.21)$.

Frequency of mind-wandering and concealing. The secrets participants kept from their partners were less negative than the negative personal information known by partners, but there was no difference in the extent to which participants attempted to suppress these thoughts. We next conducted analyses per our earlier studies (first without controlling for these variables, and subsequently controlling for suppression attempts and negativity).

Identifying outlying responses. We analyzed the frequency data with the same approach that we utilized in previous studies. The adjusted boxplot approach (to account for skew; Kolmogorov–Smirnov $D = .62$, $p < .0001$) yielded a cutoff of 89. Thus, three responses, from three participants who indicated thinking of or hiding personal information more than 89 times in a month, were considered outliers. This constituted 0.81% of the 372 responses collected from the 186 participants who passed the manipulation and honesty checks.[17]

Analyzing frequencies. For secrets, results revealed that again, participants estimated mind-wandering to the secret significantly more in the preceding month ($M = 9.12$, $SD = 10.93$, 95% CI [6.95, 11.29]) than concealing the secret while interacting with their partner ($M = 3.89$, $SD = 7.55$, 95% CI [2.39, 5.39]), $t(99) = 5.39$, $p < .001 \times 10^{-3}$, $d = 0.54$, 95% CI [0.33, 0.75].[18]

For negative personal information known by one's partner, participants also estimated mind-wandering to it ($M = 9.36$, $SD = 10.35$, 95% CI [7.10, 11.62]) more than having to conceal it ($M = 4.88$, $SD = 5.79$, 95% CI [3.64, 6.13]), $t(82) = 4.49$, $p < .0001$, $d = 0.49$, 95% CI [0.26, 0.72].[19] Such a result is to be expected because participants should have little need to conceal information that is known by their partner.

Finally, results revealed that there was no difference in the frequency with which people mind-wandered to secrets and to known negative material, $t(181) = -0.15$, $p = .88$, $d = -0.02$, 95% CI [−0.31, 0.27]. Nor was there a difference in the frequency with which participants reported needing to conceal secrets and conceal negative personal material, $t(184) = -0.99$, $p = .32$, $d = -0.15$, 95% CI [0.43, 0.14], which again we suggest is a reflection of the rarity of needing to conceal a secret (i.e., it is actually concealed as often as other negative but known material).

Note that, given that the non-secret condition concerned significantly more negative material, this may explain why the information was mind-wandered to frequently, especially in light of our finding that people sought to suppress thoughts in both conditions to equal extents. We predicted that even despite being less negative, secrets would predict lower well-being, through feelings of inauthenticity (see Table 5 for correlations of control variables).

Authenticity. By holding back a secret from one's partner, one may feel that one is holding back part of themselves or not upholding the standards and values of the relationship (e.g., disclosure, trust, honesty). That is, by having a secret from one's romantic partner, one may feel inauthentic for it. We propose that the more participants mind-wander to the secret, thus, the more they should feel inauthentic for having it. We conducted a regression that entered mind-wandering frequency and concealment frequency, and both their interactions with whether the information was secret or not, as predictors of well-being.

As can be see in Table 6, only mind-wandering frequency (and not concealing frequency) interacted with whether the information was secret in predicting authenticity ($M = 5.01$, $SD = 1.77$, 95% CI [4.76, 5.27]). Simple slopes analyses demonstrated that the more participants mind-wandered to their secret, the less authentic they felt ($p = .00004$), but there was no effect for mind-wandering to negative known personal information ($p = .41$); and there were no effects for concealing frequencies (see Table 6).

As can be seen in Table 7, the more negative the information and the more they attempted to suppress the thought, the less authentic participants felt. There was no relationship between trait neuroticism and felt authenticity. Importantly, all effects on authenticity (i.e., that mind-wandering to the secret predicted lower felt authenticity), remained when controlling for each of these control variables separately or simultaneously (Table 7).

Well-being. We next examined independent main effects of our measured variables on well-being, as measured with the Satisfaction with Life Scale ($M = 4.80$, $SD = 1.40$, 95% CI [4.59, 5.00]).

As can be seen in Table 8, increased authenticity predicts higher well-being, whereas the negativity of participants' personal information did not, nor did attempts to suppress the thought. As would be anticipated, trait neuroticism predicted lower well-being (satisfaction with life). Condition did not predict well-being, which demonstrates the two groups did not differ systematically on well-being (i.e., successful random assignment).

These results support our proposal that when it comes to secrecy and well-being, it is not a simple matter of valence (i.e., hedonia), but instead feelings of authenticity (not holding back the "real me," meeting values and standards; i.e., eudaimonia). The more negative participants rated the personal information (whether secret or

[16] Levene's test demonstrated the variances were significantly different, $F = 5.21$, $p = .02$, and thus Welch's t-test was used, which yields the same level of significance as the Student's t-test.

[17] Replacing the two outlying responses with the cutoff point identified by the adjusted boxplot (89), or the maximum value under the cutoff (50), both led to the same pattern of results and significance.

[18] Levene's test demonstrated the variances were significantly different, $F = 12.31$, $p < .001$.

[19] Levene's test demonstrated the variances were significantly different, $F(1, 167) = 10.05$, $p = .002$.

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Table 5
Zero-Order Correlations for Study 9 Variables, per Condition

Condition	Mean	*SD*	Concealment	Negativity	Suppression	Neuroticism	Authenticity
Secrecy							
Mind-wandering	9.12	10.93	.50**	.09	.34**	.20*	−.38**
Concealment	3.89	7.55	—	−.07	.05	.07	−.12
Negativity	4.65	1.63	—	—	.10	.04	−.34**
Suppression	3.89	1.90	—	—	—	.20**	−.46**
Neuroticism	3.26	1.42	—	—	—	—	−.15
Authenticity	4.60	1.86	—	—	—	—	—
Non-secrecy (negative)							
Mind-wandering	9.36	10.35	.44**	.02	.41**	.09	−.19
Concealment	4.88	5.79	—	.03	.36**	.11	−.25*
Negativity	5.41	1.81	—	—	.34	.05	.03
Suppression	4.03	1.79	—	—	—	.14	−.33
Neuroticism	3.65	1.44	—	—	—	—	.06
Authenticity	5.49	1.54	—	—	—	—	—

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

not) did not predict lower satisfaction with life, but the less authentic they felt (i.e., the less the felt they were upholding relationship values and sharing their real self with their partner), the lower their well-being.

Moderated indirect effect. Given that mind-wandering to secrets from partners (but not negative personal information known by partners) predicts decreased feelings of authenticity, and authenticity predicts well-being, this met the conditions for testing for moderated mediation. We thus conducted a formal bootstrapped moderated mediation analysis (with 5,000 iterations), examining the indirect effects of mind-wandering frequency and concealing frequency (independent of each other) on well-being *through authenticity* at both levels of the moderator (i.e., secret vs. not). For direct effects on well-being, see Table 9.

For secrets from partners, mind-wandering frequency predicted lower well-being through decreased feelings of authenticity, *M* indirect effect = −0.0128, *SE* = 0.0065, 95% CI [−0.0285, −0.003], whereas concealing frequency did not, *M* indirect effect = 0.0038, *SE* = 0.0053, 95% CI [−0.0018, 0.0211].

For negative personal information known by partners, neither mind-wandering frequency, *M* indirect effect = −0.0028, *SE* = 0.0034, 95% CI [−0.0122, 0.0019], nor concealing frequency, *M* indirect effect = −0.0082, *SE* = 0.0080, 95% CI [−0.0352, 0.0016], predicted well-being through feelings of authenticity. Finally, these moderated mediation analyses replicated when controlling for each control variable separately or simultaneously (see Table 10).

Discussion

The prior studies consistently converged on the finding that the frequency of mind-wandering to secrets, but not concealing secrets, predicts lower well-being. One potential reason for this discrepancy is that relative to mind-wandering to a secret, concealing a secret is a relatively rare experience. People intend to conceal a secret, and once in a while (if at all) a social situation necessitates actively concealing the secret, and then people move on. Yet that aside, thoughts of the secret can still frequently come

Table 6
Study 9, Simple Slopes of Mind-Wandering and Concealing Frequency at Secret and Not Secret Personal Information on Feelings of Authenticity (M = 5.01, SD = 1.77, 95% CI [4.76, 5.27]), No Controls

Independent effect on authenticity	Regression results
Evaluated at yes secret:	
Mind-wander frequency	$b = -.07$, $SE = .02$, 95% CI [−.11, −.04], $t(177) = -4.20$, $p = .00004$
Conceal frequency	$b = .02$, $SE = .02$, 95% CI [−.03, .07], $t(177) = .87$, $p = .39$
Secret (0 = secret, 1 = not secret)	$b = .70$, $SE = .33$, 95% CI [.04, 1.35], $t(177) = 2.11$, $p = .04$
Mind-Wander Frequency × Secret	$b = .06$, $SE = .03$, 95% CI [.01, .11], $t(177) = 2.18$, $p = .03$
Conceal Frequency × Secret	$b = -.07$, $SE = .04$, 95% CI [−.15, .02], $t(177) = -1.58$, $p = .12$
Evaluated at not secret:	
Mind-wander frequency	$b = -.02$, $SE = .02$, 95% CI [−.05, .02], $t(177) = -.83$, $p = .41$
Conceal frequency	$b = -.05$, $SE = .03$, 95% CI [−.11, .02], $t(177) = -1.32$, $p = .19$
Secret (1 = secret, 0 = not secret)	$b = -.70$, $SE = .33$, 95% CI [−1.35, −.04], $t(177) = -2.11$, $p = .04$
Mind-Wander Frequency × Secret	$b = -.06$, $SE = .03$, 95% CI [−.11, −.01], $t(177) = -2.18$, $p = .03$
Conceal Frequency × Secret	$b = .07$, $SE = .04$, 95% CI [−.02, .15], $t(177) = 1.58$, $p = .12$

Note. Because assessing simple slopes at both levels of secrecy (yes vs. not) only influences the sign of the interaction terms and the secrecy term, and *only* change the mind-wander and concealment coefficients, we streamline the presentation of the following Tables 7 and 9, presenting these terms evaluated at not secrecy (to maintain secrecy = 1, not secrecy = 0). Critically, in these following tables, we present the mind-wander and concealment coefficients at both levels of secrecy.

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Table 7
Study 9, Simple Slopes of Mind-Wandering and Concealing Frequency at Secret and Not Secret Personal Information on Feelings of Authenticity (M = 5.01, SD = 1.77, 95% CI [4.76, 5.27]), With Controls

Independent effect on authenticity	Regression results, predicting authenticity
Controlling for valence (negativity)	
Mind-wander frequency (at secrecy)	$b = -.07$, $SE = .02$, 95% CI [−.10, −.03], $t(176) = -3.93$, $p = .0001$
Conceal frequency (at secrecy)	$b = .01$, $SE = .02$, 95% CI [−.03, .06], $t(176) = .58$, $p = .56$
Mind-wander frequency (at not secrecy)	$b = -.02$, $SE = .02$, 95% CI [−.05, .02], $t(176) = -.82$, $p = .41$
Conceal frequency (at not secrecy)	$b = -.05$, $SE = .03$, 95% CI [−.11, .02], $t(176) = -1.34$, $p = .18$
Secret (1 = secret, 0 = not secret)	$b = -.87$, $SE = .33$, 95% CI [−1.53, −.21], $t(176) = -2.61$, $p = .01$
Mind-Wander Frequency × Secret	$b = -.05$, $SE = .03$, 95% CI [−.10, −.001], $t(176) = -2.02$, $p = .05$
Conceal Frequency × Secret	$b = .06$, $SE = .04$, 95% CI [−.02, .14], $t(176) = 1.43$, $p = .16$
Valence (negativity)	$b = -.22$, $SE = .08$, 95% CI [−.38, −.05], $t(176) = -2.61$, $p = .01$
Controlling for suppression attempts	
Mind-wander frequency (at secrecy)	$b = -.05$, $SE = .02$, 95% CI [−.08, −.02], $t(176) = -2.89$, $p = .004$
Conceal frequency (at secrecy)	$b = .01$, $SE = .02$, 95% CI [−.04, .06], $t(176) = .38$, $p = .71$
Mind-wander frequency (at not secrecy)	$b = .001$, $SE = .02$, 95% CI [−.04, .04], $t(176) = .05$, $p = .96$
Conceal frequency (at not secrecy)	$b = -.02$, $SE = .03$, 95% CI [−.09, .04], $t(176) = -.69$, $p = .49$
Secret (1 = secret, 0 = not secret)	$b = -.63$, $SE = .31$, 95% CI [−1.24, −.01], $t(176) = -1.99$, $p = .05$
Mind-Wander Frequency × Secret	$b = -.05$, $SE = .02$, 95% CI [−.10, −.002], $t(176) = -2.05$, $p = .04$
Conceal Frequency × Secret	$b = .03$, $SE = .04$, 95% CI [−.05, .11], $t(176) = .78$, $p = .44$
Suppression attempts	$b = -.32$, $SE = .07$, 95% CI [−.45, −.19], $t(176) = -4.75$, $p < .0001$
Controlling for trait neuroticism	
Mind-wander frequency (at secrecy)	$b = -.07$, $SE = .02$, 95% CI [−.11, −.04], $t(176) = -4.18$, $p = .0001$
Conceal frequency (at secrecy)	$b = .02$, $SE = .02$, 95% CI [−.03, .07], $t(176) = .87$, $p = .39$
Mind-wander frequency (at not secrecy)	$b = -.02$, $SE = .02$, 95% CI [−.05, .02], $t(176) = -.83$, $p = .41$
Conceal frequency (at not secrecy)	$b = -.05$, $SE = .03$, 95% CI [−.12, .02], $t(176) = -1.33$, $p = .19$
Secret (1 = secret, 0 = not secret)	$b = -.69$, $SE = .34$, 95% CI [−1.35, −.03], $t(176) = -2.06$, $p = .04$
Mind-Wander Frequency × Secret	$b = -.06$, $SE = .03$, 95% CI [−.11, −.01], $t(176) = -2.19$, $p = .03$
Conceal Frequency × Secret	$b = .07$, $SE = .04$, 95% CI [−.02, .15], $t(176) = 1.58$, $p = .11$
Trait neuroticism	$b = .02$, $SE = .09$, 95% CI [−.15, .19], $t(176) = .20$, $p = .84$
Controlling for valence, suppression, and neuroticism	
Mind-wander frequency (at secrecy)	$b = -.05$, $SE = .02$, 95% CI [−.08, −.01], $t(174) = -2.83$, $p = .005$
Conceal frequency (at secrecy)	$b = .005$, $SE = .02$, 95% CI [−.04, .05], $t(174) = .19$, $p = .85$
Mind-wander frequency (at not secrecy)	$b < .001$, $SE = .02$, 95% CI [−.04, .04], $t(174) = .002$, $p > .99$
Conceal frequency (at not secrecy)	$b = -.03$, $SE = .03$, 95% CI [−.09, .04], $t(174) = -.76$, $p = .45$
Secret (1 = secret, 0 = not secret)	$b = -.73$, $SE = .32$, 95% CI [−1.36, −.09], $t(174) = -2.27$, $p = .02$
Mind-Wander Frequency × Secret	$b = -.05$, $SE = .02$, 95% CI [−.10, −.0001], $t(174) = -1.98$, $p = .05$
Conceal Frequency × Secret	$b = .03$, $SE = .04$, 95% CI [−.05, .11], $t(174) = .73$, $p = .47$
Valence (negativity)	$b = -.16$, $SE = .08$, 95% CI [−.32, −.004], $t(174) = -2.03$, $p = .04$
Suppression attempts	$b = -.30$, $SE = .07$, 95% CI [−.44, −.17], $t(174) = -4.48$, $p = .00001$
Trait neuroticism	$b = .07$, $SE = .08$, 95% CI [−.09, .23], $t(174) = .82$, $p = .41$

to mind (when irrelevant to the situation at hand). Having one's thoughts return to content that is affectively negative may be why well-being suffers. That is, a hedonic account of these effects is that having one's thoughts return to a secret is to have thoughts of a negative experience come to mind, and frequent negative thoughts would predict lower well-being. Yet, we take an alternate account of this effect. That is, although secrets may often deal with negative content, negative content is not what defines a secret; rather we suggest it is the intent to conceal that makes a secret a secret.

Given that we live in a world where disclosure is how people connect to one another (Altman & Taylor, 1973), and honesty is valued in our relationships (Sprecher & Regan, 2002), this intent to hold back information from known others might signal a failure to meet personal or relational values, or a lack of presenting one's true self, that is, a lack of being authentic.

Table 8
Study 9, Independent Effect of Authenticity, Valence, Suppression Attempts, Trait Neuroticism, and Secrecy Condition on Well-Being (M = 4.80, SD = 1.40, 95% CI [4.59, 5.00])

Independent effect on well-being	Regression results, predicting authenticity
Authenticity	$b = .13$, $SE = .06$, 95% CI [.01, .25], $t(180) = 2.12$, $p = .04$
Valence (Negativity)	$b = -.09$, $SE = .07$, 95% CI [−.22, .04], $t(180) = -1.37$, $p = .17$
Suppression attempts	$b = -.04$, $SE = .06$, 95% CI [−.15, .07], $t(180) = -.73$, $p = .47$
Trait neuroticism	$b = -.36$, $SE = .07$, 95% CI [−.49, −.23], $t(180) = -5.37$, $p < .0001$
Secret (1 = secret, 0 = not secret)	$b = .07$, $SE = .20$, 95% CI [−.34, .47], $t(180) = .34$, $p = .74$

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Table 9
Study 9, Direct Effects on Well-Being (M = 4.80, SD = 1.40, 95% CI [4.59, 5.00])

Independent effect on well-being	Regression results, predicting well-being
Authenticity	$b = .14$, $SE = .06$, 95% CI [.02, .27], $t(173) = 2.30$, $p = .02$
Mind-wander frequency (at secrecy)	$b = .03$, $SE = .01$, 95% CI [.004, .06], $t(173) = 2.22$, $p = .03$
Conceal frequency (at secrecy)	$b = -.03$, $SE = .02$, 95% CI [−.06, .01], $t(173) = -1.33$, $p = .19$
Mind-wander frequency (at not secrecy)	$b = .003$, $SE = .02$, 95% CI [−.03, .03], $t(173) = .18$, $p = .86$
Conceal frequency (at not secrecy)	$b = .01$, $SE = .03$, 95% CI [−.05, .06], $t(173) = .26$, $p = .80$
Secret (1 = secret, 0 = not secret)	$b = -.11$, $SE = .27$, 95% CI [−.64, .42], $t(173) = -.40$, $p = .69$
Mind-Wander Frequency × Secret	$b = .03$, $SE = .02$, 95% CI [−.01, .07], $t(173) = 1.43$, $p = .15$
Conceal Frequency × Secret	$b = -.03$, $SE = .03$, 95% CI [−.10, .03], $t(173) = -.98$, $p = .33$
Valence (Negativity)	$b = -.09$, $SE = .07$, 95% CI [−.22, .04], $t(173) = -1.31$, $p = .19$
Suppression attempts	$b = -.07$, $SE = .06$, 95% CI [−.18, .05], $t(173) = -1.12$, $p = .26$
Trait neuroticism	$b = -.36$, $SE = .07$, 95% CI [−.49, −.23], $t(173) = -5.49$, $p < .0001$

Aside from hedonic elements, well-being is composed of eudaimonic elements (i.e., having meaning, living in accordance with one's values; see, Ryan & Deci, 2001). We proposed that having the mind remind itself (whether through internal or external signals) of information that one is holding back from others might evoke feelings of inauthenticity. Indeed, Study 9 directly compared a hedonic with a eudaimonic account by comparing secrets from partners to negative known personal information from partners. Independent of how negative the information was, or trait tendencies to experience negative affect (i.e., neuroticism), it was having one's thoughts return to secrets, and not negative information, that predicts lower well-being, specifically through reducing feelings of authenticity.

Study 10: Mind-Wandering and Concealing in Presence and Absence of Target People

The reader may have noticed that, as defined, mind-wandering about one's secret in the absence of the target person from whom it is kept and concealment as happening when in front of a target person could be considered two cells from a 2 × 2. That is, people could also mind-wander to a secret while interacting with the person from whom the information is being kept, and they could engage in efforts to conceal a secret when not with that person (e.g., deleting emails, throwing out receipts; i.e., behaviors that involve "covering their tracks"). The exclusion of these two latter cells from the prior studies does not change that people consis-

Table 10
Study 9, Indirect Effects of Mind-Wandering and Concealing Frequencies (Independent of Each Other) on Well-Being Through Authenticity, at Both Levels of the Moderator (Secrecy vs. Not)

Indirect effect	Regression results
No controls	
Mind-wander frequency (at secrecy)	*M* indirect effect = −.0128, *SE* = .0065, 95% CI [−.0285, −.0030]
Conceal frequency (at secrecy)	*M* indirect effect = .0038, *SE* = .0053, 95% CI [−.0018, .0211]
Mind-wander frequency (at not secrecy)	*M* indirect effect = −.0028, *SE* = .0034, 95% CI [−.0122, .0019]
Conceal frequency (at not secrecy)	*M* indirect effect = −.0082, *SE* = .008, 95% CI [−.0352, .0016]
Controlling for valence (Negativity)	
Mind-wander frequency (at secrecy)	*M* indirect effect = −.0106, *SE* = .0059, 95% CI [−.0249, −.0016]
Conceal frequency (at secrecy)	*M* indirect effect = .0023, *SE* = .0040, 95% CI [−.0027, .0135]
Mind-wander frequency (at not secrecy)	*M* indirect effect = −.0025, *SE* = .0033, 95% CI [−.0115, .0019]
Conceal frequency (at not secrecy)	*M* indirect effect = −.0073, *SE* = .0075, 95% CI [−.0299, .0018]
Controlling for suppression attempts	
Mind-wander frequency (at secrecy)	*M* indirect effect = −.0066, *SE* = .0049, 95% CI [−.0202, .0000]
Conceal frequency (at secrecy)	*M* indirect effect = .0012, *SE* = .0039, 95% CI [−.0031, .0141]
Mind-wander frequency (at not secrecy)	*M* indirect effect = .0001, *SE* = .0026, 95% CI [−.0044, .0067]
Conceal frequency (at not secrecy)	*M* indirect effect = −.0031, *SE* = .0056, 95% CI [−.0215, .004]
Controlling for trait neuroticism	
Mind-wander frequency (at secrecy)	*M* indirect effect = −.0132, *SE* = .0063, 95% CI [−.0293, −.0039]
Conceal frequency (at secrecy)	*M* indirect effect = .0039, *SE* = .0057, 95% CI [−.0026, .0215]
Mind-wander frequency (at not secrecy)	*M* indirect effect = −.0029, *SE* = .0033, 95% CI [−.0118, .0019]
Conceal frequency (at not secrecy)	*M* indirect effect = −.0084, *SE* = .0076, 95% CI [−.0315, .0013]
Controlling for valence, suppression, neuroticism	
Mind-wander frequency (at secrecy)	*M* indirect effect = −.0069, *SE* = .0046, 95% CI [−.0200, −.0010]
Conceal frequency (at secrecy)	*M* indirect effect = .0006, *SE* = .0037, 95% CI [−.0038, .0121]
Mind-wander frequency (at not secrecy)	*M* indirect effect = .00001, *SE* = .0028, 95% CI [−.0058, .0059]
Conceal frequency (at not secrecy)	*M* indirect effect = −.0036, *SE* = .0056, 95% CI [−.0204, .0038]

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Table 11
Descriptives for Frequency Estimates in Study 10

Frequency in past month	*M* (*SD*) [LL, UL]
Conceal in absence	1.62 (4.75) [1.50, 1.73]
Conceal in presence	2.04 (5.30) [1.92, 2.17]
Mind-wander in absence	3.51 (6.99) [3.34, 3.68]
Mind-wander in presence	2.20 (5.67) [2.06, 2.34]

tently catch themselves mind-wandering to secrets in the absence of the person more frequently than they encounter situations that necessitate the active concealment of information from the person. Nor does it alter the fact that the former but not latter predicts lower well-being. That said: What about the other two cells? Study 10 explores the full 2 (mind-wander, conceal) × 2 (in presence, in absence of target person), comparing the different frequencies, and how strongly they predict well-being.

Method

Study 10 recruited 600 participants (M_{age} = 35.01 years, *SD* = 11.47, 59% female). Originally conceived as a sample of 200, followed by two exact replications (n = 200 each), to save space in the current multi-study paper, results are pooled into one analysis (patterns of results are the same across each subsample of 200 participants; see the earlier Table 1 for secrecy frequencies, and see supplemental material for results broken down by subsample). As in Study 3, participants were presented with the 38 categories of secrets from the first part of the paper, and, per each current secret, we measured its effect on well-being, frequency of mind-wandering to the secret in the absence of the target person, and concealing the secret when with the target person. However, Study 10 also measured the frequency of mind-wandering to the secret when with the target person, and concealing the secret when not with the target person (see supplemental material for exact wordings for items).

Results

To ensure honest reporting, participants were asked at the end of the study whether they had been honest about their secrets. It was emphasized there would be no negative consequences if they admitted to being dishonest. A total of 25 participants indicated not being honest about the secrets they were keeping and were thus excluded from analysis (retaining them does not influence the results). Of the remaining participants, 549 indicated they currently had at least one of the 38 categories of secrets. In total, participants had 6,654 secrets (see Table 1 for frequencies of secrecy, and see supplemental material for secrecy frequencies per category of secret).

Frequencies. The adjusted boxplot method again identified outliers (81 responses, from 21 participants who provided frequency judgments of more than 62 times in a month were considered outliers, leading to a loss of only 0.32% of the data). We were thus left with 26,535 responses across the four frequency judgments for analysis (descriptives are presented in Table 11).

The most frequent form of secrecy was mind-wandering to the secret in the absence of the target person (see Table 11). We can also model main effects of these two factors (mind-wander = 1 vs. conceal = 0, and presence = 1 vs. absence = 0), which reveals that *people catch themselves thinking about their secrets more than they hide them* (independent of whether or not they are in the presence of the person from whom the secret is being kept), b = 1.03, 95% CI [0.91, 1.15], SE = 0.06, t = 16.88, $p < .001 \times 10^{-12}$. There was also an independent effect of absence versus presence on frequencies: *whether thinking about or hiding secrets, secrets are on people's minds more frequently outside of interactions with the person from whom the secret is being kept*, b = −0.44, 95% CI [−0.56, −0.32], SE = 0.06, t = −7.24, $p = .005 \times 10^{-10}$.

Again, although the Gaussian models yield readily interpretable coefficients of count outcomes, Poisson models better model count outcomes, and critically, replicate these analyses. People catch themselves thinking about their secrets more than they hide them [intercept = −0.21, B = 0.45, 95% CI [0.43, 0.47], SE = 0.01, z = 54.72, $p < .001 \times 10^{-12}$], and secrets are on people's minds more outside (than inside) social interactions with the target person [B = −0.19, 95% CI [−0.21, −0.17], SE = 0.01, z = −23.67, $p < .001 \times 10^{-12}$]. Converting the latter model coefficients (log-likelihood) to incidence ratios, reveals that independent of presence of the target person, people mind-wander to secrets 1.57 times more often than they conceal them, and independent of how the secret is on the mind (mind-wander/conceal), secrets are on the mind in the absence of the target person 1.21 times more often than when with the target person.

There was also an interaction between these two factors, b = −1.75, 95% CI [−1.99, −1.51], SE = 0.12, t = −14.35, $p < .001 \times 10^{-12}$, such that people mind-wandered to secrets more frequently than they concealed them, more so in the absence of target people, b = 1.91, 95% CI [1.74, 2.08], SE = 0.09, t = 22.13, $p < .001 \times 10^{-12}$, than in the presence of target people, where the difference was marginal; b = 0.16, 95% CI [−0.01, 0.33], SE = 0.09, t = 1.84, p = .07; Table 11.

Table 12
Study 10, Independent Effects on Well-Being (M = .02, SD = 2.35; 95% CI [−.03, .08]), Intercept = .29

Independent effect on well-being	Multilevel modeling results
Conceal in absence	b = .003, 95% CI [−.01, .02], SE = .01, t = .38, p = .70
Conceal in presence	b = −.01, 95% CI [−.03, .002], SE = .01, t = −1.64, p = .10
Mind-wander in absence	b = −.03, 95% CI [−.04, −.02], SE = .01, t = −5.11, $p = .003 \times 10^{-4}$
Mind-wander in presence	b = −.02, 95% CI [−.04, −.01], SE = .01, t = −2.99, p = .003

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A Poisson model replicates this interaction and the two simple effects, with the only difference being the (smaller) effect of mind-wander frequency being greater than concealing frequency is now significant rather than marginal when in the *presence* of target people (interaction $B = -0.71$, 95% CI [−0.74, −0.67], $SE = 0.02$, $z = -42.47$, $p < .001 \times 10^{-12}$; mind-wander versus conceal in absence $B = 0.78$, 95% CI [0.76, 0.81], $SE = 0.01$, incidence ratio = 2.19, $z = 67.16$, $p < .001 \times 10^{-12}$; mind-wander versus conceal in presence $B = 0.07$, 95% CI [0.05, 0.10], $SE = 0.01$, incidence ratio = 1.08, $z = 6.30$, $p < .001 \times 10^{-6}$).

Well-being. We next entered the frequency scores as simultaneous predictors of well-being. Mind-wandering to secrets in the absence, or presence, of the person from whom the secret is kept predicts lower well-being (see Table 12). Concealing secrets in the absence, or presence, of the person from whom the secret is being kept did not significantly independently predict well-being (see Table 12).

Thus, people catch themselves spontaneously thinking about their secrets more frequently than they encounter situations that require actively concealing them. Mind-wandering episodes involving secrets appear to be especially frequent in the absence of the people from whom the secrets are being kept, which consistently independently predicts lower well-being (unlike the frequency with which participants conceal secrets).

General Discussion

The current work takes a new perspective on secrecy. Prior treatments of secrecy have conceptualized and studied it as active concealment of information during social interactions. We suggest instead that secrecy is the psychological state that is brought about when one forms an intention to conceal information from others. Importantly, an intention to conceal can and does exist independent of acts of concealment. Thus, whereas prior work has examined the effects of *keeping* a secret, here we shifted the focus of inquiry and considered the psychological consequences of *having* a secret.

As would be expected, we find that having a current secret is associated with increased concealment of that secret within social interactions. Yet, we also find that secrecy exerts a pull on attention, consistent with existing evidence that the mind has a habit of wandering to thoughts about unresolved personal concerns (Baird, Smallwood, & Schooler, 2011; Klinger, 2013; Mason & Reinholtz, 2015; Stawarczyk et al., 2013) and that outstanding intentions have a special processing status in memory (cf. Goshke & Kuhl, 1996; Koriat, Ben-Zur, & Nussbaum, 1990). Thus, not only does secrecy predict concealment within social interactions, but it also predicts mind-wandering to the secret outside of those social interactions. Critically, we find that it is the frequency of mind-wandering rather than the frequency of concealing that predicts diminished well-being.

We argue that this new conceptualization of secrecy leads to a broader view of secrecy than prior work has taken, yielding new methods to study secrecy, a more complete account of what episodes and experiences people decide to keep secret, and a refined understanding of what it is like to have a secret. Moreover, the current work provides new insights into what aspects of secrecy predict lower well-being, and related downstream consequences of having an intention to conceal from others. We argue that that the intention to conceal a secret is primary; it must exist for a person to actively conceal (i.e., keep) a secret. The moment someone intends to conceal something, we suggest that person now *has* a secret, which he or she *may* need to keep when interacting with others.

Across 10 studies, using both cross-sectional and longitudinal approaches, we demonstrated that people mind-wander to secrets more frequently than they encounter situations that require secret concealment. Furthermore, we established that the variability in the frequency of mind-wandering to secrets (but not concealing secrets) predicts variability in well-being. Study 3, in particular, found that having a current versus former secret predicts lower well-being through more frequent mind-wandering to the secret outside of concealment settings (but not through concealment within social interactions).

Mind-wandering to secrets might predict lower well-being through mind-wandering to affectively negative content. Yet, this hypothesis is very much bound with a hedonic view of well-being. Well-being is much more than feeling good, however; it is also about feeling one has meaning, and is living up to one's values, and being authentic (i.e., eudaimonic well-being). It was this latter aspect of well-being that we predicted would be associated with mind-wandering to secrets. Indeed, Study 9 compared secrets from partners with negative personal information known by partners, and found that mind-wandering to the former (but not latter) predicted feelings of inauthenticity, thereby predicting lower satisfaction with life (eudaimonic well-being). Moreover, we found this effect above and beyond the negativity of the thought content and trait negative affect (neuroticism). This dovetails with work, which demonstrates that the more participants report being preoccupied with their secrets, the more those secrets seem to burden them, influencing how challenging other tasks seem (Slepian, Camp, & Masicampo, 2015; Slepian, Masicampo, & Galinsky, 2016). Thus, what seems to be harmful about secrecy, is not having to conceal a secret, but having to live with it, and having it return to one's thoughts.

A New Theory of Secrecy

By considering that secrecy processes can occur outside of active concealment within social interactions, across 10 studies we demonstrated that people catch their minds wandering to secrets outside of concealment settings far more frequently than they encounter social interactions that necessitate concealing them, and that the former is more damaging than the latter. We argue that defining secrecy too narrowly as "acts of withholding during social interactions" has yielded an inadequate understanding of how secrets are experienced, the effects that they have on people, and why they lead to these outcomes. We suggest our new perspective on secrecy and the current data call for a new theory of secrecy. Among other things, this new theory suggests ways that people with secrets might better cope with the secrets that they have, and suggests novel ways for researchers to investigate secrecy. We outline novel features and predictions of this theory below.

Intention to conceal precedes active concealment. Our shift in focus in defining secrecy as the intention to conceal information implies a timeline of secrecy. We suggest the intention to conceal information is primary; people have an intention to conceal *before*

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they encounter situations that require concealment. As soon as one commits to concealing information from one or more persons, he or she now has a secret. Critically, one may *have* a secret but not encounter a social situation that necessitates *keeping* the secret. It would seem odd to suggest that someone is working to *keep* a secret one does not yet *have*. Thus, we would argue the intention to conceal a secret is primary and worthy of examination.

Admittedly, in some circumstances, one might not intend to conceal information, but then do so during the course of a social interaction. Thus, intentions to withhold may occasionally emerge through a self-perception process (Bem, 1972) after an initial act of unintentional concealment. We propose that an unintentional omission during a conversation could lead to the inception of a secret (i.e., the intention to conceal from thereon) if, from noticing an omission, a person infers he or she must have wanted to conceal the personal information. Critically, we still suggest that even under these circumstances, the secret exists only when an intention to conceal the information is formed.

People mind-wander to secrets more frequently than they conceal them. We find that intending to keep information a secret is not only associated with increased frequency of concealment, but also increased frequency of mind-wandering to the secret. We find that people mind-wander to their secrets outside of concealment settings at a higher frequency than they work to conceal those secrets when interacting with the people from whom they wish to keep the information. We suggest four reasons for this pattern of results, none of which are mutually exclusive, and each is discussed in the following sections: temporal constraints, the effect of mental control on mind-wandering, the consequences of having an outstanding intention to withhold information from others, and self-perception.

Temporal constraints. People likely spend a greater proportion of their day in their own thoughts than they find themselves interacting with a person from who a secret is kept, and thus have more opportunities to mind-wander to a secret in the absence of the person. We suggest this may be true even when the secret is from a frequent interaction partner (e.g., one's spouse or romantic partner). If a wife cheated on her husband while on a business trip, she might mind-wander to this secret frequently, but acts of concealment may be relatively rare. Outside of answering questions about how she spent her evenings during that business trip, this secret could, in principle, not require much active concealment. She may never get asked a question about her business trip that would require active concealment of her infidelity, particularly as the trip grows more temporally distant. That said, she might frequently catch her mind wandering to thoughts about the infidelity, because such an indiscretion is of significant personal concern.

Thought suppression. Thought suppression may also play a role in heightening the frequency with which people mind-wander to their secrets. Wegner's (1994) model of ironic processes of mental control theorized that trying to suppress a thought initiates two concurrent mental processes: an intentional operating process that tries to suppress the thought and an ironic monitoring process that searches for evidence that the intentional operating process has failed. Wegner's model suggests people may sometimes experience an increase in the frequency with which they mind-wander to their secret as a result of trying to not think about it, which results from the ironic monitoring process that increases the accessibility of the secret in memory.

Interestingly, research suggests people can become quite adept as suppressing secrets with practice (Kelly & Kahn, 1994). Suppression is more likely to fail when asking participants to suppress a novel thought they have never suppressed before (e.g., a white bear), whereas suppressing a thought they have had practice suppressing (e.g., a secret) is more successful (Kelly & Kahn, 1994). We suggest that people spontaneously think about their secrets outside of concealment settings for additional reasons (beyond ironic thought intrusions). For instance, as discussed above, one simply has more time in the day to mind-wander to a secret than to be in situations that require concealment.

Outstanding goals. Mind-wandering to secrets may stem from additional factors beyond temporal opportunity and thought suppression. For instance, the act of *committing an intention* to keep a secret from others might lead one to think about the personal event or attribute more than one might otherwise. A long history of research on goal pursuit suggests outstanding intentions are more accessible in memory than are fulfilled goals and other types of information (e.g., Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Klinger, 1975; Kuhl & Beckman, 1994; Rothermund, 2003; Zeigarnik, 1927).

Here, we have suggested that an individual *has a secret* when he or she commits to an intention to withhold information from others. Having a secret entails maintaining an intention to withhold in perpetuity. As long as one has the secret, the goal to keep it a secret remains, and this goal can never be fully fulfilled (i.e., unless the secret is revealed, the goal to keep it still exists). Thus, a person with a secret might keep it chronically accessible in memory (similar to other outstanding intentions), leading one to think about the secret outside of social situations that call for acting on the goal to withhold.

Self-perception. Finally, the tendency to mind-wander to a secret may be further exacerbated if, via self-perception (Bem, 1972), people infer heightened significance from catching their mind spontaneously wandering to the secret (see Morewedge, Giblin, & Norton, 2014; Morewedge & Norton, 2009; see also Critcher & Gilovich, 2010). If intending to conceal a personal concern makes it seem more significant, this may cause people's minds to more frequently wander to that personal concern.

Mind-wandering to secrets predicts well-being more strongly than concealing secrets. When we modeled the effects of both the frequency of mind-wandering and the frequency of concealing secrets on well-being, we found the frequency of mind-wandering to secrets more strongly predicts diminished well-being than does the frequency of concealing. In fact, in each of the studies that tested the two as simultaneous predictors, holding constant the estimated frequency of concealing secrets, the variability in frequency of mind-wandering to the secret outside of concealment settings predicted the variability in the impact of the secret on well-being, whereas the converse was not the case.

Content of mind-wandering. One direction for future research is to specify more precisely what people are thinking about during these mind-wandering episodes. Some portion of this spontaneous thinking may entail past-oriented ruminating

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about the event that led to the secret or one's distressed feelings about the event. Yet, it is likely that sometimes people's mind-wandering instead involves future-oriented worrying about whether the secret should be revealed. One might also expect that some of the time mind-wandering may involve thinking about the fact that they are keeping a secret rather than the content of the secret itself.

Functional role of mind-wandering. Outside of past-focused rumination, or even future-oriented worry, people's mind-wandering episodes might involve spontaneous thoughts about what to do next, a sudden flash of insight into whom they might tell, or a whole host of other things. That is, mind-wandering to one's secrets may serve an important functional role of adaptive problem-solving. The content of people's mind-wandering outside of concealment settings is currently underspecified. Measuring the content of these thoughts might shed light on why mind-wandering to secrets is harmful as well as what types of interventions might help people cope with secrets, especially those that simply cannot be revealed.

Critically, by conceptualizing secrecy more broadly than in prior work, we establish that secrecy is not reducible to the concealment of information during a social interaction. We show that a core problem with having an intention to withhold information from others is that it is associated with frequent mind-wandering to the secret even outside of concealment settings. This finding implies scholars may need to reconsider how secrecy and its effects are measured and cast a broader net when examining the downstream consequences of secrecy.

Implications for How to Study Secrecy

Our new perspective on secrecy brings new methods for studying secrecy. In the current paper, we introduce the Common Secrets Questionnaire (CSQ), presented in the Appendix. We demonstrate that this measure seems to effectively capture common secrets: the average person reported currently having 13 of the 38 secrets included in the measure (5 of which they have never told anyone about). One beneficial feature of the CSQ is that, as illustrated in this paper, it permits assessing the *set* of secrets people have, various ratings of each of those secrets, the state of each of those secrets (e.g., known by no one; shared with at least one other person, etc.), and their outcomes. Moreover, category of secret as introduced by this method can be treated as a random factor, allowing researchers to conceptually generalize the findings to categories of secrets that were not sampled as part of the CSQ.

Perhaps the more substantive methodological contribution this paper makes is establishing the legitimacy of *thinking about secrets* as a major form of secrecy. Thus, secrecy can be studied by having people think about their secrets. Prior studies of secrecy have often assigned participants an artificial secret, in an artificial (laboratory) setting, and then measured the effects of withholding the information during a social interaction. That is, past research has measured the effects of inhibiting information in a conversation that was never actually a personal secret the participant had. Here, we examined participants' actual real-world secrets, and we demonstrated that the most common form secrecy takes is a spontaneous thought outside of a concealment setting, which predicts the most harm from secrecy (at least where well-being is concerned).

In the current work, we examine participants' personal secrets. Other classes of secrets may operate differently. For instance, keeping a secret on behalf of someone else could have positive effects (e.g., by creating a sense of intimacy between the person confided in and the confider). Tests of moderating and boundary conditions for the present results await future research.

Moreover, the current work only examined the frequency of mind-wandering and concealment episodes, but not the duration of these episodes (i.e., how long each episode of mind-wandering and concealing lasts), nor the relative time spent engaging in these processes relative to the amount of time spent alone in one's thoughts or with the person the secret is being kept from. The timing and duration of these episodes will likely have meaningful effects that cannot be captured by frequency counts alone. Thus, future research should employ experience-sampling methods to get a better picture of the timing and duration of these episodes as well as their effects.

Finally, it needs mentioning that we cannot make strong casual claims about the direction of the present effects. Although controlling for important covariates (e.g., state and trait negative affect, Study 9; current vs. former secret, Study 3; significance and deviance of the secret, Study 3) minimizes some concern of third variable alternative explanations, we cannot demonstrate causality. Experiments perhaps cannot realistically or ethically manipulate secret keeping from a close other (e.g., experimentally testing what is like to cheat on one's spouse and keep this a secret). That said, more long-term, longitudinal, diary or experience-sampling studies might provide important insight into this process, and we hope future work might use some of the present methods in adopting these longitudinal approaches.

Implications for Secrecy and Health

A host of work suggests secrecy is associated with negative health outcomes. Secrecy has been associated with depression, anxiety, and poor physical health (Cole, Kemeny, Taylor, & Visscher, 1996; Frijns, Finkenauer, & Keijsers, 2013; Kelly & Yip, 2006; Larson & Chastain, 1990; Larson, Chastain, Hoyt, & Ayzenberg, 2015; Lehmiller, 2009).

Our findings suggest that the effect of secrets on negative health outcomes may be mediated by increased mind-wandering to the secret. To date, scholars have largely assumed that secrets have their effects because interpersonal withholding is taxing. Our work suggests that, when it comes to secrecy, acts of concealment may be a less potent driver of diminished health and well-being than previously assumed. Although people have assumed secrecy primarily causes concealment, hurting well-being, our work marks a critical departure from extant work, and proposes instead that secrecy also causes mind-wandering to the secret outside of concealment settings. We demonstrate that having a current (vs. former) secret predicted increased frequency of mind-wandering to those secrets outside of concealment settings, which in turn predicted lower well-being outcomes (and this effect was associated with lower general health outcomes). We found no independent effect of having a secret on well-being through the frequency with which people conceal secrets.

Having higher psychological well-being (e.g., from need satisfaction and meeting values and standards) may be associated with increased healthy behaviors, such as healthy eating and exercise,

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and also reduced unhealthy behaviors as well as more adaptive responses to stress, thereby improving physical health (Ryan, Huta, & Deci, 2008; Ryff & Singer, 1998, 2008). Future work should measure not just the frequency with which people encounter social situations that require concealing, but also the frequency of mind-wandering to secrets outside of concealment settings as predictors of psychological well-being (both hedonic and eudaimonic), and how this might in turn influence health-related decisions and behaviors, thereby influencing physical health.

Of course people do not always feel they have someone in whom they can confide. Moreover, revealing a secret may not always be an option, such as when keeping a secret is part of one's occupation or is required by law. The current work suggests that interventions that decrease mind-wandering (e.g., therapies based on acceptance or mindfulness; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013; Mrazek, Phillips, Franklin, Broadway, & Schooler, 2013) may lead people to think less about their secrets. If participants must keep their secrets to themselves, these interventions could help in coping with the secret, and thereby improve health and well-being.

Conclusion

The concept of secrecy calls to mind one person actively concealing a secret during a social interaction with another person. Indeed, the goal of secrecy is to conceal from other people. In the current work, however, we offer a new theory and data, which present a new conception and refined understanding of secrecy. Although the intent of secrecy is to conceal, one may rarely need to actively conceal the secret, but still mind-wander to it frequently outside of concealment settings. We suggest that the intention to conceal information is primary, and occasionally active concealment follows. We find that active concealment is rare relative to the many times the mind wanders to thoughts of the secret, and frequency of mind-wandering to, but not concealing, secrets predicts lower well-being.

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(*Appendix follows*)

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Appendix

Common Secrets Questionnaire (CSQ)

Presented in two parts. Part 1 appears below. Part 2 follows.
Category labels (used throughout the paper), to the right (in bold), were not presented to participants.

PART 1:

We are interested in the psychology of secrets. These are the kinds of things people tend to keep secret.
We would like to know whether AT ANY TIME if YOU have ever kept any of the following things secret.

Carefully read each item.

Have *YOU* (*not* someone that you know) ever done one of these things, and at some point kept it a secret? Choose what best fits per each of the below items.

Again, this is about things that YOU have kept secret (*not* other people's secrets).

Hurt another person (for example, emotionally or physically hurt someone), and kept this secret from someone else	**other-harm**
Used illegal drugs, OR abused/addicted to a legal drug (e.g., alcohol, painkillers)	**drug use**
Had a habit or addiction (but NOT involving drugs)	**habit/addiction**
Stolen something from someone or some place	**theft**
Engaged in something illegal (other than drugs or stealing)	**illegal**
Physically harmed yourself	**self-harm**
Had an abortion	**abortion**
Had a traumatic experience (other than the above)	**trauma**
Have lied to someone	**lie**
Violated someone's trust (but NOT by a lie) For example, by snooping, revealing information about someone, breaking or losing something that belongs to someone without telling them, etc.)	**violate trust**
Had romantic desires about someone (while being single) For example, a crush, in love with someone, wanting relations with a specific person . . . while being single	**romantic desire**
Unhappy in a romantic relationship	**romantic discontent**
Thought about having relations with another person (while already in a relationship)	**extra-relational thoughts**
Committed *emotional* infidelity (NOT involving actual sexual infidelity) For example, having an inappropriate emotional connection with someone, or engaging in something other than sex, such as flirting, kissing, etc.	**emotional infidelity**
Committed *sexual* infidelity (engaged in sexual relations with someone who was not your partner)	**sexual infidelity**
At some point was in a relationship with someone who themselves actually had a partner (that is, the person was cheating on their partner — with you)	**other woman/man**
Dislike a friend, or unhappy with current social life	**social discontent**
Dissatisfied with something physical about yourself	**physical discontent**
Had mental health issues, or dissatisfied with something about yourself other than physical appearance (for example, fears, anxieties, depression, mental disorders, eating disorders)	**mental health**
Cheated or did something improper at work (or school), or having lied to get a job (or into a school)	**work cheating**
Performing poorly at work (or school)	**poor work performance**
Dissatisfied with your situation at work (or school)	**work discontent**
Planning to propose marriage	**marriage proposal**
Planning a surprise for someone (other than a marriage proposal)	**surprise**

For the above (Part 1), response options (presented in the following order):
I have had this experience, and keep it secret from everyone.
I have had this experience, and keep it secret from some people.
I have had this experience, and once kept it a secret, but it is not a secret anymore.
I have had this experience, but I have never kept it a secret.
I have never had this experience.

(*Appendix continues*)

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PART 2:

Similar to the above, these are things sometimes people hide from others.

Have YOU ever at any time hidden these things from other people?
Please choose the option that corresponds to the status of this secret today.

Did you ever hide a hobby or possession?	**hobby**
Did you ever hide a current relationship, or keep a past relationship secret?	**hidden relationship**
Have you ever kept a detail about your family secret?	**family detail**
Have you ever been pregnant and didn't tell some people?	**pregnant**
Have you ever concealed your sexual orientation/gender identity?	**sexual orientation**
Sexual behavior that you keep secret? (other than sexual orientation) (for example, porn, masturbation, fantasies, unusual sexual behavior, etc.)	**sexual behavior**
Kept secret a lack of having sex? (i.e., that you are not, or were not, having sex at some point)	**no sex**
Kept secret a preference for something? (for example, not liking something that people think you like, or liking something people do not know you like)	**preference**
Kept a belief secret? (for example, political views, religious views, views about social groups, prejudice)	**belief/ideology**
Keep secret details about finances (or amount of money you have)?	**finances**
Kept secret a job or employment that you have (or school activity)?	**employment**
Kept a secret ambition, secret plan, or secret goal for yourself?	**ambition**
An unusual behavior you keep secret? (unrelated to any of the above categories, in this section and the above section)	**counternormative**
A specific story you keep secret? (unrelated to any of the other categories, this section and the above section)	**personal story**

For the above (Part 2), response options (presented in the following order):
Yes, I have something like this that I keep secret from everyone.
Yes, I have something like this that I keep secret from some people.
Yes, I have something like this, and once kept it a secret, but it is not a secret anymore.
Yes, I have had something like this that some people tend to keep secret, but I never kept it secret.
I have never had something related this that people tend to keep secret.

Received December 14, 2016
Revision received March 14, 2017
Accepted March 15, 2017 ■

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