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MEMORANDUM—*for information*

Date: March 5, 2016
To: Advisory Committee on Rules of Evidence
From: Timothy Lau*
Re: Review of Scientific Literature on the Reliability of Present Sense Impressions and Excited Utterances

I. Executive Summary

A. Purpose of the Memorandum

In October 2015, the Advisory Committee on Rules of Evidence held a symposium on the subject of hearsay reform. One of the issues discussed was the reliability of present sense impression (PSI) and excited utterance (EU) hearsay evidence currently admissible under Federal Rules of Evidence 803(1) and 803(2), here referred to as the PSI and EU hearsay exceptions, respectively.

Following the symposium, a member of the committee suggested that the Federal Judicial Center conduct original, experimental research examining the reliability of PSI and EU hearsay evidence. The Center offered to prepare a summary of the scholarly literature as a preliminary step, and the committee accepted this proposal.

This memorandum is prepared in response to the modified request of the committee. Section II summarizes the existing research findings on the reliability of PSI and EU hearsay. The review is interdisciplinary, but draws especially from the neurological, behavioral, and social sciences. Section III discusses the issues that remain unresolved and the need for and feasibility of conducting new experimental studies.

This memorandum is informational and is intended to serve as a framework for further discussion. It provides a general overview of the vast topics of deception, perception, and memory implicated in the overarching question of PSI and EU hearsay reliability. The Center stands ready to supplement this memorandum with an expanded exploration of topics that interest the committee.

B. Summary of the Memorandum

The federal courts have identified two important facets of hearsay reliability: (1) the susceptibility to fabrication, coaching, or confabulation; and (2) the accuracy of underlying observation.

* I would like to thank Jessica Snowden, Jason Cantone, and Molly Johnson for their helpful comments and suggestions.

Fabrication and coaching both reflect intentional lying. The intentional falsification of a PSI or an EU can be analyzed in three stages. First, the event or condition that is the subject of the PSI or EU must be amenable to being lied about. This memorandum identifies three characteristics of such an event or condition.

Second, the declarant must, within the time period permitted by the applicable hearsay exception, make the decision to lie. The literature suggests that humans have a default response when presented with an opportunity to lie. This response hinges on the presence of a motivation to lie. Generally, when there is a motivation to lie, the default response would be to lie, and when there is no motivation to lie, the default response would be to tell the truth. Cognitive effort and time are necessary to overcome this response pattern. To that end, whether PSI and EU hearsay evidence are generally free from lies is a question of whether declarants, on the whole, can quickly perceive any advantage to lying.

Existing research is largely silent on whether PSI and EU declarants have or could easily detect a motivation to lie. To arrive at an answer, the committee may have to draw on the judicial experience. PSI and EU hearsay evidence often originate in circumstances that involve a high level of mental trauma and physical danger, such as domestic abuse situations. It would be both impractical and unethical to subject humans to an adequate simulation of these situations in order to examine their facility in identifying motivations to lie. Experiments necessarily rely on safe, but more artificial, scenarios, which may not provide an externally valid test of the circumstances in which PSI and EU hearsay evidence often arises.

Third, lies inserted into a PSI or an EU must be of sufficient quality for the hearsay to be moved into evidence. The literature suggests that it generally is more difficult to create a lie than to tell the truth. The constraints attendant to the generation of PSI and EU hearsay evidence—time pressure and the need for coherent narratives—render the task of lying even more cognitively taxing. However, simply because a task is difficult does not mean it is impossible. Existing research is not conclusive but does suggest that the difficulty of crafting good lies in PSI and EU scenarios may reduce the incidence of lying. The Center may be able to effectively test this hypothesis with experiments.

Confabulation is a false memory. Unlike intentional liars, confabulators are not aware of the falsity of their statements. Confabulations often result from brain damage or mental disease; while healthy persons also may confabulate, they generally do so during memory tests or lengthy and pressured questioning. Confabulations do not appear to present much threat to the PSI and EU hearsay exceptions, and the Center does not recommend conducting experiments about them, given the other areas of potential inquiry.

As mentioned earlier, the accuracy of observation underlying a type of hearsay statement is another measure of reliability. The research literature makes clear that attention tends to improve the accuracy of observation. To the extent that a PSI about an event or condition reflects attention to that event or condition, the PSI may be of heightened reliability. Experimental studies in this area do not appear necessary.

However, research also suggests that emotion may impair perception and other mental processes that may be important to accurate observation. To the extent that an EU is made “under the stress of excitement,” it may be less reliable. However, it does not appear

that experiments in this area would be useful for the committee to assess the validity of the EU hearsay exception.

II. Review of Research Literature on the Reliability of PSI and EU Hearsay Evidence

A. Measures of Reliability

As the Supreme Court has noted, “[r]eliability is an amorphous, if not entirely subjective, concept.”¹ Rather than define and apply a set standard of reliability, this memorandum focuses on two aspects of reliability derived from judicial language.

In a discussion about the EU hearsay exception, the Supreme Court stated that “circumstances that eliminate the possibility of fabrication, coaching, or confabulation” could “provide sufficient assurance that the statement [made in those circumstances] is trustworthy.”² Accordingly, the susceptibility of a type of hearsay evidence to fabrication, coaching, or confabulation is one dimension of its reliability.

Also, the committee’s own notes about the EU hearsay exception have specifically addressed the criticism of the exception “on the ground that excitement impairs accuracy of observation.”³ Implicit is the idea that the accuracy of observation underpinning a particular type of hearsay evidence constitutes another measure of reliability.

The remainder of this memorandum therefore reviews research on the susceptibility of both PSI and EU hearsay evidence to fabrication, coaching, or confabulation, as well as the probable accuracy of underlying observations.⁴ To that end, this memorandum focuses only on statements that qualify as PSI and EU hearsay evidence within the language of the exceptions.⁵

1. Crawford v. Washington, 541 U.S. 36, 63 (2004).

2. Idaho v. Wright, 497 U.S. 805, 820 (1990).

3. Fed. R. Evid. 803(2) advisory committee’s note.

4. A search of the literature yields no research that directly and empirically tests the assumptions underlying the PSI or EU exceptions. See, e.g., John E.B. Myers et al., *Hearsay Exceptions: Adjusting the Ratio of Intuition to Psychological Science*, 65 Law & Contemp. Probs. 3, 5 (2002) (“to our knowledge, psychological research has never directly tested the hypothesis that stress inhibits the ability to lie”). The limited empirical research concerning hearsay evidence tends to focus on such matters as the evaluation of the evidence by mock jurors. See, e.g., Gail S. Goodman et al., *Hearsay Versus Children’s Testimony: Effects of Truthful and Deceptive Statements on Jurors’ Decisions*, 30 Law & Hum. Behav. 363 (2006) (analyzing whether mock jurors perceived the credibility of a child’s statement differently based on the format in which the statement was presented and whether they could discriminate between accurate and deceptive statements made by a child). This review is therefore based on research directed at questions outside of the hearsay realm which nonetheless speak to the PSI and EU hearsay exceptions.

5. Some statements may resemble PSI or EU hearsay evidence but do not actually fulfill the requirements set forth in the exceptions. Examples include a statement about a nonexistent “event or condition” or one about an actual “event or condition” but not based on the declarant’s perception. This memorandum as-

B. Susceptibility of PSI and EU Hearsay Evidence to Fabrication, Coaching, and Confabulation

Fabrication, coaching, and confabulation are all potential sources of falsity, but they are separate phenomena. Fabrication and coaching involve intentional deception; that is, a declarant making a fabricated or coached statement intends the statement to be false. Confabulation, in contrast, is a false memory.⁶ Confabulators do not know they are not being truthful.⁷

The susceptibility of PSI and EU hearsay evidence to such intentional and unintentional deception are separately discussed in the following sections.

1. Fabrication and Coaching

No research appears to have directly addressed the susceptibility of PSI or EU hearsay evidence to deliberate lies. However, research has examined lies prompted by questions, which this memorandum reviews to the extent applicable.

Walczyk et al. have proposed the Activation-Decision-Construction Model to explain deceptive responses to questions:

The Activation-Decision-Construction Model describes answering questions deceptively The model analyzes the act into three components. First, a question heard or read activates the truth from long-term memory, usually automatically. Second, based on the activated truth and social context, a decision to lie may be made, usually to advance liars' interests. Truthful answering will then be actively inhibited, especially for well practiced truths that can proactively interfere with lying Third, a context-appropriate lie is constructed that must be coherent and plausible. When possible, memories of the truth are altered slightly for the sake of lie plausibility and to minimize the cognitive load of lie construction. Finally, a lie is shared.⁸

The intentional formation of a deceptive PSI or EU can be similarly analyzed as a three stage process. First, there must be an opportunity to lie. The PSI hearsay exception defines a PSI as “[a] statement describing or explaining an event or condition.” The EU hearsay exception defines an EU as “[a] statement relating to a startling event or condi-

sumes that courts can perfectly resolve the gatekeeping “preliminary questions of fact.” Fed. R. Evid. 803(2) advisory committee’s note.

6. Michael D. Kopelman, *Varieties of Confabulation and Delusion*, 15 *Cognitive Neuropsychiatry* 14, 25 (2010); Louis Nahum et al., *Forms of Confabulation: Dissociations and Associations*, 50 *Neuropsychologia* 2524 (2012); Jerrod Brown et al., *Confabulation: Connections between Brain Damage, Memory, and Testimony*, 3 *J.L. Enforcement* 1, 1 (2013), <http://www.jghcs.info/index.php/l/article/view/295/260>.

7. Brown et al., *supra* note 6, at 2.

8. Jeffrey J. Walczyk et al., *Advancing Lie Detection by Inducing Cognitive Load on Liars: A Review of Relevant Theories and Techniques Guided by Lessons from Polygraph-Based Approaches*, 4 *Frontiers in Psychology* 14, at 4 (2013) (citation omitted).

tion.” Neither a PSI nor an EU can be made in a vacuum. There must be some appropriate “event or condition” that the declarant can use to falsify hearsay evidence.

Second, the declarant must decide to lie. The PSI hearsay exception requires that a PSI be “made while or immediately after the declarant perceived [the event or condition],” and the EU hearsay exception requires that an EU be “made while the declarant was under the stress of excitement that [the startling event or condition] caused.” Falsifying a PSI or an EU requires the declarant to be capable of quickly deciding to make use of the event or condition to advance an agenda.

Third, the declarant must construct a deception of a quality sufficient for the falsified PSI or EU to be moved into evidence. The duty of candor to the tribunal forbids attorneys from offering evidence they know to be false.⁹ It is therefore insufficient that the declarant only have the opportunity to lie and makes the decision to do so; he or she must, within the time frame permitted by the applicable hearsay exception, contrive a falsehood of sufficient quality that attorneys cannot recognize the falsity after investigation.

This section reviews the research literature to the extent it addresses the feasibility of each of these three steps.

a. Opportunity to Falsify a PSI or an EU

No research to date appears to have tested the situational factors necessary for a declarant to successfully falsify PSI or EU hearsay evidence.

However, three probable prerequisites may be inferred: (1) there is at least one witness to whom a declarant could lie about an event or condition, but one who cannot refute the falsity; (2) the event or condition is such that a plausible lie about it can be incorporated into a PSI or an EU; and (3) the range of plausible lies permitted by the event or condition must be capacious enough to accommodate a lie that can benefit the declarant.

A discussion of these inferences is provided in section III.A.1.a.

b. Deciding to Falsify a PSI or an EU

Although there has been much psychological and neuroscientific research conducted since the enactment of the PSI and EU hearsay exceptions, there is to date no complete understanding about when people decide to lie.¹⁰

Humans have a default response when presented with an opportunity to lie.¹¹ Scholars have identified the existence of a motivation to lie as a key determinant of what this response may be.¹² Where there is no motivation to lie,¹³ humans may be predisposed to tell

9. See, e.g., Model Rules of Prof'l Conduct r. 3.3 (Am. Bar Ass'n, Discussion Draft 1983).

10. Bruno Verschuere & Shaul Shalvi, *The Truth Comes Naturally! Does It?*, 33 J. Language & Soc. Psychol. 417, 421 (2015).

11. *Id.*

12. *Id.* at 420–21.

13. In one research paradigm, participants are instructed to lie but are not given any reward for lying. See, e.g., Evelyne Debey, Bruno Verschuere & Geert Crombez, *Lying and Executive Control: An Experimental Investigation Using Ego Depletion and Goal Neglect*, 140 Acta Psychologica 133, 135–38 (2012). In

the truth.¹⁴ In contrast, when lying may be profitable, scholars have hypothesized that the default reaction is to lie.¹⁵

The suppression of the default response—to lie when there is no motivation to lie or to be honest when there is a motivation to lie—requires cognitive effort.¹⁶ During this deliberative process, the mind may weigh such factors as moral judgment and justification for lying.¹⁷ The process requires time and demands attentional focus.¹⁸ It is more impaired under situations of high cognitive load, such as conditions that promote attentional lapses or depletion of self-control,¹⁹ or under fatigue, such as conditions of sleep deprivation or later times of day.²⁰

Other factors, beyond the costs and benefits of lying particular to a situation, also play a role. Both moral judgment and the desire to maintain a favorable self-image may motivate people to avoid lying.²¹ Lying appears to be more difficult when conducted in personal settings; for example, the decision to lie has been observed to take twice as much time when testing is conducted person-to-person instead of by computer.²² Likewise, the

another paradigm, participants are incentivized to lie by the promise of rewards which are tied to the contents of their statements. See, e.g., Shaul Shalvi, Ori Eldar & Yoella Bereby-Meyer, *Honesty Requires Time (and Lack of Justifications)*, 23 *Psychol. Sci.* 1264, 1266 (2012). Comparison of the results from the two types of studies demonstrates the importance of the motivation to lie. Verschuere & Shalvi, *supra* note 10, at 421.

14. Evelyne Debey, Jan de Houwer & Bruno Verschuere, *Lying Relies on the Truth*, 132 *Cognition* 324, 331 (2014); Bruno Verschuere et al., *The Ease of Lying*, 20 *Consciousness & Cognition* 908, 909 (2011); Sean A. Spence et al., *Behavioural and Functional Anatomical Correlates of Deception in Humans*, 12 *NeuroReport* 2849, 2852 (2001); Evelyne Debey et al., *From Junior to Senior Pinocchio: A Cross-Sectional Lifespan Investigation of Deception*, 160 *Acta Psychologica* 58, 65 (2015).

15. Verschuere & Shalvi, *supra* note 10, at 421.

16. Debey, de Houwer & Verschuere, *supra* note 14, at 331; Shalvi, Eldar & Bereby-Meyer, *supra* note 13, at 1268; Ahmed A. Karim et al., *The Truth About Lying: Inhibition of the Anterior Prefrontal Cortex Improves Deceptive Behavior*, 20 *Cerebral Cortex* 205, 209–10 (2010); Debey, Verschuere & Crombez, *supra* note 13, at 140; Shawn E. Christ et al., *The Contributions of Prefrontal Cortex and Executive Control to Deception: Evidence from Activation Likelihood Estimate Meta-Analyses*, 19 *Cerebral Cortex* 1557, 1558 (2009).

17. Shalvi, Eldar & Bereby-Meyer, *supra* note 13, at 1266; Nobuhito Abe et al., *The Neural Basis of Dishonest Decisions that Serve to Harm or Help the Target*, 90 *Brain & Cognition* 41, 41 (2009).

18. Jeffrey J. Walczyk et al., *Cognitive Mechanisms Underlying Lying to Questions: Response Time as a Cue to Deception*, 17 *Applied Cognitive Psychol.* 755, 771 (2003) [hereinafter Walczyk et al., *Cognitive Mechanisms*]; Shalvi, Eldar & Bereby-Meyer, *supra* note 13, at 1268; Debey, Verschuere & Crombez, *supra* note 13, at 138–40.

19. *Id.* at 138, 140; Francesca Gino et al., *Unable to Resist Temptation: How Self-Control Depletion Promotes Unethical Behavior*, 115 *Organizational Behav. & Hum. Decision Processes* 191, 199 (2011).

20. Christopher M. Barnes et al., *Lack of Sleep and Unethical Conduct*, 115 *Organizational Behav. & Hum. Decision Processes* 169, 177–78 (2011); Maryam Kouchaki & Isaac H. Smith, *The Morning Morality Effect: The Influence of Time of Day on Unethical Behavior*, 25 *Psychol. Sci.* 95, 100 (2014).

21. Karim et al., *supra* note 16, at 209–10; Urs Fischbacher & Franziska Heusi, *Lies in Disguise: An Experimental Study on Cheating*, 11 *J. Eur. Econ. Ass'n* 525, 526 (2013).

22. Jeffrey J. Walczyk et al., *Lying Person-to-Person about Life Events: A Cognitive Framework for Lie Detection*, 58 *Pers. Psychol.* 141, 159–60 (2005) [hereinafter Walczyk et al., *Lying Person-to-Person*].

level of lying in experiments is higher in a laboratory setting than when receiving a phone call at home.²³ The relationship between the liar and audience also plays a role; people may be less likely to lie to those with whom they are close.²⁴

Training may play a role in influencing both the default response and any subsequent deliberation. For example, repetition may recondition a default response of truth-telling to one of lying.²⁵ Likewise, the decision to lie may be made easier and faster with practice.²⁶ On the other hand, lying may be made more difficult with habitual truth-telling.²⁷

Scholars estimating the overall prevalence of lying have concluded that most people tell few lies, and those lies which are told are generally not serious, are made in the context of everyday social interactions, and involve little planning and little regret.²⁸ There also exist a portion of people who are instinctively and emotionally averse to lying.²⁹ Of all lies told, most are told by a minority of prolific liars, and scholars have found a correlation between lying frequency and psychopathic tendencies.³⁰

c. *Injecting Lies into a PSI and an EU*

The construction of a lie is a mental step distinct from the decision to lie, and it requires additional time and cognitive resources.³¹ Lies appear to be generated by consciously say-

23. Johannes Abeler, Anke Becker & Armin Falk, *Representative Evidence on Lying Costs*, 113 J. Pub. Econ. 96, 103 (2014).

24. Madeline E. Smith et al., *Everyday Deception or A Few Prolific Liars? The Prevalence of Lies in Text Messaging*, 41 Computers in Hum. Behav. 220, 225 (2014); Bella M. DePaulo & Deborah A. Kashy, *Everyday Lies in Close and Casual Relationships*, 74 J. Personality & Soc. Psychol. 63, 75 (1998).

25. Verschuere et al., *supra* note 14, at 909–10.

26. B. Van Bockstaele et al., *Learning to Lie: Effects of Practice on the Cognitive Cost of Lying*, 3 Frontiers in Psychol. 526, at 5 (2012); Xiaoqing Hu, Hao Chen & Genyu Fu, *A Repeated Lie Becomes a Truth? The Effect of Intentional Control and Training on Deception*, 3 Frontiers in Psychol. 488, at 7 (2012).

27. Verschuere et al., *supra* note 14, at 909–10; Jeffrey J. Walczyk et al., *A Social-Cognitive Framework for Understanding Serious Lies: Activation-Decision-Construction-Action Theory*, 34 New Ideas in Psychol. 22, 32 (2014) [hereinafter Walczyk et al., *A Social-Cognitive Framework*].

28. Bella M. DePaulo et al., *Lying in Everyday Life*, 20 J. Psychol. & Soc. Behavior 979, 991–92 (1996); Kim B. Serota, Timothy R. Levine & Franklin J. Boster, *The Prevalence of Lying in America: Three Studies of Self-Reported Lies*, 36 Hum. Comm. Res. 2, 19–23 (2010).

29. A study conducted in Spain found that a significant portion of people, 40%, were lie-averse. Raúl López-Pérez & Eli Spiegelman, *Why do People Tell the Truth? Experimental Evidence for Pure Lie-Aversion*, 16 Experimental Econ. 233, 245 (2012). Although the 40% figure cannot be directly applied to the U.S. population given the divergence between Spanish and U.S. culture, research conducted in the United States has found that a small number of prolific liars account for a large proportion of all lies. Serota, Levine & Boster, *supra* note 28, at 21–22.

30. Serota, Levine & Boster, *supra* note 28, at 21–22; Rony Halevy, Shaul Shalvi & Bruno Verschuere, *Being Honest About Dishonesty: Correlating Self-Reports and Actual Lying*, 40 Hum. Comm. Res. 54, 69 (2014); Smith et al., *supra* note 24, at 224.

31. Walczyk et al., *Lying Person-to-Person*, *supra* note 22, at 145; Emma J. Williams et al., *Telling Lies: The Irrepressible Truth?*, 8 PLoS One e60713, at 12 (2013).

ing either the opposite of the truth or some alteration of the truth.³² Accordingly, lies rely on the truth, and liars have to mentally suppress themselves from speaking the truth.³³

The difficulty of formulating a lie increases when there is a greater need to think through a lie; that is, a more complex lie requires a greater cognitive effort.³⁴ To that end, lying by omitting information should be cognitively easier, because unlike more active forms of lying, it does not require the generation of deceptive content beyond the inhibition of truth-telling.³⁵ Research suggests that lying by omission may be the prevalent form of deception.³⁶

Along similar lines, lies may generally be harder to generate when there are fewer constraints. For example, research finds that lying is more cognitively taxing and takes longer when multiple lies are plausible or when the lies are made in response to open-ended questions rather than yes/no questions.³⁷

When a lie must fit within a narrative to advance an agenda, the liar needs to expend cognitive effort to keep the story straight.³⁸ Maintaining a plausible and consistent narrative should be more difficult under situations that increase cognitive load, such as when a narrative must be told in reverse chronological order.³⁹

Lying in response to an expected opportunity may be easier because retrieval of rehearsed lies from memory takes less cognitive effort than the generation of spontaneous lies.⁴⁰ But even when a lie has been prepared in advance, lying may still be more difficult than telling the truth because truthful knowledge may be encoded in a larger portion of the brain.⁴¹

32. Walczyk et al., *Cognitive Mechanisms*, *supra* note 18, at 765.

33. Debey, de Houwer & Verschuere, *supra* note 14, at 331; Christ et al., *supra* note 16, at 1558; Debey et al., *supra* note 14, at 65–66.

34. Walczyk et al., *A Social-Cognitive Framework*, *supra* note 27, at 33.

35. Timothy R. Levine et al., *Self-Construction, Self and Other Benefit, and the Generation of Deceptive Messages*, 31 *J. Intercultural Comm. Res.* 29, 32–34 (2002).

36. *Id.* at 32–34, 43.

37. Williams et al., *supra* note 31, at 12, 13; Walczyk et al., *Lying Person-to-Person*, *supra* note 22, at 160.

38. G. Ganis et al., *Neural Correlates of Different Types of Deception: An fMRI Investigation*, 13 *Cerebral Cortex* 830, 831, 835 (2003).

39. See Aldert Vrij et al., *Increasing Cognitive Load to Facilitate Lie Detection: The Benefit of Recalling an Event in Reverse Order*, 32 *Law Hum. Behav.* 253, 254–55, 259–60, 262 (2008) [hereinafter Vrij et al., *Increasing Cognitive Load*] (increasing cognitive load by requesting a narrative in reverse order increased cues and thus detection of deception by police officers).

40. Lara Warmelink et al., *The Effect of Question Expectedness and Experience on Lying about Intentions*, 141 *Acta Psychologica* 178, 182 (2012); Aldert Vrij et al., *Saccadic Eye Movement Rate as a Cue to Deceit*, 4 *J. Applied Res. Memory & Cognition* 15, 18 (2015) [hereinafter Vrij et al., *Saccadic Eye Movement Rate*]; Ganis et al., *supra* note 38, at 832, 835.

41. Ganis et al., *supra* note 38, at 834–35. *But see* Vrij et al., *Saccadic Eye Movement Rate*, *supra* note 40, at 15, 18 (saccadic eye movements, correlated with the search of long term memory, found to be higher in the telling of planned lies than in truth-telling, although the difference was not considered significant).

Furthermore, a successful liar must appear honest and credible, which motivates them to regulate their own behavior as well as to monitor the behavior of surrounding people.⁴² This behavioral monitoring may constitute an additional cognitive burden.⁴³

2. Confabulation⁴⁴

Confabulation is the emergence of memories of events, experiences, or details which never took place.⁴⁵ No known research directly examines whether PSI or EU hearsay evidence is susceptible to confabulation. However, scholars have identified some mechanisms underlying the phenomenon. This memorandum uses the scheme proposed by Kopelman, which generally classifies confabulations as either “spontaneous” or “provoked.”⁴⁶

42. Vrij et al., *Increasing Cognitive Load*, *supra* note 39, at 259; Kamila E. Sip et al., *When Pinocchio’s Nose Does Not Grow: Belief Regarding Lie-Detectability Modulates Production of Deception*, 7 *Frontiers in Hum. Neuroscience* 16, at 9 (2013); Bella M. DePaulo et al., *Cues to Deception*, 129 *Psychol. Bull.* 74, 103 (2003).

43. Vrij et al., *Increasing Cognitive Load*, *supra* note 39, at 259; Sip et al., *supra* note 42, at 9 (2013).

44. This memorandum uses a narrow, technical understanding of the word *confabulation*. See, e.g., *Dresser v. Colvin*, No. 12-CV-253-CJP, 2013 WL 791158, at *7 (S.D. Ill. Mar. 4, 2013) (“The ALJ evidently did not understand that confabulation is a term of art in the practice of psychology. It means ‘confusion of imagination with actual memories, or the formation of false memories, due to a psychological or neurological disorder.’”) (citation omitted); *Mohammed v. Obama*, 704 F. Supp. 2d 1, 27 (D.D.C. 2009) (“A common consequence of coercive interrogation techniques is ‘confabulation,’ or the ‘pathological production of false memories.’”) (citation omitted). However, *confabulation* can also be more broadly interpreted to encompass unintentional deception. See, e.g., *Thorogood v. Sears, Roebuck & Co.*, 678 F.3d 546, 549 (7th Cir. 2012) (“Consumers whose preference for stainless steel was unrelated to an anxiety about rust stains (almost certainly the vast majority) would not be upset to discover that an inconspicuous portion of the drum [of a clothes dryer] had been made of a different kind of steel that anyway was coated with ceramic and hence was rust-proof. One would have to have a neurotic obsession with rust stains (or be a highly imaginative class action lawyer) to worry about Sears’ drum. We said that, judging from the record and the argument of his lawyer, the concerns expressed by Thorogood [about the rust stains] were a confabulation.”) (citation omitted). The Center can address a more expanded definition of *confabulation* in a supplement, should the committee be interested.

45. Nahum et al., *supra* note 6, at 2524. Confabulation shares similarities with and yet is often viewed as distinct from delusion, which pertains to the formation of false beliefs. Kopelman, *supra* note 6, at 25; Asaf Gilboa & Mieke Verfaellie, *Telling It Like It Isn’t: The Cognitive Neuroscience of Confabulation*, 16 *J. Int’l Neuropsychological Soc’y* 961, 961–62 (2010).

46. Kopelman, *supra* note 6, at 15, 21–24. The literature is in disagreement as to how confabulations should be classified. See Gilboa & Verfaellie, *supra* note 45, at 961–63 (noting various perspectives in the literature); Esther Lorente-Rovira et al., *Confabulations (I): Concept, Classification, and Neuropathology*, 39 *Actas Españolas de Psiquiatría* 251, 253 (2011) (criticizing the Kopelman classification). The Kopelman classification is used in this memorandum out of convenience, not because of its superiority to competing schemes. The choice of the scheme does not materially affect the discussion about the susceptibility of PSI and EU hearsay evidence to confabulation.

Provoked confabulation, also known as intrusion, is a fleeting memory error that occurs when the memory is challenged.⁴⁷ It is most commonly observed when a person, in recalling a list of words, reports words that were not included in the list.⁴⁸ Although intrusions are more frequent among patients suffering from brain damage, healthy persons are not immune.⁴⁹ This type of confabulation is thought to occur when the mind is challenged to retrieve more information from memory than is actually available.⁵⁰

Spontaneous confabulation is the persistent creation of false memories without the need for provocation.⁵¹ In one case, a patient would get out of bed every day and dress in formal clothes, convinced he had been called to a meeting the night before.⁵² It is a consequence of brain damage and is suffered by those with conditions such as Korsakoff's syndrome or amnesia, for example.⁵³

Kopelman acknowledges other types of confabulation; of these, false confessions and recovery of false memories may be important to the discussion of evidentiary reliability.⁵⁴ False confessions could be intentional lies, such as those volunteered by persons who want to shield the true culprits.⁵⁵ However, there is a species of false confessions in which innocent persons under coercive, interrogative settings gradually accept guilt and develop false memories to support the belief of guilt.⁵⁶ A similar process occurs in the recovery of false memories.⁵⁷ Common to both types of confabulation are lengthy questioning and pressure to accept narratives advanced by the questioners.⁵⁸

47. Kopelman, *supra* note 6, at 15, 20.

48. Chris McVittie et al., *The Dog that Didn't Growl: The Interactional Negotiation of Momentary Confabulations*, 22 *Memory* 824, 825 (2014).

49. Sabine Borsutzky et al., *Confabulations in Alcoholic Korsakoff Patients*, 46 *Neuropsychologia* 3133, 3141 (2008); Nahum et al., *supra* note 6, at 2531.

50. Nahum et al., *supra* note 6, at 2531; Kopelman, *supra* note 6, at 15, 20–21.

51. Kopelman, *supra* note 6, at 15.

52. McVittie et al., *supra* note 48, at 826.

53. Kopelman, *supra* note 6, at 18, 21; Nahum et al., *supra* note 6, at 2524–25, 2531, 2532.

54. Kopelman, *supra* note 6, at 21–24. Kopelman recognizes three other categories of false memories: false recognition syndrome; confabulations in schizophrenic patients; and pseudologia fantastica. *Id.* The first two are products of brain damage or mental disease. *Id.* Patients who suffer from pseudologia fantastica generate fantasies and lies compulsively. *Id.* As explained in section III.A.2, it is unlikely that statements from victims of brain damage will often be introduced as PSI and EU hearsay evidence. The same reasoning leads to the conclusion that these three types of false memories are unlikely to threaten the reliability of PSI and EU hearsay evidence.

55. Saul M. Kassir, *False Confessions: Causes, Consequences, and Implications for Reform*, 17 *Current Directions Psychol. Sci.* 249, 249 (2008).

56. *Id.*; Kopelman, *supra* note 6, at 23–24; Gisli H. Gudjonsson et al., *The Role of Memory Distrust in Cases of Internalised False Confession*, 28 *Applied Cognitive Psychol.* 336, 337–38 (2014).

57. Gudjonsson et al., *supra* note 56, at 346.

58. *Id.*

C. Accuracy of Observation Underlying PSI and EU Hearsay Evidence

The fact that a declarant honestly makes a PSI or an EU is no guarantee that the resulting hearsay is reliable. An honest declarant still must accurately observe the event or condition to generate reliable evidence.⁵⁹

This section addresses potential issues of accuracy of observation underlying PSI and EU hearsay evidence. The discussion about PSI hearsay will be limited to statements based on dispassionate observation of the event or condition. With regard to the accuracy of observation, a PSI about a “startling event or condition” made “under the stress of excitement” is essentially an EU.⁶⁰ In this section, such a PSI will be treated as an EU.

1. PSI

In general, research suggests that attention facilitates accurate perception.⁶¹ For example, the accuracy and speed of the perception of objects is greatest within the area where one’s attention is directed.⁶² This enhancement effect of attention on perception is most pronounced when the difficulty of perception is highest.⁶³ Attention also results in a better ability to notice change.⁶⁴

2. EU

a. “Startling Event or Condition” from a Scientific Point of View

It is important to note the divergence in the usages of *startling*, *excitement*, and *stress* in the context of the EU hearsay exception and in the scientific literature.

59. As noted in section II.A, the committee has considered the “accuracy of observation” underpinning a particular statement as a measure of its reliability. Fed. R. Evid. 803(2) advisory committee’s note.

60. As the committee has stated, “[i]n considerable measure [the PSI and EU exceptions] overlap.” Fed. R. Evid. 803(2) advisory committee’s note.

61. *Attention* as used in section III.B.1 refers to voluntary attention. Voluntary attention is the allocation of perceptual resources to the spatial location important to task goals. William Prinzmetal et al., *Voluntary and Involuntary Attention Have Different Consequences: The Effect of Perceptual Difficulty*, 62 Q.J. Experimental Psychol. 352, 352 (2009). It is distinct from “involuntary attention,” which is the involuntary capture of attention by a stimulus unrelated to the goal-directed activity. *Id.* Voluntary attention is by definition the type of attention implicated within the PSI hearsay exception. This is because a PSI declarant has the task goal of “describing or explaining an event or condition,” and his or her perceptual resources are directed to the event or condition.

62. William Prinzmetal, Christin McCool & Samuel Park, *Attention: Reaction Time and Accuracy Reveal Different Mechanisms*, 134 J. Experimental Psychol.: Gen. 73, 90 (2005).

63. Prinzmetal et al., *supra* note 61, at 364.

64. Graham Davies & Sarah Hine, *Change Blindness and Eyewitness Testimony*, 141 J. Psychol. 423, 431 (2007). *See also* Deborah Davis et al., ‘Unconscious Transference’ Can Be an Instance of ‘Change Blindness,’ 22 Applied Cognitive Psychol. 605, 618–19 (2008) (diverted attention results in higher likelihood of failure to notice changes).

The startle reflex, as science now understands it, is a defensive reaction to an intense and abrupt sensory stimulus such as a sudden, loud noise.⁶⁵ The reflex includes an involuntary muscular contraction, such as the blinking of the eyes or the ducking of the head, presumably to facilitate flight or to protect the body from danger.⁶⁶ It also occurs at a speed too fast to be simulated, and, unlike surprise, cannot be entirely inhibited by anticipation.⁶⁷ The startle reflex may be accompanied by an emotional response, such as surprise, along with a disruption to cognitive processing and motor responses, but it can also be completed within fractions of a second without awareness that the reflex ever took place.⁶⁸

The EU hearsay exception defines an EU as “[a] statement relating to a startling event or condition, made while the declarant was under the stress of excitement that it caused.” In associating “startling” with “stress of excitement,” the exception seems to reflect an understanding, held by some scholars prior to and through the 1980s, that startle is itself an emotional response, such as an extreme form of surprise.⁶⁹ The exception does not appear to require that the “startling event or condition” be one that triggers a reflexive response, such as the startle reflex; instead, it seems to contemplate the event or condition to be one that leads to a strong emotional response, or, in the words of the exception, the “stress of excitement.”⁷⁰

Courts also have interpreted a startling event or condition as an event eliciting emotion rather than the startle reflex. For example, the Seventh Circuit has recently noted that, “in almost every imaginable scenario, seeing a person pointing a gun at the head of another is a startling situation.”⁷¹ The sight of a gun pointed at the head of another person may cause intense emotion, but it seems unlikely to trigger such reflexive muscular movement as flinching. Furthermore, the Supreme Court, in dicta, suggested that a startling event or condition “has a[n] . . . effect of focusing an individual’s attention.”⁷² The committee’s notes similarly indicated that a startling event or condition is more “likely to evoke comment.”⁷³ That a startling event or condition focuses attention and evokes

65. M. Koch, *The Neurobiology of Startle*, 59 *Progress in Neurobiology* 107, 108 (1999); Javier Rivera et al., *Startle and Surprise on the Flight Deck: Similarities, Differences, and Prevalence*, 58 *Proc. Hum. Factors & Ergonomics Soc’y* 1047, 1047 (2014); Sergio Agnoli, Laura Franchin & Marco Dondi, *Three Methodologies for Measuring the Acoustic Startle Response in Early Infancy*, 53 *Developmental Psychobiology* 323, 323 (2011).

66. Christian Grillon & Johanna Baas, *A Review of the Modulation of the Startle Reflex by Affective States and Its Application in Psychiatry*, 114 *Clinical Neurophysiology* 1557, 1557 (2003); Rivera et al., *supra* note 65, at 1047.

67. Paul Ekman, Wallace V. Friesen & Ronald C. Simons, *Is the Startle Reaction an Emotion?*, 49 *J. Personality & Soc. Psychol.* 1416, 1424 (1985).

68. Rivera et al., *supra* note 65, at 1047–48; Jenefer Robinson, *Startle*, 92 *J. Phil.* 53, 55 (1995).

69. Ekman, Friesen & Simons, *supra* note 67, at 1424–25.

70. The language of the EU hearsay exception also appears to contemplate a response from the “startling event or condition” that is longer in duration than the startle reflex.

71. *United States v. Zuniga*, 767 F.3d 712, 716 (7th Cir. 2014).

72. *Michigan v. Bryant*, 131 S. Ct. 1143, 1157 (2011).

73. Fed. R. Evid. 803(2) advisory committee’s note.

comment suggests a judicial conception of “startling event or condition” not so much as one that actually causes a startle reflex, but as one that brings about a strong emotional response, such as surprise, anxiety, fear, and anger.⁷⁴

The memorandum therefore interprets “startling event or condition” as an event or condition that elicits an emotional response. The EU hearsay exception does not discriminate between different emotions, such as surprise or fear, and the discussion here generalizes across the emotions to draw common conclusions.⁷⁵

b. Effect of Emotion on the Accuracy of Observation

There currently is no complete understanding of how emotion affects mental processes, and emotion is itself a broad term that encapsulates many emotional states. However, it is generally accepted that emotion may impair some cognitive processes while facilitating others.⁷⁶ To that end, emotion may degrade some types of perception and cognitive processing that would be important for accurate observation. For example, anxiety has been found to reduce the ability to accurately recognize faces and to discriminate between sounds.⁷⁷

This general degradation in perception caused by emotion may be compensated for by the weapon focus effect, where the presence of an emotionally arousing stimulus, such as a gun, narrows the range of attentional focus to that stimulus.⁷⁸ This enhanced attention may result in more accurate observation of the stimulus, even if it detracts from observation of the peripheral or background details of the scene, such as the face and clothing of the bearer of the gun.⁷⁹ The attentional effects of the stimulus may arise not only

74. Laurent Itti & Pierre Baldi, *Bayesian Surprise Attracts Human Attention*, 49 *Vision Res.* 1295, 1305 (2009); Gernot Horstmann, *Evidence for Attentional Capture by a Surprising Color Singleton in Visual Search*, 13 *Psychol. Sci.* 499, 504 (2002); Jenny Yiend & Andrew Mathews, *Anxiety and Attention to Threatening Pictures*, 54A *Q.J. Experimental Psychol.: Hum. Experimental Psychol.* 665, 679 (2001); Anne M. Finucane, *The Effect of Fear and Anger on Selective Attention*, 11 *Emotion* 970, 973 (2011).

75. It should be noted that different emotions have different effects on attention. *See, e.g.*, Finucane, *supra* note 74, at 972 (selective attention costs differ between the fear condition and the anger condition).

76. Hadas Okon-Singer et al., *The Neurobiology of Emotion-Cognition Interactions: Fundamental Questions and Strategies for Future Research*, 9 *Frontiers in Hum. Neuroscience* 58, at 3 (2015); Michael J. Saks & Barbara A. Spellman, *The Psychological Foundations of Evidence Law* 194 (2016).

77. Angela S. Attwood et al., *Acute Anxiety Impairs Accuracy in Identifying Photographed Faces*, 24 *Psychol. Sci.* 1591, 1593 (2013); S.L. Mattys et al., *Effects of Acute Anxiety Induction on Speech Perception: Are Anxious Listeners Distracted Listeners?*, 24 *Psychol. Sci.* 1606, 1608 (2013).

78. Robin L. Kaplan, Ilse Van Damme & Linda J. Levine, *Motivation Matters: Differing Effects of Pre-Goal and Post-Goal Emotions on Attention and Memory*, 3 *Frontiers in Psychol.* 404, at 1 (2012); Finucane, *supra* note 74, at 973.

79. Kaplan, Van Damme & Levine, *supra* note 78, at 1; Florin Dolcos & Ekaterina Denkova, *Current Emotion Research in Cognitive Neuroscience: Linking Enhancing and Impairing Effects of Emotion on Cognition*, 6 *Emotion Rev.* 362, 363 (2014); Nancy Mehrkens Steblay, *A Meta-Analytic Review of the Weapon Focus Effect*, 16 *Law & Hum. Behav.* 413, 420–22 (1992); Jonathan M. Fawcett et al., *Of Guns and Geese: A Meta-Analytic Review of the ‘Weapon Focus’ Literature*, 19 *Psychol., Crime & L.* 35, 56–58 (2012).

when the stimulus arouses not only emotions of negative valence, such as fear, but also emotions of positive valence.⁸⁰

The effect of arousal may apply not only to the perception of an active event but also to the memories about such events. Emotionally arousing stimulus or events are more likely to be encoded into memory, and memories of emotional events may be more vivid and enduring than memories about more neutral stimuli or events.⁸¹ At the same time, memories about peripheral details may be weaker, and may result, for example, in a decreased ability to remember the appearance of a person encountered under stress and to subsequently identify this person.⁸² These memories about peripheral details may be at greater risk of unintentional manipulation and suggestion.⁸³

III. Open Questions and the Need for Experimentation

A. Susceptibility of PSI and EU Hearsay Evidence to Fabrication, Coaching, and Confabulation

1. Fabrication and Coaching

The research findings summarized in this memorandum do not yield firm and unequivocal conclusions about the resistance of PSI and EU hearsay evidence to the negative effects of fabrication and coaching. Nonetheless, they do provide some support for the underlying intuition that the conditions surrounding PSI and EU help “produce[] [statements] free of conscious fabrication.”⁸⁴

a. *Opportunity to Falsify a PSI or an EU*

For there to be a falsified piece of PSI or EU hearsay evidence, there must first be an appropriate opportunity. There has been no empirical research examining when such an opportunity may arise; however, it is possible to infer a number of necessary conditions.

80. Dolcos & Denkova, *supra* note 79, at 363–64.

81. *Id.* at 363–64; Robin L. Kaplan et al., *Emotion and False Memory*, 8 *Emotion Rev.* 1, 2–3 (2015); Elizabeth A. Kensinger & Suzanne Corkin, *Memory Enhancement for Emotional Words: Are Emotional Words More Vividly Remembered than Neutral Words?*, 31 *Memory & Cognition* 1169, 1177 (2003); Adam K. Anderson et al., *Emotional Memories Are Not All Created Equal: Evidence for Selective Memory Enhancement*, 13 *Learning & Memory* 711, 714–15 (2016).

82. Tim Valentine & Jan Mesout, *Eyewitness Identification Under Stress in the London Dungeon*, 23 *Applied Cognitive Psychol.* 151, 159 (2008).

83. Kaplan et al., *supra* note 81, at 5. *See also* Michael E. Lamb, Kathleen J. Sternberg & Phillip W. Esplin, *Conducting Investigative Interviews of Alleged Sexual Abuse Victims*, 22 *Child Abuse & Neglect* 813, 820 (1998) (discussing the susceptibility of the accounts of very young children to suggestion).

84. Fed. R. Evid. 803(2) advisory committee’s note.

To be used as hearsay evidence, that is, to be “offer[ed] in evidence to prove the truth of the matter asserted,” a PSI or an EU must have content.⁸⁵ Many utterances, such as “Ouch!” or obscenities, are not useful as hearsay evidence because they assert little to no content. Essentially, a PSI or an EU used as hearsay evidence must have descriptive value and is an act of communication from a declarant to a witness, even if the witness may not be known or may not be in proximity to the declarant.⁸⁶

The need for the declarant to communicate to a witness severely limits how the declarant may lie. The declarant cannot blatantly lie to a witness who also is present at the subject event or condition of the PSI or EU or who is in a position to immediately investigate the declarant’s claims.⁸⁷ And even if the witness is not present to perceive the event or condition, the declarant cannot lie in a way that is entirely divorced from what the witness knows or will come to know.

It is instructive to consider examples that Justice Scalia proposed in a recent dissenting opinion:

The classic “present sense impression” is the recounting of an event that is occurring before the declarant’s eyes, as the declarant is speaking (“I am watching the Hindenburg explode!”). *See* 2 K. Broun, McCormick on Evidence 362 (7th ed. 2013) And the classic “excited utterance” is a statement elicited, almost involuntarily, by the shock of what the declarant is immediately witnessing (“My God, those people will be killed!”). *See id.*, at 368–369.⁸⁸

Even if the witness were not initially in a position to perceive the explosion of the Hindenburg or the impending deaths, the witness should still respond to the PSI or EU, for example, by arriving on the scene or calling law enforcement. After all, any listener to a statement describing an event or condition would likely direct attention to what the statement describes, particularly if it were something unusual. To that end, if a lie within a PSI or an EU did not comport with what the witness or law enforcement found on site, the PSI or EU likely would be disregarded as a false alarm.⁸⁹ And it is difficult to imagine how the examples provided by Justice Scalia, were they lies, could ever have been plausible. If the Hindenburg landed safely, then “I am watching the Hindenburg explode!” would probably never be introduced as hearsay evidence.

Even if an event or condition permits the generation and construction of plausible lies, there still may not be a plausible lie useful to the PSI or EU declarant. If “I am watching the Hindenburg explode!” were a falsified statement, it might be plausible if the Hin-

85. Fed. R. Evid. 801(c)(2).

86. An example of such a witness would be a 911 operator who hears a PSI declarant describing an ongoing act of criminal activity.

87. Saks & Spellman, *supra* note 76, at 194.

88. *Navarette v. California*, 134 S. Ct. 1683, 1694 (2014) (Scalia, J., dissenting).

89. The situation is different when the witness is in league with the declarant, but the witness could always be cross-examined about his or her relationship with the declarant.

denburg in reality imploded rather than exploded.⁹⁰ But even if such a lie were plausible, it would likely be a very limited number of persons whom the lie could benefit.

It is therefore possible to infer three situational factors for successful falsification of PSI or EU hearsay evidence: (1) the declarant knows that there is a witness to the PSI or EU who at the same time could not directly refute the declarant's description of the event or condition; (2) the available physical evidence of the event or condition allows for a plausible lie to be incorporated into the PSI or EU; and (3) the range of plausible lies permitted by the event or condition must be capacious enough to accommodate a lie that could benefit the declarant.

The frequency of these factors in situations where PSI and EU hearsay evidence arise may be estimated by reviewing cases in which the hearsay exceptions were invoked. However, such a study would be limited by the fact that judicial opinions generally do not provide sufficient details to permit assessment, for example, of the capacity of witnesses to refute the subject PSI or EU or the range of plausible lies that the declarant could have employed.

Accordingly, it may be possible to infer the existence of some situational barriers against the injection of lies about a particular event or condition into PSI or EU hearsay evidence. However, it may not be feasible to measure the degree of protection they provide against the introduction of falsified hearsay into evidence.

b. Deciding to Falsify a PSI or an EU

Even if the declarant has a proper opportunity to lie, the declarant must still make the decision to lie. The committee has explained that “[t]he underlying theory of [the PSI hearsay exception] is that substantial contemporaneity of event and statement negative the likelihood of deliberate or conscious misrepresentation.”⁹¹ Likewise, it stated that “[t]he theory of [the EU hearsay exception] is simply that circumstances may produce a condition of excitement which temporarily stills the capacity of reflection and produces utterances free of conscious fabrication.”⁹² The logic flow for both exceptions essentially runs as follows: (1) the default behavior is a tendency to truth; (2) “conscious fabrication” requires “reflection”; (3) the “reflection” required for “conscious fabrication” is difficult or unlikely under the “substantial contemporaneity of event and statement” or “condition of excitement”; and (4) PSIs and EUs therefore reflect default, truthful behavior.

The research discussed in section II.B.1.b supports some of these assumptions about the decision to lie. The intuition of the existence of a default response appears to be supported by the literature. Similarly, research supports the committee's beliefs that “capacity of reflection”—or cognitive effort, in modern scientific language—is necessary to overcome this default behavior and that the exertion of cognitive effort is more difficult under time and mental pressure.

90. The physical evidence of such an implosion would have to allow for an interpretation that the zepelin exploded.

91. Fed. R. Evid. 803(2) advisory committee's note.

92. *Id.*

However, the assumption that the default response obtained through a PSI or an EU would more likely be truthful is less supported. Research suggests that the default response—whether to tell the truth or to lie—may hinge on the existence of a motivation to lie. When the declarant has no motivation to lie, the resulting PSI or EU likely reflects a default reaction of truth-telling. Likewise, when the advantage of lying is latent or not immediately obvious, the PSI or EU also may stem from a default behavior of truth-telling. But where there is a benefit to lie readily perceptible to the declarant, he or she may be primed to lie. In this case, overcoming the default response to lie, so as to tell the truth, may actually require “capacity of reflection.”

Accordingly, the question of whether a particular piece of PSI or EU hearsay evidence may contain lies is context-sensitive and depends on both the circumstances during which the statement was made and the motivations the declarant may have had at the time. To the extent that the hearsay exceptions are formulated based on generalities, a proper evaluation of the exceptions would require balancing those statements made by neutral declarants, or made in such circumstances where the benefit to lying is difficult to detect, against those statements made in circumstances where lying is obviously advantageous.⁹³

No research appears to have directly addressed how frequently a motivation to lie exists within the circumstances under which the typical PSI or EU hearsay is made. To that end, the committee may have to draw on the judicial experience rather than experimental research to arrive at an answer. It may be difficult to experimentally replicate the mental stress and danger involved in real-life PSI or EU situations within the ethical boundaries on research with human participants.

There were at least five precedential appellate opinions in 2014 affirming the admissibility of PSI or EU hearsay. These involved: (1) a 911 call by a mother “asking that police come to her residence because her child’s father had just hit her and was ‘going crazy for no reason’” (in *United States v. Boyce*);⁹⁴ (2) a statement made by a supervisor to the employee “that [the supervisor’s boss] had told [the supervisor] to do everything in his power to stop [the employee] from going to Human Resources” about a case of sexual harassment (in *Malin v. Hospira, Inc.*);⁹⁵ (3) a statement made to a paramedic by an assault victim that “she had been hit with a baseball bat” and sexually assaulted and that revealed the identity of the perpetrator (in *Woods v. Sinclair*);⁹⁶ (4) a statement made by a man to his friend that the defendant “had a gun,” accompanying a request to the friend to call the police (in *United States v. Zuniga*);⁹⁷ and (5) a statement made to a police officer “imme-

93. It is notable that some courts have intuited the strong role that the motivation to lie can play and have therefore weighed a lack of motivation to falsify in determining the admissibility of PSI hearsay. See Edward J. Imwinkelried, *The Need to Resurrect the Present Sense Impression Hearsay Exception: A Relapse in Hearsay Policy*, 52 How. L.J. 319, 339 (2009) (providing citations to a number of cases where courts have looked to the motivation to lie).

94. 742 F.3d 792, 793, 796 (7th Cir. 2014).

95. 762 F.3d 552, 554–55 (7th Cir. 2014).

96. 764 F.3d 1109, 1124–25 (9th Cir. 2014).

97. 767 F.3d 712, 715 (7th Cir. 2014).

diately after his arrival at the residence” by a woman “recalling the details of the fight she had with [her fiancé], including the fact that [the fiancé] had pointed the shotgun at [her] and threatened to shoot her in the head” (in *United States v. Graves*).⁹⁸

These examples suggest that statements in the context of domestic violence form an important category of the PSI and EU hearsay evidence presented in court. As in *Boyce*, *Woods*, and *Graves*,⁹⁹ the hearsay evidence is used in such cases because declarants recant, will not testify, or cannot testify.¹⁰⁰ Motivations that inform the decisions of such declarants to refuse to support their PSI or EU hearsay with subsequent testimony may include the fear of losing a family breadwinner or worry for the safety of themselves or their children.¹⁰¹

Understanding whether real-world declarants may decide to inject lies into a PSI or an EU may therefore require asking questions such as whether a person, fresh from an incident of domestic violence, could so easily and quickly discern the advantages of speaking dishonestly to law enforcement that he or she would be primed to lie. The fact that victims do recant or refuse to testify after initially cooperating with law enforcement suggest that PSI or EU declarants do need some time and reflection to discover the motive to lie.

But it would be both unethical and resource-intensive to experimentally subject humans to the levels of stress and physical danger needed to realistically simulate the settings in which PSI and EU hearsay evidence are generated. While it may be technically possible to conduct experiments of lying that involve lower, and thus more ethical, levels of induced stress, the methodology may not be representative of real-world conditions and the results may not be of interest or use to the committee.

In one experimental paradigm used to study deception, participants are asked to report on the outcome of a die thrown under a cup and are incentivized to lie with the offer of a payment that scales with the reported outcome of the roll.¹⁰² Such an experiment can be modified by tying the reward to a more complicated formula,¹⁰³ and may then be used

98. 756 F.3d 602, 604–66 (8th Cir. 2014).

99. In *Boyce*, “[the declarant] did not testify at trial.” 742 F.3d at 794. In *Woods*, the declarant did not survive the assault. 764 F.3d at 1117. In *Graves*, “[the declarant] . . . recanted her statements at trial.” 756 F.3d at 606.

100. Douglas E. Beloof & Joel Shapiro, *Let the Truth Be Told: Proposed Hearsay Exceptions to Admit Domestic Violence Victims’ Out of Court Statements as Substantive Evidence*, 11 Colum. J. Gender & L. 3–4 (2002).

101. *Id.* at 4–5.

102. See, e.g., Shalvi, Eldar & Bereby-Meyer, *supra* note 13, at 1265–66.

103. In the typical die-under-the-cup experiment, the reward is directly proportional to the reported outcome of the roll. For example, a reported die throw of 2 yields a reward of \$2 and a reported throw of 6 yields a reward of \$6. However, the reward can be changed to follow a quadratic formula, such as $Yield = -x^2 + 6x$, where x is the reported outcome. In the example, the yield is maximized at \$9 by a reported throw of 3. A reported throw of 6, in contrast, yields \$0. The mathematical formula of the yield can be endlessly complicated to increase the difficulty of discerning the reported outcome associated with the optimum reward.

to test the relationship between the difficulty of discerning the motivation to lie and the resulting lying behavior.

But any conclusion that could be drawn from such an experiment cannot easily be extrapolated to situations involving the urgency and the potentially complex and highly personal motives to lie involved in the creation of actual PSI and EU hearsay evidence. Even if the experiment proposed above were to yield a chart tying the mathematical complexity of the reward formula to the incidence of lying, it would be difficult to associate real-life motivations, such as the fear of losing a family breadwinner, to a particular point on the spectrum of mathematical complexity so as to use the chart to predict the behavior of typical declarants.

c. *Injecting Lies into a PSI and an EU*

Beyond making the decision to lie, while falsifying a PSI or an EU, a declarant also must make effective use of the opportunity and craft lies of a quality sufficient for attorneys to move them into evidence. The committee's rationale that "conscious fabrication" requires "reflection" finds some support in research, discussed in section II.B.1.c, which demonstrates that the construction and convincing delivery of lies require cognitive resources and effort.

The research findings further suggest that the construction of lies may be more difficult under the conditions in which the typical PSI or EU are made.¹⁰⁴ At the outset, the existence of PSI or EU hearsay is itself a guarantee that the declarant did not resort to the easiest lie: silence. According to research, lying by omission may be less cognitively demanding than lying by fabrication because the former does not require generating additional information. And unless a declarant is prompted or required to describe an event or situation, he or she does not actually have to provide a PSI or an EU.¹⁰⁵ For example, in the context of domestic abuse, a victim who wishes to conceal an act of violence by a spouse or partner can elect not to call law enforcement rather than to create a situation where some explanation must be given. The research literature does not speak to how frequently liars who intend to lie about an event or situation do so by silence. But given the prevalence of omission among the various means of deception,¹⁰⁶ there may actually

104. A literature review by scholars in 2002, which does not have the benefit of subsequent research cited within this memorandum, has come to substantially similar conclusions. Myers et al., *supra* note 4, at 6–8.

105. Of the five cases cited in section III.A.1.b, only two involve situations where some form of PSI or EU was arguably compelled by the circumstances. In *Woods*, the declarant was responding to questions from a paramedic, called by a third party, who was asking how the declarant was injured. 764 F.3d 1109, 1117, 1124 (9th Cir. 2014). In *Graves*, the declarant was explaining the cause of gun shots to an officer who was called by a third party in response to the shots. 756 F.3d 602, 603–04 (8th Cir. 2014). The three other cases involve PSI or EU statements volunteered by the declarant. Two cases involve 911 calls triggered by the declarant. *Boyce*, 742 F.3d 792, 793 (7th Cir. 2014); *Zuniga*, 767 F.3d 712, 715 (7th Cir. 2014). In *Malin*, the supervisor did not need to tell the declarant that his own supervisor told him to prevent her from reporting sexual harassment to human resources. 762 F.3d 552, 554 (7th Cir. 2014).

106. Levine et al., *supra* note 35, at 40.

be no PSI or EU at all in a significant portion of the times when would-be declarants encounter an appropriate event or condition for lying.

Even if the declarant chooses or is compelled to generate some spoken lie, such lies are easier when they involve responses to closed-ended yes/no questions or when the possible lies are limited. But it is unlikely that PSI or EU hearsay evidence is made in many circumstances that constrict the universe of potential lies in such a way. In the examples provided by Justice Scalia, none involve close-ended lies.¹⁰⁷ Statements simply contradicting what is observed, such as “I am not watching the Hindenburg explode” and “I am watching the Hindenburg not exploding,” do not sound convincing and should be easy to refute. It also may be instructive to consider the case where an officer is called by a third party to investigate an act of domestic abuse involving gun shots.¹⁰⁸ A declarant seeking to shield an abusive spouse from prosecution would have to do better than a simple denial if there were shell casings on the floor or bullet holes in the walls.

To falsify a PSI or an EU that would be introduced into court, a declarant must make a lie of greater sophistication. He or she must process the facts as he or she observes them and adjust the truth, all the while keeping the falsification plausible within a coherent narrative. The need to convince and avoid detection further increases the cognitive burden.

Lies may be made easier with preparation and rehearsal. But PSI and EU hearsay evidence seems unlikely to involve expected situations, rendering it difficult to employ rehearsed lies. The element of a startling event or condition is built into the definition of an EU and should reduce the possibility of a rehearsed lie. And if a PSI declarant predicted the event or condition he or she intended to lie about, it would still be necessary to tailor the prepared statement to fit the events as they actually unfold. To the extent that liars perform poorly in situations where their prepared lies are narrated in reverse,¹⁰⁹ it is probable that liars who are forced to adjust to events as they unfold would perform poorly as well, in that both situations demand extra cognitive resources to keep the narrative straight. Though the possible increased difficulty of lying under the circumstances of the typical PSI and EU does not necessarily mean a reduction in the incidence of lying, which is the assumption upon which the hearsay exceptions rely, humans are generally cognitive misers. That is, they tend toward the simplest cognitive mechanisms.¹¹⁰ It is quite plausible that, under cognitively demanding conditions, potential declarants would take the path of least resistance and either not lie or stay silent.

It may be possible to experimentally study the connection between the difficulty of lying and instances of lying. For example, the Center could run experiments where participants are invited into a room with a vase, which is constructed to shatter at the slightest touch. An experimenter can walk into the room after the vase is destroyed to demand

107. Likewise, all of the five cases involve PSIs and EUs that were narrative and open-ended in nature.

108. As in *Graves*. 756 F.3d at 603–04. It should be noted that in *Graves* the EU declarant did not conceal the defendant’s actions.

109. Vrij et al., *Increasing Cognitive Load*, *supra* note 39, at 259–60, 262.

110. See, e.g., Maggie E. Toplak, Richard F. West, & Keith E. Stanovich, *Assessing Miserly Information Processing: An Expansion of the Cognitive Reflection Test*, 20 *Thinking & Reasoning* 147, 148 (2014).

payment, which would incentivize the participants to lie by denying their responsibility.¹¹¹ The difficulty of lying may be varied by changing the elapsed time between the destruction of the vase and the experimenter's entrance and the type of questions the experimenter asks.¹¹² Such a study, although artificial, may help determine whether there is a relationship between the presumed difficulty of constructing lies and the actual incidence of lying.

Of course, the responsibility to compensate for a broken vase is not comparable to the stakes typically involved in the context of real-world PSI or EU hearsay evidence, such as domestic violence. Such an experiment therefore may be unable to account for the complex motivations to lie, which, as discussed in section II.B.1.b, may be central to the decision to lie. Nonetheless, experiments might help demonstrate whether the difficulty of lying affects the overall incidence of lying, and therefore test this foundational aspect of the PSI and EU hearsay exceptions.

2. Confabulation

Existing research suggests that experimental studies on the susceptibility of PSI and EU hearsay to confabulations are unwarranted at this time.

As discussed in section II.B.2, spontaneous confabulations typically arise from brain damage. Attorneys are unlikely to frequently introduce statements made by declarants known to suffer from brain damage as PSI or EU hearsay evidence. It also seems unlikely, absent strong corroborating evidence, that jurors would credit such evidence. PSI and EU hearsay may be susceptible to this type of confabulation in a case where the declarant is unknown, but, as Justice Scalia pointed out in his dissenting opinion in *Navarette*, PSI or EU made by unknown declarants may not even be admissible at the outset.¹¹³

Intrusions may be made by healthy individuals and occur when weak memories are tested. But the typical PSI or EU hearsay evidence is unlikely to involve such a memory challenge. Returning to the examples pointed out by Justice Scalia ("I am watching the Hindenburg explode!" and "My God, those people will be killed!")¹¹⁴ neither require any test of recollection beyond the need to retrieve specific words, such as "Hindenburg," "explode," and "killed," from memory. The circumstances are entirely unlike a test that requires recitation of a memorized list of words, a research paradigm in which intrusions are most frequently observed.

111. The method for such an experiment is adapted from a study of false confessions where participants were falsely accused of pressing the wrong key on a computer and thereby damaging it. Saul M. Kassin & Katherine L. Kiechel, *The Social Psychology of False Confessions: Compliance, Internalization, and Confabulation*, 7 *Psychol. Sci.* 125, 126–27 (1996).

112. As discussed in section II.B.1.c, it is generally easier to lie to closed-ended questions than to open-ended questions. Walczyk et al., *Lying Person-to-Person*, *supra* note 22, at 160. The experimenter may therefore increase the difficulty of lying by asking open-ended questions (such as, "What happened?") instead of closed-ended questions (such as, "Did you break the vase?").

113. 134 S. Ct. 1683, 1694 (2014) (Scalia, J., dissenting).

114. *Id.*

The reliability of PSI and EU hearsay evidence is also unlikely to be affected by the types of confabulation that occur in recovered memory and false confession scenarios. While PSI and EU hearsay evidence are, with some frequency, statements made by declarants to law enforcement, as in *Boyce* and *Graves*,¹¹⁵ such statements do not often appear to be made under the type of pressured questioning typically involved in the formation of false confessions or the recovery of false memories. Furthermore, in order for a piece of hearsay evidence to be corrupted by such confabulations, it would be necessary for law enforcement to develop and force a narrative about the subject event or condition onto the declarant and for the declarant to accept the narrative and generate false memories to support the narrative. The entire process requires a time duration that is unlikely to fit within the window permitted by the applicable hearsay exceptions.¹¹⁶

Until there is new research showing that confabulations are more widespread among healthy individuals than is now known, experiments to measure the potential threat of confabulations to the reliability of PSI and EU hearsay evidence seem unnecessary.

B. Accuracy of Observation Underlying PSI and EU Hearsay Evidence

1. PSI

As summarized in section II.C.1, the research literature shows that attention generally improves the accuracy of observation.

Accordingly, it does not seem particularly controversial that the rules of evidence would value PSI hearsay. A PSI—that is, “[a] statement describing or explaining an event or condition, made while or immediately after the declarant perceived it”—necessarily is supported by the force of attention. PSI hearsay evidence may therefore benefit from the enhanced perception due to this attention paid to the subject event or condition. Furthermore, a PSI is contemporaneous with the event or condition, and, unlike courtroom testimony, is less subject to the deleterious effects of time on memories.¹¹⁷

At this time, experimental studies on the accuracy of observation underlying PSI hearsay evidence seem unnecessary.

2. EU

The committee has already recognized the criticism of the EU hearsay exception “on the ground that excitement impairs accuracy of observation.”¹¹⁸

115. 742 F.3d 792, 793, 796 (7th Cir. 2014); 756 F.3d 602, 604–66 (8th Cir. 2014).

116. The Confrontation Clause may further restrict the admission of such hearsay. *Ohio v. Clark*, 135 S. Ct. 2173, 2179–81 (2015).

117. *United States v. Orm Hieng*, 679 F.3d 1131, 1147 (9th Cir. 2012) (“The reason present sense impressions are considered inherently reliable is because statements contemporaneously describing an event are *unlikely to reflect memory loss* or provide an opportunity to lie.”) (emphasis added).

118. Fed. R. Evid. 803(2) advisory committee’s note. See also *Boyce*, 742 F.3d at 800 (Posner, J., concurring) (“And even if a person is so excited by something that he loses the capacity for reflection (which

Research findings do cast some doubt on the accuracy of observation underlying EU hearsay evidence. The literature reviewed in section II.C.2 suggests that emotion, as broadly defined, can impair some cognitive processes important for accurate observation. This can be particularly relevant in emotional situations where EU hearsay evidence is created.

But at the same time, the literature also posits that emotionally arousing stimuli can draw attention and perceptual resources. The hearsay exception requires that an EU be a “statement relating to a startling event or condition.” This requirement of a nexus between the content of the statement with the subject of the declarant’s extra attention, that is, the emotionally arousing stimulus, may counteract some of the negative effects of emotion on the accuracy of observation.

These findings about the negative effects of emotion on cognitive processes do not appear to be so different from what the committee knew or considered when it promulgated the EU hearsay exception as to create new concerns about the exception.¹¹⁹ It is doubtful that further experiments would be helpful to guide the committee’s evaluation.

If an EU about a startling event or condition were to be compared with courtroom testimony about the same startling event or condition, then the underlying accuracy of observation could not be a factor. Both the testimony and the EU are backed by the same observation. If the EU is unreliable because the underlying observation is clouded by the stress of excitement, then the live testimony is unreliable for the very same reason. There is no need for experiments to show that the intervening time between the startling event or condition and the live testimony cannot result in an improvement in the accuracy of observation about the startling event or condition.

Indeed, the literature provides some reason to think that the EU would be superior to live testimony. The content of the EU often makes clear what exactly it was that the declarant paid attention to and therefore may have better perceived. For example, an EU about the presence of a gun suggests that the gun may have been the subject of the declarant’s attention.¹²⁰ But in a trial testimony based on memories, it may not always be easy to separate out the possibly enhanced memories pertaining to the central details from the more potentially vulnerable memories concerning the peripheral details. Still, there is no experiment that can measure such an advantage of EU hearsay evidence against the inability of the evidence to be cross-examined.

If an EU were to be compared against a statement made without the stress of excitement, then literature already makes clear that the statement made without the stress of excitement generally should be superior in terms of the underlying accuracy of observation. Experiments measuring the difference between such statements would not be helpful; the exception is not a rule for choosing the most reliable hearsay from a number of

doubtless does happen), how can there be any confidence that his unreflective utterance, provoked by excitement, is reliable?”).

119. The negative impact of anxiety and preoccupation on eyewitness ability was recognized as early as 1978. Judith M. Siegel & Elizabeth F. Loftus, *Impact of Anxiety and Life Stress upon Eyewitness Testimony*, 12 Bull. Psychonomic Soc’y 479, 480 (1978).

120. This is the fact pattern of *Boyce*. 742 F.3d at 793.

declarants, but rather a rule for determining the admissibility of a specific EU made by a particular declarant.

If an event or condition so happens to be startling to the declarant, then any contemporaneous statement the declarant makes “under the stress of excitement” and “relating to [the] . . . event or condition” will be an EU. There is no possibility of revisiting the startling event or condition to obtain the contemporaneous statement that the declarant would have made absent the stress of excitement. Accordingly, even if the difference in the accuracy of observation under “stress of excitement” and under a state of dispassion could somehow be experimentally quantified,¹²¹ it may yield no useful conclusion about whether EU as a whole should be admissible hearsay evidence.

The Center therefore does not recommend conducting experiments about the accuracy of observation underlying EU hearsay evidence.

121. It is also unclear how an experimental subject can be put through the same event or condition twice, in a way that is “startling” once and not the other, without the observations made the first time biasing the observations made the second time and thereby rendering the comparison meaningless.