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THE BUTCHER ON THE BUS EXPERIENCE

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> Consider seeing a man on a bus whom you are sure that you have seen before; you "know" him in that sense. Such a recognition is usually followed by a search process asking, in effect, Where could I know him from? Who is he? The search process generates likely contexts (Do I know him from work; is he a movie star, a TV commentator, the milkman?). Eventually the search may end with the insight, That's the butcher from the supermarket!
>
> (Mandler, 1980, pp. 252–253)

The phenomenon described in this personal episode has become a classic and oft-cited reference. Although Mandler originally dubbed this experience butcher on the bus (aka "tartling"; Cleary & Specker, 2007; Goldstein & Gigerenzer, 1999), he later referred to it as partial recognition (Mandler, 1991; Mandler, 2008). This example launched a discussion of familiarity without recollection in his 1980 article: when a familiar person is encountered in an atypical setting, the context fails to support immediate retrieval of any details regarding who that person is. In the spirit of Brown and McNeill's (1966) abbreviation of the tip-of-the-tongue (TOT) experience, BOB will be used as shorthand for the butcher on the bus experience. This chapter provides background on how the term was coined, variables associated with the experience, how widespread the experience is, and related person recognition difficulties.

In general, most of the research referencing the BOB experience use it to provide the reader an everyday and easy-to-grasp illustration of one of two different concepts in cognitive research. The first is the distinction, in the recognition memory literature, between familiarity and recollection, where a strong sense of familiarity is experienced in the complete absence of recollection. The second way in which BOB has been used is to illustrate the central role of context reinstatement in successful recognition. It should be further noted that the BOB has rarely been studied or analyzed in its own right, but is primarily used as an example to best illustrate the phenomena under investigation in one of these two areas of research.

It will probably come as no surprise that William James provided a much earlier reference to intense familiarity sans recollection, although his out-of-context item is a picture rather than a person:

> I enter a friend's room and see on the wall a painting. At first I have the strange, wondering consciousness, 'Surely I have seen that before,' but when or how does not become clear. There only clings to the picture a sort of penumbra of familiarity,—when suddenly I exclaim: "I have it! It is a copy of part of one of the Fra

> Angelicos in the Florentine Academy—I recollect it there." Only when the image of the Academy arises does the picture become remembered, as well as seen.
>
> (James, 1893, p. 292)

Both Mandler's and James's descriptions share some similarities. The first is the absolute certainty that the object/person is known; it is not qualified in any sense. Second, it is immediately obvious that the context is incorrect, and this mismatch is central to the recollection difficulty. Finally, a mental search for the correct context is automatically evoked and identifying the correct setting appears to be sufficient for successful resolution.

Before proceeding, allow a short digression on the terms "butcher" and "bus." In the four decades since Mandler's (1980) introduction of BOB, the profession of butcher waned to the point where Gruppuso, Lindsay, and Masson (2007) suggested that "Today, it's more likely to be the video store clerk than the butcher one encounters on the bus" (p. 1085). However, the occupation of butcher is currently resurgent, riding the societal trend away from supermarket toward more modular market stores (e.g., Whole Foods, ~~Trader Joes~~). Ironically, the profession of "video store clerk" has essentially disappeared. A similar comment pertains to "bus." When the BOB first captured my interest decades ago, public transportation was struggling and the term was a bit arcane. However, now that mass transportation is growing in popularity, both terms are back on solid footing.

How Common Is the BOB Experience?

This colorful phrase has been used numerous times since Mandler (1980) introduced it, and Table 14.1 shows that its popularity has increased in recent decades. In addition to being frequently cited, the BOB experience has been characterized as …

> "widespread" and "ubiquitous" (cf. MacKenzie & Donaldson, 2007)
> "common" (Anderson, Jacoby, Thomas, & Balota, 2011; Donaldson & Curran, 2007; Hayes, Baena, Truong, & Cabeza, 2009)
> "everyday" (Cohn, Moscovitch, Lahat, & McAndrews, 2009; Henson & Gagnepain, 2010; Mandler, 1991)
> "classic" (Galli, Feurra, & Viggiano, 2006; Gruppuso et al., 2007; Ortu & Cihon, 2018; Saylik, 2017; Voss & Paller, 2008; Yovel & Paller, 2004)
> "famous" (Kronlund & Wittlesea, 2006)
> "epitome of pure familiarity" (Yovel & Paller, 2004)

It has been further suggested that "most people" have had the experience (Duke, Fiacconi, & Köhler, 2014; Gruppuso et al., 2007; Tanabe-Ishibashi, Ikeda, & Osaka, 2014), and that faces "often" elicit "feelings of familiarity in the absence of recollection" (Parkin, Gardiner, & Rosser, 1995, p. 389). An explicit assumption running through all of these references is that the BOB is very common, but is this actually true?

Two prospective diary studies suggest that the experience does happen to many people. Young, Hay and Ellis (1985) had young adult participants (ages 20–40 yrs) record of all their person recognition problems experienced over a seven-week period. These difficulties were later categorized as: complete failure to recognize a person; inability to fully access all details about an individual; misidentifying an individual; and experiencing a person as familiar but not recognizing who they are. The last category reflects the BOB experience, although they did not label it as such (cf. Burton, Jenkins & Robertson, 2018). All 22 diarists had BOB experiences (233 total, ranging from 1 to 22 across respondents) which accounted

Table 14.1 Articles Referring to the Butcher on the Bus Experience

1980–1989	
Mandler (1980)	
1990–1999	
Mandler (1991); Mäntylä (1997); Paller et al. (1999)	
2000–2009	
Cohn et al. (2009); Curran & Hancock (2007); Donaldson & Curran (2007); Galli et al. (2006); Groh-Bordin et al. (2006); Gruppuso et al. (2007); Hayes et al. (2009); Kronlund & Wittlesea (2006); Mandler (2008); Morris et al. (2008); Wittlesea & Williams (2001); Yovel & Paller (2004)	
2010–2019	
Anderson et al. (2011); Burton et al. (2018); Cohn et al. (2014); Deffler et al. (2015); Duke et al. (2014); Gimbel et al. (2017); Henson & Gagnepain (2010); Kirwan et al. (2010); Ortu & Cihon (2018); Perlman et al. (2016); Saylik (2017); Stark et al. (2018); Tanabe-Ishibashi et al. (2014); Tinard & Guillaume (2019); Tunney et al. (2012); Urquhart et al. (2018); Voss et al. (2012); Vakil & Vardi-Shapiro (2019); Voss & Paller (2017); Waidergoren et al. (2012); Wixted & Mickes (2010)	

for 25% of person recognition problems. The majority of BOB experiences (58%) were successfully resolved, supporting the informal descriptions by James (1893) and Mandler (1980). Also, most incidents (62%) took longer than 10 seconds to either identify the person or give up. As might be expected, the main cause of BOB difficulties was encountering a known person in an unexpected or inappropriate context.

> I was walking along the street, when I saw a person who looked familiar. At first she was only familiar; then I thought she was an assistant in the library, but wasn't sure. Gradually I became convinced she was. I would have recognized her instantly in the usual place.
>
> (pp. 506–507)

> I was in the bank, waiting to be served. I saw a person and I knew there was something familiar immediately. After a few seconds I realized she was from a shop on campus or a secretary of one of the departments. I eventually remembered by a process of elimination.
>
> (p. 507)

A subsequent diary study by Bartlett, Strater, and Fulton (1990; cited in Bartlett, 1993) included both young (N = 22) and older (N = 21) participants. Similar to Young et al. (1985), all person recognition problems experienced across seven weeks were recorded. However, Bartlett et al. (1990) used closed-ended response options: known person unrecognized; person misidentified; and familiar only. The last category subsumes BOB experiences, although like Young et al., 1985 they did not designate it as such. There were 34 BOBs (26% of total incidents) for young and 11 (18% of total) for older diarists. The number of persons who experienced BOBs in each age group was not noted, but these errors accounted for a substantial percentage (22%) of all errors across both groups.

One additional diary study by Schweich, van der Linden, Bredart, Bruyer, Nelles and Schils (1992) examined person recognition problems over one month for a group of young (N = 24) (ages 19–25 yrs) and older (N = 22) (ages 54–73 yrs) subjects. The mean number of "person seemed familiar only" experiences (which we equate to BOB) was 0.83 for young and 0.27 for older adults. These BOB-like experiences comprised 22% of all person

recognition errors for the young group, but no data on this is provided for the older subjects. (Note: one other diary study reported BOB experiences, but included no summary data; Clinch & Mascolo, 2018).

While Young et al. (1985) and Bartlett et al. (1990) yield clear evidence that BOBs are common, their samples are limited. In Young et al. (1985), all respondents had the experience but only young subjects were evaluated. While Bartlett (1990) found BOB experiences with both young and older adults, data on prevalence was not presented. That is, we are not sure how many individuals in each group had the experience. Finally, Schweich et al. (1992) indicate that these experiences are three times more common among young than older adults in absolute number, but again incidence data are not provided on the number of older and younger respondents having such experiences. Also, given that Schweich et al. (1992) simultaneously gathered data on both name and face errors, participants in the older group may have attended more to name than face memory problems. This speculation derives from both the past literature (Burke, MacKay, Worthley, & Wade, 1991) and their own data (name error reports were four times greater in the older than in the young group).

BOB Survey

To gather more precise information on how common BOB experiences are, we used an on-line survey with participants recruited from two sources. The first pool is alumni from Southern Methodist University (SMU), stratified into seven age decades (twenties through eighties). Two hundred individuals randomly sampled from each decade group were contacted by email. Surveys were completed by 359 respondents. These data were supplemented by a second sample comprised of 45 students enrolled in SMU Psychology Department classes. Respondents from both samples were aggregated into five age groups, roughly by decade (% females in parenthesis): 18 to 29 yrs, $N = 86$ (83%); 30 to 39 yrs, $N = 41$ (71%); 40 to 49 yrs, $N = 50$ (52%); 50 to 59 yrs, $N = 55$ (62%); 60 to 69 yrs, $N = 62$ (34%); 70 to 89 yrs, $N = 66$ (35%).

The BOB survey item was: "Have you ever run into someone who looks familiar, but can't place where you know them from?" As shown in the top row of Table 14.2, the BOB experience is essentially universal: nearly all (99%) respondents experienced it. In addition, it is remarkably consistent across the entire age range. Gender was identified among respondents, and there was no incidence difference either overall (males = 99%; females = 98%) or within any age grouping.

Now that the experience has been verified as commonplace, the next question is: What is so special about BOB? That is, why devote an entire chapter to it? Is the experience not just another manifestation of incomplete or partial retrieval (Mandler, 1991)? We often forget someone's name or who they are, so what makes the BOB experience exceptional?

Table 14.2 Percentage of survey respondents affirming each experience, by age group

	Age Group					
	18–29	30–39	40–49	50–59	60–69	70–89
Butcher on the bus	98.8%	100.0%	100.0%	100.0%	100.0%	93.0%
Walk familiar	72.1%	68.3%	72.0%	65.5%	64.5%	77.3%
Gestures familiar	80.2%	78.0%	86.0%	78.2%	85.5%	81.8%
Voice familiar	82.6%	73.2%	98.0%	92.7%	91.9%	84.8%
Inverted butcher on the bus	26.8%	17.1%	16.0%	18.2%	12.2%	22.7%

Why the BOB Experience Is Important

Metacognitive Awareness in the Absence of Identity Clues

Perhaps the most distinctive feature of BOBs is that, in the moment, absolutely no information comes to mind that could help identify the person. Usually, encountering someone familiar is accompanied by a sense of where we know the person from (department at work, party, neighborhood). It is exceptional to have no inkling about context. Thus, the BOB represents a very rare experience where a strong sense of familiarity is missing any recollective details.

Familiarity itself has been extensively researched, mostly using episodic recognition memory paradigms. Participants evaluate the familiarity of recently presented stimuli (words/pictures), and these responses are compared with some contextual recollection about the prior presentation. Familiarity is defined as a feeling that the stimulus has been experienced before, whereas recollection involves recalling contextual aspects of that prior encounter: perceptual details (e.g., font, color); spatial location (e.g., where on the page); and temporal framework (e.g., which list), etc. The frequent goal of such research is to assess whether familiarity and recollection are related or independent processes (Yonelinas, 2002). Do familiarity and recollection fall on the same continuum, with familiarity a much weaker version of recollection? Or are familiarity and recollection based on separate (but perhaps correlated) dimensions?

The BOB experience is commonly used as a real-world example of how familiarity can occasionally seem devoid of recollection. However, debates in the literature about familiarity and recollection most commonly use standard recognition memory tasks whereby participants judge whether each test item is a repeat of one presented earlier. One could argue that this task may not be the best one to model the real-world BOB experience. Hintzman (2011) suggests that memory researchers often become too focused on debating the processes behind performance in narrow laboratory tasks and lose sight of the bigger questions about how memory operates in the world. From this perspective, if researchers are interested in studying the BOB experience, they should develop a task that attempts to induce that experience in the lab, rather than using standard recognition memory tasks developed for other purposes and which may not actually elicit the BOB experience. Other metacognitive states of memory, in which there is metacognitive awareness with little else other than the sense experience, have elicited the development of appropriate laboratory paradigms. Examples include the TOT (Brown, 2012; Schwartz, 2001c) and déjà vu (Brown & Marsh, 2010; Cleary, 2008) experiences. Researchers should follow a similar approach with the study of the BOB experience.

As a final comment on the lack of identity cues, there exist some definitional misunderstandings of the BOB experience. MacKenzie and Donaldson (2007) suggest that the phenomenon is synonymous with "I know your face but I can't remember your name" (p. 454). In fact, it is not just the name that is missing, but any possible clues about identity, such as where you have met the person, the person's profession, or personal attributes (marital status, hobbies).

Subjective Intensity of Metamemory Experience

Another reason why BOB deserves special attention is its intensity. Using the tip-of-the-tongue (TOT) experience to illustrate this point, a TOT is set apart from more mundane word finding difficulties by the way it momentarily highjacks our consciousness (Brown,

1991; 2012). Some suggest the TOT puts us in a state of "torment" (Brown & McNeill, 1966), "turmoil" (Faust, Dimitrovsky, & Davidi, 1997), "frustration" (Schwartz, 2001b), "agitation" (Wellman, 1977) or even curiosity to discover the word (Metcalfe, Schwartz & Bloom, 2017). In short, the TOT feeling temporarily consumes one's attentional focus. In contrast, the feeling of knowing (or FOK) experience (Hart, 1965, 1966) reflects the degree of confidence that a currently unrecallable word could subsequently be recognized. In some sense, FOK is a modulated or toned-down version of the more intense attention grab associated with a TOT. Similarly, bumping into an acquaintance at the grocery store, whose name you can't recall, does not usually elicit the degree of intensity that accompanies the BOB. You may experience a modest sense that there is something vaguely familiar but not an overpowering certitude that you know them. In contrast, the BOB experience captures one's attention and demands a search (cf. Hanley, 2014), similar to a TOT experience.

The intensity of a BOB may stem from the imminent possibility of a face-to-face embarrassing encounter with someone we should be able to identify but can't (Hayes et al., 2009). The potential awkwardness of this ~~imminent~~ confrontation could trigger the strong emotional reaction (cf. Burton et al., 2018). Alternatively, Kronlund and Whittlesea (2006) suggest that a feeling of surprise, elicited by fluent processing of a familiar person in a context where they are unexpected, triggers an intense push to resolve this inconsistency. In contrast to Kronlund and Whittlesea (2006), Morris, Cleary, and Still (2008) argue that it is *not* the discordant fluency, but rather the physiological arousal associated directly with the perceptual processing that elicits the emotional intensity. Related to this, Ellis and Young (1990) propose that an emotional brain pathway is involved with face recognition that is separate from the one involved with processing perceptual features. This independent track allows for the greater possibility of heightened autonomic reaction with face perception, which might be augmented if immediate perceptual identification is absent.

Automaticity of the Feeling's Onset

The third feature of BOB that sets it apart is that the familiarity assessment is automatic rather than intentional. Under most circumstances, familiarity involves conscious effort. When a person walks toward us, we evaluate whether they look familiar. When reading through a listing of recently published articles, we assess whether the authors or paper seem familiar. While it is possible for memories to come to mind without effort (Berntsen, 1996), information retrieval usually involves intentional memory search and familiarity evaluations.

Anderson et al. (2011) characterize the BOB as "spontaneous familiarity," or recognition without intention (Ste-Marie & Jacoby, 1993), where the sight of an acquaintance triggers a feeling of familiarity without active effort. This contrasts with laboratory familiarity assessments that normally require explicit effort. Cleary and Specker (2007) also use the term spontaneous familiarity, and distinguish between two varieties: spontaneous *detached* familiarity without accompanying memory attributes (cf. Curran & Cleary, 2003), which characterizes the BOB experience, versus spontaneous *attached* familiarity, with accompanying attributes that clarify the source of that feeling.

BOB as a Vehicle to Illustrate a Theory

As noted earlier, the BOB is an excellent and clear example that is used in support of theoretical positions. In many written reports, it is invoked to connect the reader's experience to the theoretical discussion at hand: effects of context change on recognition memory, and whether ~~recognition~~ familiarity and recollection are separable sub-components of

recognition. There is a distinction in how the BOB relates to each position, the clarification of which may better help appreciate these applications. The BOB can be viewed within an independent variable (IV) framework: a real-world context change (butcher shop to bus) that disrupts face recognition. Here, the environmental alteration is the primary focus (IV) and the details of the recognition impairment (dependent variable; DV) are a behavioral reflection of such alteration. The other perspective flips this, putting the primary emphasis on recognition behavior (DV) as embodying the contrast of recollection versus familiarity. From this perspective, the context change (IV) is simply a catalyst to separate these two components of recognition (DV). Although the literature citing the BOB experience generally cleaves to either the IV (context) or DV (recollection/familiarity) framework, there is still considerable overlap in these perspectives. This distinction can help appreciate the literature, but investigations in this area do not adhere exclusively to one perspective versus the other.

Context Change on Face Recognition

Gruppuso et al. (2007) were rightly appalled by the lack of research on the effects of the context on face recognition, given the centrality of this experience in everyday life and numerous references to Mandler's (1980) prototypical example. A handful of investigations prior to Gruppuso et al. (2007) did examine context change and person recognition, but with mixed results and materials that lacked verisimilitude. Defining context as another person's face (rather than a setting), Bower and Karlin (1974) found no difference in recognition performance when the target face at test was associated with the same face as at input (presented as pairs of slides) versus a new face. Several subsequent studies did, however, find a facilitating effect of consistent context on face recognition. Again using pairs of unfamiliar faces at input, the same pairing at test facilitated facial recognition compared to being paired at test with either a different face (Watkins, Ho, & Tulving, 1976; Winograd & Rivers-Bulkeley, 1977) or no face (Winograd & Rivers-Bulkeley, 1977).

Rather than defining context as another person's face, Davies and Milne (1982, Experiment 1) used a more realistic context. Unfamiliar faces were presented against various backgrounds during input, and at test the background either stayed the same or changed. Recognition was reduced when background changed, providing a more realistic experimental confirmation of the BOB experience (Experiment 1). It is noteworthy that no context effects were found using famous faces (Experiment 2), although celebrity faces should have better modelled the BOB as they are familiar to all subjects. However, Experiment 2 is probably a poor test because no effort was made to match the background with the one in which the celebrity is usually seen.

Several papers have used the BOB experience to explicate broader theoretical positions regarding context effects in recognition memory. For example, Perlman, Hoffman, Tzelgov, Pothos and Edwards (2016) present a contextual locking hypothesis, in which the butcher's identity is "locked" into his/her experiential context—the butcher shop. Contextual locking affects explicit memory, but is unrelated to implicit memory. Thus, one's ability to recall the butcher's identity—an episodic function—is seriously impaired when the context is changed to a bus. In contrast, implicit memory is not tied to context, so familiarity is unaffected when contextual settings differ between the initial and later encounters.

The BOB experience is also employed by Stark, Reagh, Yassa, and Stark (2018) to frame ideas about the complexities of context. They caution against oversimplifying context by viewing it as a unitary entity, such as a butcher shop or bus. Rather, context is multifaceted, consisting of temporal, spatial, behavioral and emotional elements. Viewing context as a

singular factor is risky, and the contribution of each separate element needs to be identified in evaluating any effects of context change. Stark et al. (2018) also add another caution about regarding the hippocampus as the seat of familiarity or recollection. Contextual memory has been closely tied to the hippocampus, which may make separating familiarity from recollection problematic.

Tanabe-Ishibashi et al. (2014) pose a fundamental question regarding why the context shift creates the memory difficulty characterized by the BOB experience. Assuming that full identification of the butcher is tied to the "learning" context (meat counter), a change to the "test" context (bus) can create difficulty either because of interference *or* insufficient cue support. If the bus context is creating cue interference, then Tanabe-Ishibashi et al. (2014) reasoned that a changed context would make performance worse than either the same cue (butcher shop) or no cue, with performance comparable under the latter two conditions. The contrasting position is that full recognition is dependent upon cue support, and that the learning context is needed to enable adequate retrieval. If true, then performance should be best with the same context at test, and higher than in either the changed or no cue conditions, which should not differ from each other. They actually found support for both positions, depending upon which dependent variable is used: with *reaction times*, changed cue < (same cue = no cue), confirming context interference; with *hits*, same cue > (changed cue = no cue), supporting association deficiency. Thus, they conclude that both processes may be contributing to the BOB experience.

Two aspects of Tanabe-Ishibashi et al.'s (2014) investigation may present limitations to the generality of their findings. First, these differences were found only when the context (background scene) was meaningful. When background was made meaningless, by scrambling the visual elements in meaningful scenes, the effects disappeared. Thus, the coherence of the context is important. A second limitation is their short term memory design, consisting of an 8 sec retention interval between the face viewing and recognition test. It might be a stretch to assume that their findings relate to the typical BOB situation, where the retention interval is closer to days or weeks (cf. Mandler, 2008).

Familiarity Without Recollection

Gruppuso et al. (2007) provided a comprehensive experimental evaluation of the BOB phenomenon related to separating familiarity from recollection in recognition. Their key question was whether familiarity for a previously-viewed face would remain undiminished, even if recollection accuracy declined. They presented 48 unfamiliar faces at study, each paired with a different context picture (travel scene, sports, etc.). To assure that the context was sufficiently processed, subjects rated how well each face belonged with the paired scene or object. The test included old and new faces, and each was shown with either the same (as input), switched (seen with another face at input), or new context. Subjects first identified a face as "old" or "new," and "old" responses were followed by a second evaluation of whether they actually remembered the experience of seeing the face presented (remember) or had a more general sense that the face had been presented (know). Whereas remember responses were impaired for switched or new compared to same contexts, Gruppuso et al. (2007) found that know (or familiarity) responses were comparable across same, switched and new contexts. Thus, when encountering the butcher in a new (switched) context, the familiarity remains undiminished even though remembering is impaired. As Gruppuso et al. note, identifying a person depends on your ability to access "sufficient source-specifying information" and one "is less likely to recollect such information (but no less likely to access familiarity) when the butcher is encountered in an atypical context" (p. 1089).

Gruppuso et al.'s (2007) study was extended by Tunney, Mullett, Moross, and Gardner (2012), who used a similar research design but obtained a different outcome. In Experiment 1, they replicated Gruppuso et al. (2007) on recollection, with face remember accuracy (hit rate) higher with same context at test, compared to either switched or new contexts (which did not differ). Without adjustment, familiarity assessments for old faces were comparable across same, switched and new contexts, similar to Gruppuso et al. However, when recognition was adjusted assuming independence between remember and know judgments, using Jacoby, Yonelinas and Jennings's (1997) IRK formula of Familiarity = Know/(1—Remember), familiarity assessments followed the same pattern as remember judgments—significantly higher for same than for either switched or new contexts. It should be noted that Gruppuso et al. (2007) found comparable outcomes with both adjusted and unadjusted familiarity. To further explore whether context played any role in familiarity assessments, in Experiment 2 Tunney et al. (2012) asked subjects to make context judgments following the remember/know assessment. Surprisingly, context recollection was above chance following both remember and know judgements, bringing into question the independence of these two memory dimensions. This finding is important, given that the BOB is often used as an everyday illustration of the separation between recollection (remember) and familiarity (know).

Tunney et al. (2012) do point out a fundamental issue with all laboratory research seeking to examine the BOB experience. Assessing this depends upon a sufficient number of trials where high feeling of knowing (familiarity) is accompanied by low assessed recollection (remember). In most trials, these two memory assessments move in tandem (high/high or low/low) leaving few items with a high know and a low remember assessment. The rarity of such experiences makes the BOB striking in real-life settings but also difficult to elicit experimentally using a standard remember/know paradigm. As argued earlier, trying to retrofit the BOB experience into standard memory research paradigms designed for other purposes may not be the best approach to clarify the phenomenon. What is needed is a new laboratory model built from the ground up around BOB, and some starter ideas are presented later in this chapter in the section on Future Directions.

There are examples of successfully bringing relatively rare experiences into the laboratory to study. For instance, the TOT state was elegantly elicited and documented in a seminal study by Brown and McNeill (1966), and hundreds of research efforts followed this lead (Brown, 1991, 2012; Schwartz, 2001c). Another rare cognitive quirk that has been brought under laboratory scrutiny is the déjà vu experience (Brown & Marsh, 2010; Cleary, 2014; Moulin, 2018). Directly mining the BOB experience can potentially yield a rich source of additional perspectives on metamemory function, just as has laboratory research on déjà vu (Brown, 2003, 2004; Cleary, 2014; Moulin, 2018).

Theoretical Perspectives

Theoretical speculation based directly upon the BOB experience has been relatively rare, but several studies have touched upon this.

Demand for Resource Allocation

Morris et al. (2008) are the only researchers who have used BOB as a focus of their theoretical speculation. They dig into the experience more analytically using a combination of context, cognitive resource needs and arousal. In their view, individuals must manage their

limited cognitive resources to optimize memory retrieval. For easy recall, demand is low; for difficult recollection, demand is high. The BOB presents an especially challenging retrieval situation, with high resource demand triggered primarily by the inappropriate context. One result of the high resource expenditure related to the BOB is elevated arousal which leads to a greater autonomic response. They further speculate that the intense arousal caused by this automatic response can be misinterpreted as familiarity. Thus, what an individual normally feels to be familiarity during a BOB is actually elevated arousal, resulting from high cognitive resource requirement.

Morris et al. (2008) support this speculation with a list learning study. At test, those items associated with higher skin conductance had higher positive recognition ratings. This was true whether or not the item had actually been shown in the earlier list. They also point to another study supporting their idea that arousal can be interpreted as familiarity. When a buzzer was placed under subjects' seats during a learning experiment, Goldinger and Hansen (2005) discovered that on those trials where the vibration was detected by subjects, they gave higher recognition evaluations for accompanying items. The vibration was supposedly viewed as a sign of arousal by subjects, and this arousal was interpreted as familiarity for the simultaneously-shown item. This speculation by Morris et al. is intriguing—that arousal is a proxy for familiarity—and has clear implications not only for metamemory phenomena associated with elevated arousal (BOB, TOT, déjà vu) but also for the entire research literature on familiarity and recollection. This point has also been put forth by Schwartz and Cleary (2016), who argue that the arousal associated with other quirky memory states like TOT and déjà vu may serve a personal functional value (cf. Ryals, Reynolds, Patton, & Cleary, 2018). That is, the arousal signals that one should expend additional effort to resolve the moderate distress or intriguing feeling. With a TOT, this effort is directed at finding the missing word, whereas with déjà vu, the effort is focused on determining what prior experience enigmatically connects to the present.

IAC Model of Facial Recognition

Although not developed with reference to the BOB experience, the interactive activation and competition (IAC) model of face recognition (Burton, Bruce, & Hancock, 1999; Burton, Bruce, & Johnston, 1990) provides a good framework within which to interpret the BOB experience. Cleary and Specker (2007) have done a thorough job of detailing this connection, and a brief summary is provided here. The first stage of the IAC model involves a sense of familiarity, in the absence of any specific semantic information about the person. Semantic attributes are activated in the second stage, which is then followed by name access in stage three. Relating this to the BOB experience, the first stage is where the strong sense of familiarity about the butcher occurs in the absence of any knowledge of who they are. The intense disconnect that defines the BOB occurs when one is unable to make the normally-smooth transition between stages one and two, remaining in stage one. The semantic information that they are your butcher may eventually become available (stage two), thus resolving the BOB. Then their name may come to mind if you happen to know it (third stage) (Cleary & Specker, 2007), although this is not essential for the BOB. This IAC model may be more easily applicable to BOB experiences than are the dual process models of familiarity and recognition (Yonelinas, 2002). Dual-process models are derived from research where an obvious familiarity source always exists—the prior study list (Cleary & Specker, 2007). For BOB experiences, an obvious referential context for the sense of familiarity is unavailable, which defines the experience.

BOB and Neuropsychology

A substantial literature exists on efforts to separate recollection and familiarity through differences in brain region activation. As it stands, these findings are not definitive, but the BOB experience has been pulled into this effort as a clear model of the familiarity/recollection distinction. This subset of studies has not helped to resolve the debate regarding the issue of familiarity/recollection independence, but the research is reviewed here to provide complete coverage of the BOB literature.

The BOB experience has been used in a handful of investigations using event related potentials (ERPs) to determine whether independent brain processes are involved in remembering faces with contextual details (recollection) and without them (familiarity) (cf. Donaldson & Curran, 2007). Words are less ideal stimuli to use in such investigations because all have some contamination from pre-experimental background familiarity. Novel faces have the potential to provide a much cleaner measure, although they are rarely used (cf. Cleary & Specker, 2007).

One notable exception is an investigation by Yovel and Paller (2004), who presented 24 unfamiliar faces at study, each associated with an arbitrary occupation. Old faces were mixed with 12 new ones at test, and subjects indicated whether each face was old (from study list) or new. Following old responses, subjects were asked to recall the associated occupation. If successful, this was assumed to reflect contextual memory from the input list, and hence recollection. If not, this was interpreted as a familiar-only response. When contextual recall for an old face was successful, there was greater activation in the mid-frontal 300 to 500 ms post stimulus (or FN400) compared to familiar-only old faces, as well as a graded effect of familiarity later (500 to 700 ms post stimulus). Thus, both processes (familiarity and recollection) were reflected in bilateral, parietal-maximum brain potentials in the same areas, but familiarity responses were shorter and of lower magnitude.

Given the importance of their finding that the FN400 activation level was not a pure measure of familiarity, Yovel and Paller (2004) attempted to increase the salience of familiarity to the subjects. During input, in addition to rating how well the face and occupation fit together, subjects were also instructed to remember the pairing for later. With this added requirement, there was no difference in FN400 activation at test between when context was and was not remembered. There was, however, still a difference at 500 to 700 ms between old faces remembered with versus without context.

MacKenzie and Donaldson (2007) support Yovel and Paller's (2004) outcome of a posterior old/new effect reflecting familiarity, and add a new finding that recollection is indicated by an anterior old/new difference. They essentially replicated Yovel and Paller (2004) but rather than face-occupation pairs they used face-name pairings during study with subjects indicating (yes/no) whether the face fit the name. They discovered that familiarity is reflected in posterior activity, differing from other recognition studies, and that recollection is frontally located. Curran and Hancock (2007) also found recollection/familiar differences in the PN400 waveform. Donaldson and Curran (2007) cautiously speculate that the weight of the evidence provided in these three investigations (Curran & Hancock, 2007; MacKenzie & Donaldson, 2007; Yovel & Paller, 2004) support dual-process, over single-process, views of recognition. While suggesting several variables that might account for the discrepancies among studies, they urge additional work on this important topic that relates to the BOB experience.

There also exists one fMRI study comparing familiarity in recognition that refers to the BOB experience. As with other physiological investigations, Hayes et al. (2009) used unfamiliar faces to remove effects of background familiarity. But unlike the prior ERP

investigations (Curran & Hancock, 2007; MacKenzie & Donaldson, 2007; Yovel & Paller, 2004), they did not direct subjects' attention to the relationship between context and face, because they felt that the BOB phenomenon involves an incidental association between the person (butcher) and context (butcher shop) which is "spontaneously bound during encoding" (p. 2542). In line with their thinking, they had subjects rate the friendliness of the faces instead of how well the face fit the context. They hypothesize that this unintentional experiential pairing is key to the difficulty in accessing contextual information upon later meeting that person outside of the usual setting. Hayes et al. compared behavioral and image differences between two conditions: studied faces paired with a scene (context) or shown alone (no context). All faces were tested alone.

As expected, there were more high-confidence responses at test to faces presented earlier without context, given that study and test situations matched in this condition. Furthermore, the impact of context was reflected in differences between left (familiarity) and right (recollection) hippocampal activity. More specifically, increased activity in the left MTL during input was linked with smaller context effects, whereas increased activation in the right MTL was related to greater context effects. Thus, the left MTL appears to be related to familiarity, whereas the right MTL is connected more directly to recollection (contextual processing). Hayes et al. (2009) assert that this outcome helps clarify incidental context effects on face encoding, and how different neural regions subsume familiarity and contextual associations.

~~Some~~ caution is needed ~~in~~ relating brain research to the BOB experience. The phenomenon involves a stark and clear juxtaposition of recollection and familiarity in real-life settings, but currently, researchers are lacking an adequate laboratory model for inducing BOB experiences in the laboratory. These issues are multitudinous, including face familiarity at test (high versus modest), learning task (multiple versus single exposure), retention interval (weeks versus minutes) and face ethnicity (Voss & Paller, 2008), to name a few. Perhaps most important is the type of face processing during input, which ranges from simply memorizing the face (Tanabe-Ishibashi et al., 2014) to rating the person/context fit (Gruppuso et al., 2007; Tunney et al., 2012) to rating the person-to-occupation fit and remembering it (Curran & Hancock, 2007; Yovel & Paller, 2004). Given the hegemony of processing tasks, it is no wonder that the outcomes are inconsistent across studies. In short, unlike other cognitive quirks that have been reasonably well duplicated in the lab (TOT; Brown, 2012; Schwartz, 2001c; déjà vu; Brown & Marsh, 2008, 2009; Cleary, 2014; Clearyet al., 2012; Cleary, Ryals, & Nomi, 2009), there has been little effort to develop a laboratory paradigm aimed at eliciting the phenomenal quality of a real-world BOB experience. Without this, we will most likely continue to experience disjointed outcomes from studies attempting to insert the BOB experience into paradigms developed for other purposes.

Can Contexts Bleed Familiarity to Persons?

In this section, we consider a question that is closely related to the BOB experience: Can the familiarity of the context, in itself, bias the rated familiarity of an unfamiliar (never seen) individual? This question stems from a secondary finding from Gruppuso et al. (2007). False alarms to new faces at test were higher when paired with old contexts (seen at input, but paired with other faces) versus new contexts (cf. Anderson et al., 2011). This suggests a familiar context can leak some of that familiarity to faces that have never been seen before. This same boost in false alarms to new faces paired with ~~a~~ familiar (studied) contexts was also found by Davies and Milne (1982) and Rainis (2001), although Tunney et al. (2012) failed to find such an effect. This possibility of a "halo effect" of familiar context on unfamiliar person recognition motivated an investigation by Deffler, Brown and Marsh (2015).

Faces of unfamiliar persons were paired with either a famous landmark (Eifel Tower; Washington Monument), a mundane scene or a simple color background. Familiar scenes elicited higher familiarity ratings to faces paired with them, compared to faces presented with neutral scenes or simple backgrounds. Thus, it appears that the context of an initial encounter with a person can bias how familiar they first appear.

This finding begs the question of whether the BOB experience occurs only in familiar settings (i.e., bus). Would it also happen if the butcher were seen in a novel context, like a restaurant that one has never been to before? Would increasing the familiarity of the context increase the intensity of the BOB effect? That is, would the feeling be strongest seeing the butcher in your Starbuck's (visited daily), less so at your church (weekly services) and reduced even further at your favorite movie theater (attended monthly)? Related to this, Urquhart, Sivakumaran, Macfarlane and O'Connor (2018) suggest that the familiarity of the context can affect the likelihood that a déjà vu is experienced, by influencing the salience of a novel stimulus feature experienced in that context. Similarly, a familiar environmental setting may potentiate the perceptual contrast of encountering an unexpected but familiar person.

BOB Extensions: Voice, Walk, Gestures

Seeing a familiar person at a distance is the usual trigger for a BOB—not so close to greet ~~them,~~ but close enough to see what they look like. Can other aspects of an individual, aside from ~~the~~ physical look or appearance, elicit a sense of familiarity without recollection (cf. Young et al., 1985)? As O'Toole et al. (2011) suggest, humans often supplement difficulties with facial recognition by using cues from other perceptual features such as what the person's body looks like. In fact, Pilz, Vuong, Bulthoff, and Thornton (2011) propose that the way in which a person moves may influence how their face is processed.

To address this possibility, we devised three possible non-facial dimensions to explore: voice, walk and gestures. You see a person walking across campus a block away, and their distinctive stride—bobbing up and down with hands stiff at their side—automatically elicits a sense of familiarity prior to identifying who they are. Or you catch a glimpse of someone gesturing distinctively in the corner of a crowded room and their movements trigger familiarity moments before you can figure out who they are. Or you hear somebody approaching your office with their distinctively familiar voice echoing down the hallway, and a wave of familiarity precedes identification. Young et al. (1985) report a BOB-type of familiarity triggered by voice rather than appearance:

> I didn't recognize her till she spoke; then I recognized the voice as familiar. I've no idea who she was.
>
> (p. 507)

Crafting survey items that capture these other types of familiar-only person experiences proved daunting because such encounters tend to be idiosynchratic. As an alternative, we inquired about "indirect" experiences, where a person with whom you are interacting triggers a sense of familiarity for another unidentified ~~person~~ who closely resembles that person. This is similar to Young et al.'s (1985) "resemblance only" experiences reported by diary study participants:

> I passed a woman standing in the entrance to the college. She smiled vaguely at me. I know I don't know her but I had a strong feeling that she resembled someone else.
>
> (p. 513)

The person identification literature is dominated by face perception, but a few studies have tackled identification by movement and voice. While person recognition is always best through facial information, it is still above chance using gait (Burton, Wilson, Cowan, & Bruce, 1999) and movement (Pilz et al., 2011). Our naturalistic recognition of persons relies, to some extent, on a combination of body shape, gait and gesture (O'Toole et al., 2011; Roark, O'Toole, Abdi & Barret, 2006; Robbins & Coltheart, 2012), a concept that O'Toole, Roark and Abdi (2002) refer to as "dynamic identity signatures."

With respect to voice, Hanley and colleagues (Hanley & Damjanovic, 2009; Hanley, Smith, & Hadfield, 1998; Hanley & Turner, 2000) found that familiar-only responses occur regularly to vocal stimuli. They speculate that the connection between voice and the semantic representation of the person is not as strong as the face-semantic connection, a conclusion based upon the higher likelihood of recalling a person's occupation during face-based compared to voice-based familiar-only states.

Survey Data

We used three survey items to evaluate these BOB-related experiences:

> Have you ever seen someone walk a certain way, but are unable to figure out who they resemble?
>
> Have you ever observed someone gesture in a familiar way, but can't figure out who they remind you of?
>
> Have you ever heard someone's voice that sounds like a familiar person, but don't know who that other person is?

The results appear in the middle section of Table 14.2. As with BOB, all three dimensions elicited familiarity without recollection in a majority of respondents across all age groups. Overall percentages were 70% for walk, 82% for gesture, and 87% for voice. Furthermore, the ordinality of these differences (walk < gesture < voice) was consistent in five of the six age categories. Summing positive responses across voice, gestures and walk, 96% of all respondents acknowledged at least one such experience, 83% had two, and 66% had all three.

A few additional comments are needed about these three corollary dimensions of person familiarity. First, our questions and resultant data are preliminary. It would be ideal to make these three questions parallel in form to the BOB item. For instance, when overhearing a person's voice from across the room at a gathering, you are overcome by a sense of familiarity but are unable to identify who they are (can't see them). Or hearing a celebrity's "voice-over" on a commercial, you experience intense familiarity but are unable to identify them. Or seeing someone walking across campus at a distance, you are positive that you know them but can't at the moment. Presenting a specific scenario in a survey item, such as in the above examples, would probably not capture many of the personally idiosynchratic familiar-only experiences. Most frequently, an individual's walk, voice and gestures are experienced during direct contact with that person, with facial cues most likely dominating the others. An exception might be a blind person, who could have a face-to-face BOB experience from vocal cues.

As a final observation on voice, walk and gesture, if a feature of the person before you is strongly reminiscent of someone else, perhaps the identity of the individual you are talking to interferes with retrieving who that other person is. This is similar to how the bus context might interfere with access to the meat-department cue, which is essential to retrieve the butcher's identity. Perhaps cue overload underlies this experience (Watkins & Watkins, 1976)

where the presently-available person simply overshadows and inhibits one's access to the other individual who shares this same characteristic (i.e., waving their arms broadly in front of them as they talk; having a high and raspy voice).

The "Inverted" BOB: When a Familiar Person Feels Strangely Unfamiliar

Can a familiar person become momentarily and unexpectedly unfamiliar? That is, the expected sense of familiarity is missing for someone you know well? Young et al. (1985) found evidence of person familiarity failure in their diary study. This error was actually rather common, with 114 incidents reported from 21 of 22 diarists. Familiarity failure often occurred with persons who were highly familiar (42%) and seen regularly (38%), and who fit with being at that particular place (28%). Most incidents also occurred under good viewing conditions (82%) so perceptual degradation was not a factor. Unlike the BOB experience, where one is starkly aware of the memory problem, diarists became aware of the missed familiarity only a quarter of the time (24%), and were often informed about their recognition failure by someone else (40%).

The contrast between regular and inverted BOB experiences may be clarified by a comparison to the déjà vu versus jamais vu experiences. BOB resembles déjà vu, in that both involve an immediate and intense feeling of familiarity for that person (BOB) or setting (déjà vu), yet it is unclear what aspect of the person or setting is eliciting that familiarity. In contrast, during jamais vu a normally familiar setting or activity becomes momentarily stripped of the expected sense of familiarity (Brown, 2003, 2004). An example would be walking into one's office and having it feel suddenly unfamiliar, or driving a commonly traversed route that appears momentarily foreign. Jamais vu is less common than déjà vu (Brown, 2004; Brown & Marsh, 2010), and the most easily grasped example is word blindness where a common word looks momentarily odd or unfamiliar. Over half of college students claim to have had this experience (Brown & Marsh, 2010).

The temporary loss of person familiarity has not been previously assessed in the published literature, so we generated a survey item: "Have you ever been with a friend, but they momentarily seem like a stranger to you?" As seen in the bottom row of Table 14.2, one in five respondents (20%) said that this had happened to them, and it was found across all age groups at roughly the same prevalence. So, although person familiarity failure is not universal, it is sufficiently prevalent to be worth further exploration. Perhaps more precisely honed questions would bring out subtle aspects of this experience. Drawing from my own experience, I completely failed to recognize a long-term colleague of mine (David Mitchell, who contributed a chapter to this book) the morning after he shaved off his beard. I stared blankly at him until I heard him say "hello," at which point his identity immediately returned. What other specific feature changes can strip away a person's familiarity? Mandler (2008) suggests that a related phenomenon should be explored, where a person might not feel familiar but does have some associated recollective fragment associated with them ("did we meet at an alumni gathering?"; "have I seen you at athletic ~~the~~ center?"). One problem with measuring the incidence of this person familiarity failure may be our own lack of awareness. As Young et al. (1985) discovered, it is much more likely for someone else (than you) to notice the problem.

Related Phenomena

There exist several other ~~cognitive~~ quirks that share features with the BOB experience, and these are detailed below.

Tip of the Tongue (TOT)

What is common to both TOT and BOB experiences is a strong feeling or sensation of memory without recollection (TOT; Brown, 1991, 2012; Schwartz, 2001c) and a certitude that the momentarily missing information (word; person's identity) eventually can be remembered. The main difference is that during a TOT, semantic information about the inaccessible word is potentially available to help guide the word search. More specifically, a TOT typically begins with a question containing semantic clues (What is the capital of Spain? Who wrote The Inferno?). In contrast, semantic information about the target person is starkly absent during a BOB. With respect to the three defining features (presented earlier) that make a BOB distinctive—absence of cues, intensity, automaticity—the TOT shares the last two but not the first. Referring back to the IAC model, BOB involves being unable to make the transition between the first (perceptual) and second (semantic) stages, whereas a TOT more likely reflects being stuck between stages two and three (name) (Bruce & Young, 1986; Burke et al., 1991; Hanley, 2014; Young et al., 1985). In a TOT, semantic information is available, but in a BOB it is missing.

There is one variety of TOT that fits the BOB experience nearly perfectly. With *olfactory* TOTs (Cleary, Konkel, Nomi, & McCabe, 2010), an individual is routinely at a loss to identify the particular object associated with the odor, much less the name (Jönsson & Olsson, 2003; Jönsson, Tchekhova, Lönner, & Olsson, 2005). Thus, the individual is suspended in a pure sensory experience that is eliciting strong familiarity (stage one), without the ability to identify any semantic aspects about the odor or what it emanates from (stage two), much less the odor name (stage three).

An investigation by Eysenck (1979) that reversed the typical TOT paradigm also relates to the BOB experience. In a prototypical TOT, a person seeks to retrieve a word when provided semantic information whereas with the BOB the person is available but semantic aspects are not. Similar to a BOB, Eysenck (1979) presented low-frequency words to subjects and asked for their definition. Thus, the word (like the butcher) is presented, but not its semantic features. On those trials where subjects had high confidence that they knew the target word but could not provide a definition, they still exhibited some semantic knowledge as measured by Osgood's semantic differential (evaluation, activity, potency). What is lacking, however, in Eysenck's (1979) outcome is the intense and immediate sense of familiarity associated with a BOB or TOT. Perhaps the paradigm used by Eysenck could be extended by providing a modest contextual cue (i.e., medical term; something edible) to see if this elicits an elevated sense of familiarity and motivates a search for the specific definition (cf. Schwartz & Cleary, 2018).

Recognition Without Identification (RWI)

During RWI, a person can identify that a particular stimulus (word, picture, odor) has been presented on a prior list, or is related to a stimulus from a prior list, yet is unable to identify that specific prior experience/stimulus that elicited the sense of familiarity (Cleary, 2008; Cleary & Reyes, 2009; Cleary, Ryals & Nomi, 2009). In the original investigation on this, Peynircioğlu (1990) followed a word list with a word-fragment completion test. For unsolved fragments, subjects could still identify (above chance) which ones had completion words that appeared on the prior list. Thus, they accurately assessed familiarity without specific information about the eliciting stimulus. Related to the BOB experience, Cleary and Specker (2007) evaluated face memory by presenting famous individuals' names in the input list and then later testing name recall using face cues. When subjects could not tell who the person

was, they could still identify (above chance) whether the name had appeared in the study list. In typical RWI studies, the experimenter requests the prior-list evaluation; however, others require familiar-novel discrimination, instead of recent old-new discrimination (e.g., Bolte & Goschke, 2008; Cleary, Ryals, & Nomi, 2013). These variants rely on familiarity-based general knowledge judgments during stimulus identification failure, rather than familiarity-based judgments of recent occurrence on a list. RWI may differ from BOB in the intensity of the familiarity experience. It is also as yet an open empirical question whether in RWI, the feeling of familiarity is typically intense enough to capture the subjects' attention, as is the case for BOB and TOT experiences. However, it is possible that the familiarity modeled by RWI could be made strong enough to impinge upon conscious awareness and motivate a search for the associated (previously shown) stimulus.

Prosopagnosia

This recognition failure, also known as "face blindness," consists of a neurological pathology where ~~one~~ is unable to recognize any faces as familiar, even their own. Popularized by Oliver Sacks (Sacks, 1985), who incidentally also experienced this malady, prosopagnosia is related to BOB in that both involve an inability to recognize an individual from their face. The difference is that with prosopagnisia, this problem is chronic whereas with BOB, it is transient. Interestingly, with prosopagnosia there is some emotional response to the unrecognized individuals, as measured by GSR (cf. Young, 2009), although this usually does not reach conscious awareness.

Related to prosopagnosia is the Capgras' syndrome, a clinical condition where friends or relatives can suddenly appear unfamiliar (Ardila, Niño, Pulido, Rivera, & Vanegas, 1993; Capgras & Reboul-Lachaux, 1923; Roberts et al., 1990). This is also similar to the inverse BOB, described earlier in this chapter. Capgras' syndrome is rare, and complicated by the fact that the known person is felt to have been replaced by an impostor. Ellis and Young (1990) have further suggested that prosopagnosia and Capgras' syndrome could be considered mirror images of each other.

Déjà vu

As noted earlier, another phenomenon involving spontaneous and intense familiarity without identity clues is the déjà vu experience. Looking again at the three distinctive features of BOB (presented earlier), the déjà vu experience shares all three. An automatic and intense sense of familiarity grabs hold of one and there are no immediately obvious clues as to the source of the familiarity. With the BOB, what aspects of the person triggers familiarity? With déjà vu, what feature(s) of the present experience elicit the feeling (Brown, 2003, 2004; Neppe, 1983)? One difference is that with déjà vu, the source of the sensation may never be resolved, whereas with a BOB the person's identity is regularly recovered (Young et al., 1985). A second difference is that déjà vu experiences decline with age (Brown, 2003, 2004), whereas there is no evidence of an age difference for BOBs either in our survey results (presented earlier in this chapter) or in Bartlett et al. (1990). Although Schweich et al. (1992) did find an age group decline in reported frequency, there were aspects of their instructions that make their BOB data ambiguous (see earlier discussion in this chapter). Urquart et al. (2018) have suggested that there are unexplored similarities between déjà vu and BOB, in that both involve contrasts between context and stimulus familiarity. That is, a known stimulus (or person) may trigger the sense of unspecified familiarity when experienced in a setting that is unusual and that fails to support its normal contextual features.

Some Cautions About BOB Research

While BOB has become a nearly iconic representation for familiarity without recollection, several studies caution that this may be misleading. In perhaps the strongest warning, Voss, Lucas, and Paller (2012) included a section in their article entitled "Butchering the butcher-on-the-bus experience: The oversimplification of familiarity memory" (p. 2). They argue that familiarity may result from the operation of a variety of different neural processes, and that the BOB concept may lead us to view familiarity as simply memory that lacks context, or which is missing recollection. Specifically, familiarity might be mistakenly characterized as exclusionary, or as a brain process that embodies memory stripped of recollection/context.

Hanley (2014) raised a different and more paradigmatic criticism. He notes that Mandler (1980) initially used BOB to help define a "know," in contrast to a "remember," response in a list-learning paradigm. Hanley suggests that this could be misleading in two ways. First, all words presented on a laboratory list have a built-in level of background familiarity, so some level of familiarity already exists for each stimulus at both input and test. If one views the "bus" as comparable to a laboratory test list with many items (or bus riders), every person on the bus will not necessarily have some degree of familiarity. Second, in remember/know investigations, the prior encounter assessed for familiarity usually happened a few minutes ago (immediately preceding list), whereas with BOB the prior encounter(s) with the person lack a readily identifiable time frame.

Cleary and Speckler (2007) raise a similar objection to relating the BOB to laboratory research on recognition. Studying familiarity in the lab always ties in with a sense of experiential recency (though see Bolte & Goschke, 2008 or Cleary et al., 2013, for non-list-learning approaches to studying familiarity). Participants make their judgements with reference to a recently presented list of stimuli. BOB, in contrast, is devoid of any temporal sense, which makes an experimental study of BOB using currently developed paradigms difficult. So, although the BOB reference is a useful heuristic to connect individuals to a real-world familiarity glitch (quirk), it may be technically misleading about subtleties in familiarity experiences.

Gimbel, Brewer, and Maril (2017) make an even finer point about the different types of familiarity-without-context experiences in one's everyday encounters. A sense of familiarity could emanate from a recent *single* exposure (or RSE) versus *multiple* previous exposures (or MPE). Suppose that you had seen a person once previously, a week earlier on the bus that you regularly ride (RSE). Contrast this with Mandler's intended reference of seeing an individual many times before—not on the bus, but in the butcher department (MPE). Meeting both individuals again on the bus might elicit identical familiarity-without-context responses, but via distinctly different prior exposure histories. ~~They~~, experimentally verified that even though these two intense familiarity reactions may feel comparable, they are associated with qualitatively different patterns of brain activation. Perirhinal cortex activation is related to the RSE, whereas activity in the parahippocampal cortex is connected to MPE.

Future Directions

Given the growing attention to the BOB experience in the cognitive literature, it deserves closer scrutiny. Like the TOT (Brown, 1991, 2012; Schwartz, 2001c) and déjà vu (Brown, 2004; Cleary, 2008, 2014; Moulin, 2018) experiences, examining those circumstances where normal memory processes go awry affords a unique opportunity to gain additional insights into normal memory function. As with other relatively rare, everyday cognitive glitches, the BOB may present challenges in designing laboratory models. Although an exact

duplication of the real-world experience may be difficult, we hopefully can design close approximations—an approach that has been successful in studying other relatively rare metamemory experiences (i.e., TOT; déjà vu). The first step in designing such research is an expanded exploration of BOBs' natural occurrence through retrospective survey research and prospective diary investigations (Schwartz, 2001a). Central in these efforts should be such questions as: How often does it happen? In what specific contexts does it occur? How familiar is the context (how often have you been there)? How familiar is the person who is encountered: how long have you known them, how frequent are the encounters, how long since the most recent encounter? How much time do you take to resolve who the person is, or give up trying? What mental paths are taken to track down the person's identity? Does the context always return before the name, as suggested by anecdotal reports (James, 1893; Mandler, 1980), or does name retrieval occasionally precede context recall?

Answers to such questions would be invaluable in designing laboratory research, guiding such variables as person familiarity; context familiarity; frequency of person-context pairing; and retention intervals. Laboratory research could evaluate whether distraction influences whether BOBs occur, and what cues can be used to resolve ~~them~~. Can the experience be elicited incidentally, or is some intentional focus on the individual necessary? We are aware when the full-blown BOB metamemory experience captures us, but does it initiate outside of our direct awareness? Laboratory research on both the TOT (Brown, 2014) and déjà vu (Brown & Marsh, 2008, 2009; Cleary et al., 2009, 2012) experiences were derived from first understanding of the dimensions of the experiences. Brown and McNeill's (1966) groundbreaking study on TOTs provides a wonderful blueprint for the journey from anecodal observation to pilot exploration to fully developed laboratory research. ~~In addition,~~ over a century of anecdotal published research on déjà vu preceded the launch of extensive laboratory explorations (Brown, 2003, 2004).

With respect to laboratory experiments on BOB, most have used only unfamiliar faces. Perhaps using familiar (celebrity) faces could increase ~~the~~ external validity. This could allow one to vary how well known the stimulus is, as well as the appropriateness of the context within which the person is viewed (i.e., how closely ~~does~~ it match their usual context). Although Davies and Milne (1982) did not find an effect of context variation on recognition of celebrity faces, they did not attend to how well the presented context matched the celebrity's normal context.

Summary

The BOB is a metamemory experience where one encounters someone who is strikingly familiar but unidentifiable outside of their usual setting. Mandler's (1980) classic example has been used extensively in research to characterize the effects of context change on recognition, as well as the differentiation between familiarity and recollection. Survey data confirms the previously implicit assumption that this experience is universal, as well as consistent across age. Also, other person-identification experiences of intense familiarity without recollection are verified by survey data, including a person's walk, gesture and voice. Unexpected failure of person familiarity (similar to jamais vu) is also documented. Although much rarer than BOB, it is consistent across age.

Three aspects the BOB experience make it exceptional and worth special consideration. The first is that one stands in a temporary recollective void, with absolutely no clues as to who this person might be (other than that they are familiar). Most memory challenges leave some clues to work with, but not BOB. Second is its overwhelming intensity, matched by only a handful of other memory quirks, such as the TOT state (Brown, 2012; Schwartz,

2001c; Schwartz & Brown, 2014) and déjà vu experience (Brown, 2003, 2004; Cleary, 2008; Moulin, 2018). Finally, the surge of familiarity is automatic and unintentional, in contrast with most familiarity assessments that require intentionality and effort. Several important cautions are presented regarding the use of standard laboratory paradigms to study BOB. Designing new laboratory approaches to model real-life BOB experiences would provide a useful direction to better understand this important ~~cognitive~~ glitch.

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