

# Reduced Repetition Blindness for One's Own Name

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We report a series of studies demonstrating reduced repetition blindness (RB) for one's own name. Participants searched RSVP streams for their own name and another name, and reported how many times these names appeared in each stream. In half of the streams containing two names, the same name was repeated; in the other half, the two names were different. Half of the repetitions were the participant's own name, half were another name. The results showed large RB for the "other name" condition, and attenuated, but significant, RB for the "own name" condition. This reduction in RB for the participant's own name was found when participants searched for the target names among nouns, among other names, and when participants just detected the presence or absence of the second name. Reduced RB for one's own name helps to reduce previous uncertainty regarding the existence of lexical and conceptual RB for words.

## INTRODUCTION

Typically, repetition of a given stimulus leads to faster or more accurate processing of the second instance (e.g. Jacoby & Dallas, 1981; Scarborough, Cortese, & Scarborough, 1977). In contrast to the usual benefit of repeated presentations, repetition blindness (RB) is found when stimuli are presented rapidly, one at a time, in the same spatial location using the rapid serial visual

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presentation (RSVP) paradigm. Under these conditions, participants are less accurate in reporting two stimuli that are the same than two stimuli that are different (e.g. Kanwisher, 1987, 1991a; Kanwisher & Potter, 1989, 1990). Participants are not perceptually “blind” to the second instance of the repetition; however, despite at least preliminary processing, participants’ reports suggest that they are unaware of the repetition. To account for this apparent contradiction, the token individuation hypothesis has been put forward, by Kanwisher and others, to explain RB (see Bavelier & Potter, 1992; Kanwisher, 1987, 1991a; Kanwisher & Potter, 1989, 1990). These researchers make a distinction between types (representations of a class of stimuli that can be activated) and tokens (specific instances of a class coded in terms of time and space, and consciously available in episodic memory). According to this theory, participants access a type representation for each stimulus in the list, but they cannot individuate a token for the second instance of a repeated stimulus (C2) if the first instance (C1)<sup>1</sup> was already tokenized. Presumably, tokenization for a repeated C2 fails because its type activation is interpreted as residual activation from C1. Support for the token individuation hypothesis comes from studies demonstrating no RB (Kanwisher, 1991a), or even priming (Kanwisher, 1987; Shapiro, Driver, Ward, & Sorensen, 1997b), when C1 is not attended (and assumed to be typed but not tokenized). The absence of RB under these conditions suggests the need for C1 tokenization in the production of RB, while the presence of priming provides evidence that C1 was typed even though it was not tokenized.

The token individuation hypothesis attributes RB to “on-line” difficulties in establishing tokens in short-term memory, and predicts that manipulations at time of retrieval should not affect the amount of RB. In contrast, more recent “tokens only” theories attribute RB to “off-line” retrieval problems or response biases occurring after all stream items (including repeated C2s) have been consciously encoded (Armstrong & Mewhort, 1995; Fagot & Pashler, 1995; Whittlesea & Podrouzek, 1995). For example, Whittlesea and Podrouzek (1995) reported that cues presented after the stream, but before recall, significantly reduced the amount of RB relative to no-cue conditions. Such cues included attempting to recall as many words as possible from the stream, or pronouncing the repeated word, prior to deciding whether a repetition had been presented. Whittlesea and Podrouzek concluded that such findings support a model where C1 and C2 are both encoded, with RB resulting from a failure to remember the two separate occurrences. While such “tokens only” theories can account for the results of manipulations at retrieval, it is less clear how such models can account for findings of RB and C1 is attended, but priming when C1 is not attended (e.g. Shapiro et al., 1997b). Also, Park and Kanwisher (1994)

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<sup>1</sup> For ease of presentation, C1 will be used to refer to the first critical target item in the stream, and C2 to the second critical target item in the stream. This notation is used for both repeated and non-repeated target pairs and, therefore, does not differentiate between them.

demonstrated that RB is robust under conditions where response bias and guessing strategies cannot be at play, and robust RB has been found with procedures that did not use overt report of the critical stream items (e.g. Arnell & Jolicoeur, 1997; Park & Kanwisher, 1994). For example, Park and Kanwisher (1994) reported that the amount of RB was not affected by response requirements or memory load, and Arnell and Jolicoeur (1997) demonstrated robust RB even when participants were shown pictures of the target items and asked to report how many times each picture had been presented in the previous stream.

Given that neither class of model, on its own, accounts for all of the RB results, it is likely that both attention and memory models are somewhat correct, and a two-process hybrid model may better represent the phenomenon. For example, participants may fail to fully consolidate a token in short-term memory for a repeated C2 owing to encoding difficulties. However, at retrieval, participants may be able to construct a complete token on some proportion of trials when aided by contextual cues provided by the experimenter. Regardless of the exact model of RB that one assumes, it is important to ask what representations mediate RB. The present study addresses whether conceptual representations can mediate RB for word stimuli.

## Nature of Representations

Repetition blindness has been demonstrated with many different stimuli, such as words (Kanwisher, 1987), letters (Kanwisher & Potter, 1990), colours (Kanwisher, 1991a), object pictures (Bavelier, 1994; Kanwisher & Yin, 1993) and non-object pictures (Arnell & Jolicoeur, 1997). The diversity of stimuli suggests that robust RB will be found whenever C1 and C2 share the same meaning, the same phonology and the same visual identity. Interestingly, RB is also found when stimuli share only some of these attributes. For example, RB has been found for non-identical words that share 3–4 letters in the same location (e.g. manor–mayor) (Bavelier, Prasada, & Segui, 1994), and for words with the same orthography but different phonology (e.g. right–rig) (Kanwisher, 1991b). Cross-case RB has been demonstrated using letters (Bavelier & Potter, 1992; Kanwisher, 1987), and Bavelier and Potter (1992) have reported RB for words with the same or similar phonology, but with no orthographic overlap (e.g. I–eye). Such results demonstrate that RB for words can be mediated by letter-level orthographic representations, or intact phonological representations (Bavelier, 1994). It is commonly thought that both orthographic and phonological representations are accessed very early in word processing (e.g. Coltheart, Davelaar, Jonasson, & Besner, 1979; Smith & Magee, 1980).

Although it is clear that orthographic and phonological representations can underlie RB for words, it is less clear that representations (such as lexical and semantic) which are accessed later in processing can produce reliable word RB. A confusing pattern of results has emerged from experiments examining RB

mediated by later lexical and semantic representations. Null effects of semantic representation have been reported in two studies (Altarriba & Soltano, 1996, experiment 1b; Kanwisher & Potter, 1990). However, two other studies have reported the presence of semantically mediated RB (MacKay & Miller, 1994; O'Reilly & Neely, 1993). There is even one study which has produced semantically mediated repetition priming using RSVP word lists (Altarriba & Soltano, 1996, experiment 2).

Kanwisher and Potter (1990) presented synonyms (e.g. sofa–couch) among filler words in RSVP streams. Performance on semantically repeated trials and non-repeated trials did not differ. In a stronger test of semantic RB for words, Altarriba and Soltano (1996, experiment 1b), used C1 and C2 words from different languages, where the words were semantically identical across the languages, but not phonologically or orthographically related (e.g. red–rojo). These words were imbedded in sentences where the visual form of the words always changed from English to Spanish (or Spanish to English) after the C1 word and before the C2 word. These researchers reported that bilingual participants showed no difference in report performance for semantic target pairs when compared to unrelated target pairs. In their second experiment, Altarriba and Soltano (1996) switched to word list streams where English and Spanish words were presented pseudo-randomly in a mixed fashion. They factorially combined the language of C1 (English or Spanish) and the language of C2 (English or Spanish) and presented these conditions randomly within blocks. With these procedures, Altarriba and Soltano found repetition priming for semantic translations (e.g. red–rojo) relative to unrelated translations (e.g. red–rosado).

In contrast to the results of Altarriba and Soltano (1996), MacKay and Miller (1994) reported significant RB for words which were semantically identical across languages. Furthermore, the magnitude of the RB was equally large for semantic translations (e.g. horses–caballos) and identical words (e.g. horses–horses). These authors used a procedure very similar to Altarriba and Soltano (1996, experiment 1b), with the exception that English and Spanish words were pseudo-randomly presented in mixed-language sentences.

In a clever study, O'Reilly and Neely (1993) presented semantically ambiguous word pairs in RSVP streams, and used the filler stream items to bias the participant's interpretation of the word so that different meanings were suggested for C1 and C2 (e.g. money–bank–river–bank). The amount of RB for these word pairs with the same phonology and orthography, but different meaning, was reliably less than the amount of RB for the same words that biased the same meaning for C1 and C2 (e.g. money–bank–vault–bank).

Despite the common assumption that lexical access precedes semantic access (e.g. Coltheart et al., 1979), the results for lexical-level RB are not less confusing. Based on results from RSVP experiments, Bavelier et al. (1994) reported that RB is not sensitive to morphological similarity, and also not sensi-

tive to absolute word frequency, which is thought to occur during or after lexical access (Forster & Davis, 1984; Scarborough et al., 1997). However, Bavelier et al. (1994) reported that RB is sensitive to relative neighbourhood frequency organization (i.e. how frequent the target word is relative to its orthographic neighbours). In contrast, Hochhaus and Mihura (1992) have reported large effects of absolute word frequency. These researchers found large RB for high-frequency words and no RB for obscure words in studies where masked primes and targets were presented briefly in rapid succession.

Presently, the safest conclusion to draw is that RB based on representations accessed later during word processing may be real, but difficult to demonstrate. The present study examines the existence of conceptual RB, but in a fairly novel fashion where the amount of RB is compared for lexically and conceptually salient words and lexically and conceptually neutral words. To this end, we have relied on a commonly experienced finding, referred to colloquially as the “cocktail party” effect—the finding that one’s own name could sometimes be heard in an unattended ear where no other words were readily decipherable (Moray, 1959).

## Own vs Other Names

In the following experiments, we compare the amount of RB for one’s own name to the amount of RB for a neutral name. Any reliable differences in the amount of RB for “own” and “other” names would demonstrate the importance of conceptual or lexical representations in the production of RB. Equal amounts of RB for own and other names would suggest the RB is not affected by lexical and conceptual information. If the RB magnitude is different for own and other names, can we predict whether own names should show reduced RB or increased RB? Given the findings of Hochhaus and Mihura (1992), who reported more RB for high-frequency words than for low-frequency words, one might predict greater RB for own names than neutral names, given that one’s own name would likely be more frequent than a neutral name. However, if one assumes that Hochhaus and Mihura found no RB for obscure words because these obscure words had lexical salience that was noticed by the participants, then one might also reasonably predict the reverse; namely, less RB for one’s own name than a neutral name. Similarly, one’s own name is conceptually salient, and this conceptual salience may act to reduce RB for one’s own name. For example, the greater lexical or conceptual salience of one’s own name may make both instances of one’s name easier to discriminate or may make the two instances easier to encode as two distinct entities. Previous studies have convincingly demonstrated that greater salience of C2 results in reduced RB (e.g. Chun & Potter, 1993; Kanwisher & Potter, 1989; Ward, Duncan, & Shapiro, 1997). As mentioned above, the results of Moray (1959) demonstrated that approximately one-third of all participants, who shadowed a passage from one ear of

dichotically presented speech, could hear their own name in the unattended ear. Verbal reports from our own participants, following various studies, suggest that participants are more likely to notice conceptually salient stimuli such as pictures of guns, or names of friends, when viewing RSVP streams. Therefore, if RB is lexically or conceptually mediated, more or less RB could be postulated for own names as compared to other names, but the magnitude of RB for own and other names should not be equal. Because one's own name is both lexically and conceptually salient, the present study cannot disambiguate whether any differences in RB magnitude for own names, as compared to other names, is due to lexical or semantic information *per se*. The goal of the present work is simply to test whether at least one of these relatively late processes can modulate the RB effect.

### Attentional Blink and Own Names

Recent investigations into the attentional blink (AB) have demonstrated the importance of conceptual or lexical information in RSVP tasks (Shapiro, Caldwell, & Sorensen, 1997a). The generic AB task requires participants to report the identity of a lone white letter (the target) presented in an RSVP stream of black letters, and then report whether or not a black letter "X" (the probe) had been presented anywhere in the post-target stream (Raymond, Shapiro, & Arnell, 1992). The results of such experiments demonstrate a profound deficit in probe detection for up to 500 msec after presentation of the target (Raymond et al., 1992; Shapiro, Raymond, & Arnell, 1994). However, participants demonstrate no difficulty in detecting the probe when they are instructed to ignore the white target letter and just search for the probe, suggesting that perceptual factors do not underlie the AB (Raymond et al., 1992). To further examine the nature of the attentional limitation suggested to underlie AB, Shapiro et al. (1997a) presented participants' own names or neutral other names as probes in RSVP streams. These researchers reported no AB when the second target (the probe) was the participant's own name, but a significant AB for other name probes. The study by Shapiro et al. (1997a) is noteworthy, as it is the first reported instance where no AB was found when a visual, patterned target and a visual, patterned probe were presented in continuous RSVP streams. It therefore appears that participants can detect (or retrieve) conceptually or lexically salient stimuli more readily than neutral stimuli under conditions where attention is limited—whether by use of divided attention manipulations (as in Moray, 1959) or RSVP (as in Shapiro et al., 1997a).

To summarise, the goal of this paper is to examine whether or not lexical or conceptual representations mediate RB using own name and neutral other name stimuli, and to provide a theory that explains the confusing pattern of results that has emerged thus far on the topic of lexically and conceptually mediated RB. Because own and other names differ only in their lexical and

conceptual salience to the participant, any differences in the magnitude of RB for own and other names would provide strong evidence that lexical/conceptual representations can mediate RB. In Experiment 1, participants searched for specified names among filler names, using a modified AB task. In Experiments 2A and 2B, a more typical RB task was used where participants reported how many times the two specified names appeared in each stream. In all experiments, the amount of RB for participants' own names was compared to the amount of RB for other names, and in all cases the amount of RB was reliably less for one's own name.

## EXPERIMENT 1

Because the own versus other name manipulation was successful in modifying the amount of AB when these stimuli were presented as probes in RSVP streams (Shapiro et al., 1997a), the present experiment examined RB for own and other names using instructions and procedures similar to Shapiro et al. (1997a), but including trials where C1 (the target in AB terminology) and C2 (the probe) were the same name. Ward et al. (1997) have reported that RB is found when using AB instructions where participants are asked to report the identity of a lone white letter among black letters, and then detect whether a specified black letter (e.g. an X) was presented in any post-target stream position. With AB instructions, RB is operationally defined as poorer probe detection when the target and the probe are the same than when the target and probe differ.

## Methods

*Participants.* Twelve undergraduates University of Waterloo students (6 females, 6 males) aged 19–27 years participated for pay. In this experiment, and all subsequent experiments, participants reported normal or corrected-to-normal visual acuity and stated that English was their first language. Participants were selected from the paid participant pool on the basis of their first name. Three of the females had recorded “Karen” as their first name, two had recorded “Julie” and one had recorded “Susan”. Three of the males had recorded “Scott” as their first name, Two had recorded “David” and one had recorded “Jason”. In this experiment, and all subsequent experiments, participants verified that their recorded name was accurate and that this was the name they used in their day-to-day interactions. All participants indicated that they had no good friends or family having the neutral other name. For Julies and Susans, Karen served as the neutral other name. Julie served as the neutral other name for two of the Karens, and Susan was the other name for the remaining Karen. The same counterbalancing was used for the male names, which served to eliminate any stimulus-specific biases.

*Apparatus and Stimuli.* The stimuli for this and all subsequent experiments were presented on a Everview VGA colour monitor. Micro Experimental Laboratories (MEL) software (Schneider, 1988) and an IBM-compatible 486 computer controlled the stimulus displays, the timing of events, and recorded the data. The computer keyboard allowed participants to control the onset of stimulus presentation and make their responses. Participants viewed the display binocularly from a distance of approximately 40 cm under conditions of dimmed room illumination.

The stimuli were 22, common, five-letter first names; the "own name", and the "other name" and 20 filler names. Two filler names began with the same first letter as the own and other names, and one or two other names ended with the same last letter as the own and other names (see Appendix 1). The names subtended approximately  $0.7^\circ$  in height and  $2.3^\circ$  in width. The words were presented in the same location in the centre of a uniform grey field ( $9.7 \text{ cd/m}^2$ ) for 100 msec with no blank inter-stimulus interval. All of the words appeared black ( $0.7 \text{ cd/m}^2$ ) with the exception of the C1 item, which appeared white ( $43.6 \text{ cd/m}^2$ ).

*Procedure.* Participants were run individually in one 30-min session. Each session consisted of 120 RSVP trials divided into five blocks of 24. Four practice trials preceded the experimental trials. Participants initiated each trial by pressing the spacebar on the keyboard. Each trial began with a 500 msec presentation of a white fixation cross prior to the RSVP stream.

Each RSVP stream consisted of six successively presented names. On 80 trials, two target names were presented in the stream. These names were presented in either the 2nd and 4th stream positions, or the 3rd and 5th stream positions. On half of these trials the names were the same and on the other half they were different. Half of the repeated streams repeated the participant's own name (e.g. Karen/Karen for a participant named Karen) and half repeated the other target name (e.g. Julie/Julie). Half of the non-repeated streams presented the participant's name first (e.g. Karen/Julie) and half presented the other target name first (e.g. Julie/Karen). The first target name (C1) was always presented in white, and all other names were black, including C2. There were 40 filler trials where only one target name was presented in either the 2nd or 3rd stream position. This name was always presented in white. On half of these trials the participant's own name was presented and on half the other name was presented. For all streams the computer randomly selected the filler stream names from the set of 20, with the constraint that each filler name was not presented more than once in a stream. Order of trials was completely random within a block.

Participants were instructed to search for two critical names (e.g. Karen and Julie) and to try their best to ignore all of the other names. Participants were asked to report which of the two critical names had been presented as the white



target name, and then report whether either of the critical names had been presented in the post-target stream. Participants were informed that the critical names could not be presented in the pre-target stream. Following each stream, a sentence asked participants for the identity of the white name. Participants pressed the key matching the first letter of the name they identified as the target, guessing if unsure. Immediately after the participant's key press, the first sentence was removed and another sentence appeared asking if one of the two critical names had appeared after the white name. Participants pressed the "1" key to indicate that a critical name had been presented, or the "0" key to indicate a critical name had not been presented. Participants were never asked to report the identity of the probe name. Participants received no feedback at any point during the experiment.

## Results and Discussion

The mean percentages of two-name trials where the probe name was correctly detected are presented in Table 1 as a function of repetition and own/other name. Non-repeated trials were classified as "own" or "other" on the basis of their C2 identity. A  $2 \times 2$  analysis of variance was conducted with repeated/not repeated and own/other name as within-participant variables. The analysis revealed greater response accuracy for non-repeated trials than repeated trials,  $F(1,11) = 10.61, p < .01$ , indicating the presence of RB. There was also an accuracy advantage for own name over other name,  $F(1,11) = 36.5, p < .001$ . Most importantly, there was also a repetition  $\times$  own/other name interaction,

TABLE 1  
Mean Percentage of Two-name Trials in  
Experiment 1 where the Post-target  
Name was Correctly Detected.<sup>a</sup>

	<i>Name</i>	
	<i>Own</i>	<i>Other</i>
Non-repeated	79.2	55.8
Repeated	62.1	22.9
Difference (RB)	17.1	32.9
Ratio (RB)	13.9	56.2

<sup>a</sup>The difference measure of RB is the mean accuracy on repeated trials subtracted from the mean accuracy on non-repeated trials. The ratio measure of RB (calculated separately for each participant) is the mean accuracy on repeated trials divided by the mean accuracy on non-repeated trials, subtracted from 1 and multiplied by 100.

$F(1,11) = 10.05, p < .01$ . The interaction demonstrates reliably greater RB for other names compared to own names.

It is worth noting that the above analysis, where RB is defined as the difference in probe accuracy between repeated and non-repeated trials, works against finding less RB for own name trials. This is because mean accuracy is greater for non-repeated streams with own name as C2 than accuracy for nonrepeated streams with other name as C2. It is likely that the process underlying RB works as a filter to reduce accuracy for a proportion of all repeated trials, as opposed to a process that reduces accuracy by a constant amount (see Park & Kanwisher, 1994, for a more complete discussion). If RB does occur on a given proportion of trials that would have been accurately reported without the repetition, then the greater the accuracy on non-repeated trials, the greater the RB difference.<sup>2</sup> Such differences in scale would produce larger RB for own names than for other names, which is the opposite to the current finding. To more accurately contrast the amount of RB for own and other names, an RB ratio is needed for both own and other names.

Park and Kanwisher (1994) calculated a ratio called RBI, where the percentage of correct repeated trials was divided by the sum of the percentage of correct repeated trials and the percentage of correct non-repeated trials. While our logic is the same as that of Park and Kanwisher, we chose to calculate the amount of RB using a slightly different ratio. For both own and other name trials, each participant's percentage accuracy on repeated trials was divided by his or her percentage accuracy on non-repeated trials. The resulting value was subtracted from 1 and then multiplied by 100 to estimate the percentage of repeated trials where participants were blind to the repetition. This ratio was chosen over the RBI ratio only because it allowed a more meaningful comparison (in percent) of the amount of RB for own and other names. Throughout this paper, all analyses using this ratio were also completed using Park and Kanwisher's RBI ratio, and the same results were always found for both.

Our ratio values are presented in Table 1 for both own and other names. A t-test revealed a higher proportion of RB for other name trials than own name trials,  $t(11) = 3.18, p < .01$ .

When the difference in probe accuracy for repeated and non-repeated trials was examined separately for own and other name trials, paired t-tests indicated marginally significant RB for one's own name,  $t(11) = 1.95, p < .08$ , and highly significant RB for the neutral other name,  $t(11) = 4.50, p < .001$ . While the magnitude of RB is clearly less for one's own name than a semantically neutral name, it appears there is still evidence for some RB in the own name

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<sup>2</sup> For example, if RB occurs on one-quarter of all repeated trials, and a participant scored 80% on non-repeated trials, the RB difference would be 20%. If the participant scored 60% on non-repeated trials, the RB difference would drop to 15%.

condition. The difference in RB magnitude for own and other names suggests that lexical/conceptual representations can underlie RB.

The probe false alarm rate in the present study was very high, averaging 38%. In fact, the false alarm rate was higher (although not significantly) than the percentage of correct C2 detections in the other name-repeated condition. Although the false alarm rate was high, it was statistically equivalent for own and other C1 names,  $t < 1$ . Because participants responded present or absent to C2, we cannot ascertain whether the participants thought they saw their own name, or the other name as C2, when committing a false alarm (this issue is addressed in Experiment 2A).

Performance on non-repeated trials was higher when C2 was the participant's own name compared to trials where C2 was the other name,  $t(11) = 4.15$ ,  $p < .002$ . This result supports the AB findings of Shapiro et al. (1997a), who reported probe detection difficulties for neutral names, but not participants' own names, following identification of a target. This continuity across studies is reassuring, but it is possible that the reduction in RB for one's own name is specific to AB streams and procedures. Accordingly, the following experiments used procedures more typical of RB studies.

## EXPERIMENTS 2A AND 2B

The purpose of Experiments 2A and 2B was to examine the magnitude of RB for own and other names while using streams and tasks more typical of previous RB experiments. For both of these experiments, participants were asked to report how many times the critical names appeared in each stream. Repetition blindness has been demonstrated previously using tasks where participants were asked to report: the number of vowels appearing among consonants (Park & Kanwisher, 1994), the number of animal pictures appearing among non-animal pictures (Arnell & Jolicoeur, 1997), and the number of non-object pictures appearing among pattern masks (Arnell & Jolicoeur, 1997).

In Experiment 2A, participants searched for their own name and a neutral other name that were presented in streams of filler names. Participants were asked to report how many times they saw each of the two critical names in each stream (e.g. one Karen and one Julie). In Experiment 2B, participants searched for their own name and a neutral other name that were presented in streams of common nouns. Participants were asked to report how many times the critical names appeared in each stream. Participants in Experiment 2B did not have to report which critical names they had seen (e.g. one Karen and one Julie), only how many names in total were found (e.g. two names). Both imbedding the critical names among name fillers and requiring participants to break down their report by each name in Experiment 2A served to make the task more difficult, allowing a comparison of own and other RB magnitudes at varying points on the accuracy scale. Requiring participants to report how many times they saw

each name in Experiment 2A also allowed an examination of which name participants added (own *vs* other) when they made a “false alarm”.

## Experiment 2A: Methods

*Participants.* Sixteen undergraduate University of Waterloo students (8 females, 8 males) aged 19–23 years participated for pay. Eight participants received scores of less than 10% in one cell of the design (the repeated, other name cell for all eight participants); they were replaced, such that counterbalancing of names was maintained. Two of the four remaining females recorded “Karen” as their first name and two recorded “Julie”. Two of the four remaining males recorded “Kevin” as their first name and two recorded “Jason”. Karen served as the neutral other name for the Julies. Julie served as the neutral other name for the Karens. The same counterbalancing was used for the male names. None of the participants took part in Experiments 1 or 2B.

*Stimuli and Procedure.* In addition to the “own” and “other” names, the stimuli included the 20 filler names used in Experiment 1. Two filler names began with the same first letter as the “own” and “other” names, and one or two other names ended with the same last letter as the “own” and “other” names (see Appendix 1).

There were 120 experimental trials divided into five blocks of 24 trials. The streams and procedures were the same as those for Experiment 1, with the following exceptions. Again there were 80 streams containing two names, but in the present experiment half of the 40 filler streams contained one name and half contained three names. When three names presented they occurred in either the 2nd, 3rd and 5th stream positions, or the 2nd, 4th and 5th stream positions. On half of these trials, the first and last name were the participant’s own name with the “other” name in between; on the other half of the trials, the reverse was true.

All of the words, including the critical names, were presented in white against a black background. Participants were told to search each stream for the two critical names and to try equally hard to see both names. After each stream, the participants were presented with a sentence asking them how many times the name “Karen” (or “Kevin” for the males) had appeared in the stream they had just viewed. The participants pressed the number key matching the number of times they thought Karen (or Kevin) had been presented. Zero, one, two and three were the responses allowed. Immediately following their response to the first question, another question appeared asking participants how many times the name “Julie” (or “Jason” for the males) had appeared in the stream they had just viewed. Again participants entered their response, with zero, one, two, and three the responses allowed. All participants received the sentence prompting

them for their “Karen” or “Kevin” response before the sentence prompting them for their “Julie” or “Jason” response, regardless of their own name.

## Experiment 2A: Results

The mean percentages of two-name trials with responses of at least two<sup>3</sup> are presented in Table 2 as a function of repetition and own/other name. Non-repeated trials were again classified as “own” or “other” on the basis of their C2 identity. A  $2 \times 2$  analysis of variance was conducted with repeated/non-repeated and own/other name as repeated measures. This conservative analysis revealed greater response accuracy for non-repeated trials than repeated trials,  $F(1,7) = 42.16$ ,  $p < .001$ , indicating the presence of RB; an accuracy advantage for own name or other name,  $F(1,7) = 47.01$ ,  $p < .001$ ; and

TABLE 2  
Mean Percentage of Two-name Trials in  
Experiment 2A Where Both Names were  
Correctly Reported.<sup>a</sup>

	<i>Name</i>	
	<i>Own</i>	<i>Other</i>
Non-repeated	76.9	58.1
Repeated	56.9	21.3
Difference (RB)	20.0	36.8
Ratio (RB)	24.8	59.0

<sup>a</sup>The difference measure of RB is the mean accuracy on repeated trials subtracted from the mean accuracy on non-repeated trials. The ratio measure of RB (calculated separately for each participant) is the mean accuracy on repeated trials divided by the mean accuracy on non-repeated trials, subtracted from 1 and multiplied by 100.

<sup>3</sup> For the present analyses, trials were scored as correct if the participants responses included the correct identities of the critical names, even if a “false alarm” was committed. Use of this scoring assumes that such responses would likely follow trials where both name targets were correctly encoded. However, additional analyses were also conducted where trials were scored as correct only if responses included only the two correct target identities with no false alarms, and the same pattern of results was obtained [repetition,  $F(1,7) = 48.66$ ,  $p < .001$ ; own/other name,  $F(1,7) = 58.03$ ,  $p < .001$ ; repetition  $\times$  own/other,  $F(1,7) = 4.76$ ,  $p < .07$ ; RB own vs other,  $t(7) = 4.77$ ,  $p < .01$ ; repeated vs non-repeated for own name,  $t(7) = 7.28$ ,  $p < .001$ ; repeated vs non-repeated for other name  $t(7) = 4.92$ ,  $p < .01$ ].

a marginal repetition  $\times$  own/other name interaction, demonstrating greater RB for other names than own names,  $F(1,7) = 5.32, p < .06$ .

Results from the RB ratio analysis demonstrated significantly greater RB for other names compared to own names,  $t(7) = 4.62, p < .002$ .

When the difference in probe accuracy for repeated and non-repeated trials was examined separately for own and other names, paired  $t$ -tests indicated significant RB both for one's own name,  $t(7) = 6.38, p < .001$ , and for the neutral other name,  $t(7) = 4.96, p < .002$ . Although reduced compared to the amount of RB for non-repeated trials, RB for one's own name was still present.

When responses to each of the two questions were summed together, participants' reported three or more names on 2.2% of trials where the streams contained only two critical names. Because participants were asked to report how many times each of the critical names appeared, we can use these "false alarms" to examine the participants' response biases. A  $2 \times 2 \times 2$  analysis of variance was performed with the following within-participant variables: repeated/non-repeated trial, own/other C2 identity, and whether the extra name participants reported was their own name or the other name. Across all two-target trials, participants showed a slight, but non-significant, trend towards responding with the other name,  $F(1,7) = 1.75$ . There was also a marginally significant interaction between the identity of C2 (own or other) and the identity of the extra response (own or other),  $F(1,7) = 5.50, p < .06$ . Participants were more likely to respond with the name that was not presented in the C2 position. The finding that participants are more likely to falsely report a name that was not presented as a C2 item suggests that non-repeated scores in this study may be slightly elevated compared to participants' actual ability to detect non-repeated names. However, given the very low frequency of these false-positive responses, this bias cannot account for the substantial RB demonstrated in the present study. Furthermore, such a bias could not produce the repeated/non-repeated  $\times$  own/other name interaction found in these experiments. In fact, these false alarms provide strong evidence that the attenuation in RB for one's own name cannot be due to a simple bias to report one's own name more often than the neutral target name. No other effects from the analysis of false alarms approached significance.

Data from the filler streams containing one name or three names were also analysed. There was no reliable difference in response accuracy between three-name trials where the participants' own name was presented twice and three-name trials where the other critical name was presented twice,  $t(7) < 1$ . There was also no reliable difference in response accuracy between one-name trials where the participants' own name was presented and one-name trials where the other critical name was presented,  $t(7) < 1$ . In addition, there was no difference in the number of "false alarms" for own and other single name trials, with only two false alarms made, across all participants, for all one-name trials.

## Experiment 2B: Methods

*Participants.* Sixteen undergraduate University of Waterloo students (8 females, 8 males) aged 18–24 years participated for pay. Participants were again selected from the paid participant pool on the basis of their first name. Four of the females had recorded “Karen” as their first name and four had recorded “Julie”. Four of the males had recorded “Kevin” as their first name and four had recorded “Jason”. Counterbalancing of names was applied as in Experiment 2A. None of the participants participated in Experiments 1 or 2A.

*Stimuli and Procedure.* The streams and procedures were the same as those for Experiment 2A, with the following exceptions. In addition to the own and other names, the stimuli included 20, common, concrete nouns, five letters in length. Two filler words began with the same first letter as the own and other names, and one or two other filler words ended with the same last letter as the own and other names (see Appendix 2). After the stream, the participants were presented with a sentence asking them how many names had appeared in the stream they had just viewed. The participants pressed the number key matching the total number of names they thought had been presented. Zero, one, two, three and four were the responses allowed. Participants were never asked how many of the names were their own name and how many were the other name.

## Experiment 2B: Results and Discussion

The mean percentages of two-name trials with responses of at least two<sup>4</sup> are presented in Table 3 as a function of repetition and own/other name. Non-repeated trials were again classified as “own” or “other” on the basis of their C2 identity. A  $2 \times 2$  analysis of variance was conducted with repeated/non-repeated and own/other name as repeated measures. The analysis revealed greater response accuracy for non-repeated trials than repeated trials,  $F(1,15) = 62.49$ ,  $p < .001$ , indicating the presence of RB; an accuracy advantage for own name over other name,  $F(1,15) = 30.66$ ,  $p < .001$ ; and a repetition  $\times$  own/other name interaction, demonstrating greater RB for other names than own names,  $F(1,15) = 30.42$ ,  $p < .001$ . In the present experiment, response accuracy did not differ for non-repeated streams with own name as C2

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<sup>4</sup> For the present analyses, responses of “three” or “four” were accepted as correct based on the assumption that such responses would likely follow trials where both name targets were encoded. However, additional analyses were also conducted where only responses of “two” (i.e. no false alarms) were counted as correct, and the same pattern of results was obtained [repetition,  $F(1,15) = 53.49$ ,  $p < .001$ ; own/other name,  $F(1,15) = 18.18$ ,  $p < .001$ ; repetition  $\times$  own/other,  $F(1,15) = 26.67$ ,  $p < .001$ ; RB ratio own vs other,  $t(15) = 4.99$ ,  $p < .001$ ; repeated vs non-repeated for own name,  $t(15) = 3.77$ ,  $p < .01$ ; repeated vs non-repeated for other name,  $t(15) = 9.79$ ,  $p < .001$ ].

TABLE 3  
 Mean Percentage of Two-name Trials in  
 Experiment 2B where at Least Two  
 Target Names were Reported.<sup>a</sup>

	Name	
	Own	Other
Non-repeated	84.7	81.3
Repeated	70.0	32.5
Difference (RB)	14.7	48.8
Ratio (RB)	21.0	58.9

<sup>a</sup>The difference measure of RB is the mean accuracy on repeated trials subtracted from the mean accuracy on non-repeated trials. The ratio measure of RB (calculated separately for each participant) is the mean accuracy on repeated trials divided by the mean accuracy on non-repeated trials, subtracted from 1 and multiplied by 100.

and non-repeated streams with other name as C2,  $t < 1$ . Nevertheless, we continued to estimate the magnitude of RB for own and other names using the RB ratio, and again demonstrating greater RB for other names than own names,  $t(15) = 4.93$ ,  $p < .001$ . When the difference in probe accuracy for repeated and non-repeated trials was examined separately for own and other name trials, paired  $t$ -tests indicated significant RB both for one's own name,  $t(15) = 3.31$ ,  $p < .01$ , and for the neutral other name,  $t(15) = 3.49$ ,  $p < .001$ . While the amount of RB is clearly less for one's own name than a neutral name, it appears that participants still demonstrate some difficulty with own name repetitions. The present results again implicate lexical or conceptual representations in the production of RB.

Participants gave responses of three or more on 6.4% of trials where the streams contained two names. A  $2 \times 2$  analysis of variance was conducted on the "false alarms" for two-target trials with repeated/non-repeated and own/other as repeated measures. False alarms were marginally more likely to occur on trials where C2 was the participant's own name (8.3%) than when C2 was the neutral other name (4.5%),  $F(1,15) = 3.55$ ,  $p < .08$ . No other effects from this analysis approached significance: repetition,  $F(1,15) = 1.15$ ; own/other name  $\times$  repetition,  $F(1,15) = 2.30$ .

Data from the filler streams containing one name or three names were also analysed. There was no reliable difference in response accuracy between three-name trials where the participant's own name was presented twice and three-name trials where the other critical name was presented twice,



$t(15) = 1.39$ . However, participants reported seeing a critical name more often following a single-name trial containing their own name than a single name trial containing the other critical name,  $t(15) = 3.90$ ,  $p < .001$ . The number of false alarms did not differ for single-name trials containing own names and single-name trials containing other names,  $t(15) < 1$ . It appears that, while participants do not have a bias to respond with one's own name (as demonstrated in the false alarm analyses of Experiment 2A), one's own name is more often reported than a neutral name (at least in the present experiment). This difference in sensitivity has implications for the above claim that RB is attenuated for one's own name in the present experiment. It is possible that performance on own name repeated trials is superior to performance on other name repeated trials simply due to the difference in sensitivity for own and other names, as opposed to reduced RB for one's own name. In this manner, reduced RB for one's own name would merely result from the extra case of reporting two independent instances of one's own name compared to the reduced ease of reporting two independent instances of a neutral name, and the present findings would simply demonstrate that the "cocktail party" effect generalized to trials containing two targets rather than one. This is fundamentally different from the claim put forward here, which suggests that the on-line mechanism that is at least partially responsible for RB is affected by the lexical/conceptual salience of the items. In the former case, the reduction in RB for one's own name can be fully explained by the participant's performance on two independent events. In the latter case, the difference in RB magnitude for own and other names could not be accounted for merely by knowing participants' performance on two independent own or other name targets. To eliminate the alternative explanation that reduced RB for one's own name merely reflects a difference in ease of detection for own and other names, an analysis was performed where differences in sensitivity for own and other names were removed. In this new analysis, performance on two-target, own name repeated trials was compared to the performance expected on two-target, own name repeated trials if RB was not present and both targets were independent. This value was obtained by squaring the percent correct each participant produced on single-target own name trials. The same calculation was also performed for other name trials, where percent correct for two-target, other name repeated trials was compared to the product of the other name score produced on single-target "other" name trials. A  $2 \times 2 \times 2$  mixed analysis of variance was performed on the data from Experiments 2A and 2B, with the repeated score versus the single-target product and own/other name as within-participant factors, and Experiment (2A or 2B) as a between-participants factor. Participants performed more poorly on repeated trials than expected if the two targets were reported independently,  $F(1,22) = 191.69$ ,  $p < .001$ . However, again the difference was less for one's own name than for the other name,  $F(1,22) = 8.85$ ,  $p < .007$ . No other effects from this analysis approached significance.

Note that the above analysis did not test whether participants demonstrated greater sensitivity for their own name over the other name. This difference in sensitivity had already been demonstrated (at least in Experiment 2B) with the greater report accuracy for single-name trials where participants' own name was presented, compared to single-name trials where the other name was presented. What is more important, and what the above analysis does demonstrate, is that this difference in sensitivity cannot account for the differential RB magnitude for own and other names.<sup>5</sup>

The results from Experiments 2A and 2B again demonstrate reduced RB for one's own name. This attenuation for participants' own names was found both when the task was quite difficult in Experiment 2A and when the task was quite easy in Experiment 2B. Furthermore, the amount of attenuation, when calculated from the RB ratios, was almost identical in the two experiments. The results of the analyses reported above also suggest that the RB attenuation for one's own name does not result from a bias to respond with one's own name (Experiment 2A), or from a difference in sensitivity between one's own name and another neutral name (Experiments 2A and 2B).

## GENERAL DISCUSSION

The experiments reported above demonstrate reliably less RB for one's own name than a neutral name. Reduced RB for one's own name was found in all experiments, despite changes in task instructions and difficulty levels. In Experiment 1, a modified attentional blink task was used where participants reported which of two critical names (their own name or a neutral name) had been presented as a lone white target, and then reported whether either of the critical names had been presented in the post-target stream. Participants failed to report the post-target (C2) name more often when it was preceded by the same name than when C2 was preceded by a different name, and this effect was reliably larger for other name C2s than own name C2s. The same pattern was found in Experiments 2A and 2B, where more typical RB tasks were employed. In Experiment 2A, participants searched streams of names for two critical names (their own name and a neutral name) and reported how many times they had seen each of the two names. In Experiment 2B, participants searched streams of

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<sup>5</sup> The above analysis is not free of assumptions. The assumption most likely to have been violated in the present case is one which assumes that the report of C1 and C2 are independent. Even for two-name trials where the two names differ, processing the first target is likely to affect processing of the second. We recognize that the main effect of repeated/non-repeated in the present analysis, and its interaction with own/other name, is likely to reflect the cost of processing two targets (as opposed to a single target), in addition to the RB effect. Nonetheless, a significant repeated/baseline  $\times$  own/other interaction still provides evidence that sensitivity alone does not account for the present pattern of findings.

nouns for two critical names (their own name and a neutral name) and reported how many times they had seen a name in each stream. These experiments showed robust RB for other names and attenuated, but significant, RB for own names.

An analysis of false responses in Experiment 2A showed that participants had no response bias towards reporting their own name, and no bias to report extra names on own name repeated trials. A response bias explanation for reduced own name RB is also unlikely given that particulars rarely made false-positive responses to two-name trials, yet the amount of attenuation was both large and robust. Furthermore, response bias cannot explain the results of Experiment 1, where participants merely reported whether a name was present or absent in the post-target stream.

Furthermore, reduced RB for own name targets cannot be explained by a difference in sensitivity for own and other names (i.e. as a scaling artifact). The reduction in RB for one's own name is not simply the result of own names being easier to detect than neutral names—the “cocktail party effect”—but is more likely the result of an on-line mechanism that grants one's own name preferential status for being consolidated once it has been activated. Attenuated RB for one's own name was found in Experiment 2 even when differences in sensitivity were removed by comparing performance on own and other name repeated trials to performance levels calculated if two own or other names had been presented independently. If a sensitivity or scaling artifact was responsible for reduced RB for one's own name, then the significant repetition  $\times$  own/other name interaction should have been eliminated in the analysis using independent presentations. Furthermore, differences in sensitivity could not explain the results in Experiment 1, where scores were based on correct detection of C2 only, and the C2 items were identical for repeated and non-repeated trials. Nor could differences in sensitivity explain the results of Experiment 2A, where there was no sensitivity difference for own and other names on single-name trials. Thus, attenuated RB for one's own name cannot be explained simply as better overall performance for one's own name, but must be due to one's own name interacting with at least one of the mechanisms that produce RB.

## Conceptual Repetition Blindness

Finding attenuated RB for one's own name, compared to a neutral other name, supports the existence of lexically or semantically mediated RB for words. The finding that participants named Karen showed less RB for the name Karen than the name Julie, but Julies showed less RB for the name Julie than the name Karen, can only be explained in terms of the lexical or conceptual salience of one's own name. The present study supports the conclusions of O'Reilly and Neely (1993) and MacKay and Miller (1994), who also found that semantics influenced the amount of RB found for words. As with O'Reilly and Neely, the

present study provides particularly strong support for the mediation of RB by lexical or semantic representations given that C1 and C2 were identical in all respects other than their salience to the participant. Therefore, the results of this study, in conjunction with others, can be taken as evidence for the existence of lexically or conceptually mediated RB.

Why is it that the above studies have demonstrated reliable conceptual effects on RB for words, yet other studies (Altarriba & Soltano, 1996; Kanwisher & Potter, 1990) have concluded that RB for words is not influenced by semantics? One possibility is that the magnitude of RB is only influenced by semantics when the task requires participants to use semantic knowledge. Bavelier (1994) has recently suggested that RB can occur at any point during token consolidation, provided that two items are encoded in short-term memory along dimensions on which they are similar. In support of this position, Bavelier has demonstrated greater RB when C1 and C2 are similar on a dimension that is important for success on the task, than when C1 and C2 are similar on a dimension that is less crucial.

The tasks used in the present set of experiments probably prompted participants to encode conceptually the items in the stream. For example, in Experiment 2B, participants reported the number of names presented among nouns—a task that probably leads participants to search conceptually through the stream. The conceptual nature of the tasks used here may have emphasized semantic encoding of stream items, which in turn led to conceptually mediated RB. This may also be true of the experiment reported by MacKay and Miller (1994), where bilingual participants produced robust RB for words from different languages that were semantically identical, but not phonologically or orthographically related. In MacKay and Miller's experiment, words were presented in mixed-language sentences. Spanish and English versions of the words were presented randomly in each stream. Such conditions may have led participants to emphasize the semantic encoding of the words and place less emphasis on the randomly changing, and less important, language codes.

Recall that O'Reilly and Neely (1993) presented semantically ambiguous word pairs in RSVP streams, and used the filler stream items to bias the participant's interpretation of the word so that different meanings were suggested for C1 and C2 (e.g. money–bank–river–bank). The amount of RB for these word pairs with the same phonology and orthography, but different meaning, was reliably less than the amount of RB for the same words that biased the same meaning for C1 and C2 (e.g. money–bank–vault–bank). It is possible that the related word primes increased the rate of semantic activation for the word targets, making semantic effects more likely. If the amount of conceptual RB depends not only on the usefulness of conceptual information for the task at hand (Bavelier, 1994), but also on how early conceptual information is incorporated into an opened token where various representations are consolidated together as an episodic instance (Arnell & Jolicoeur, 1997), such semantic priming

could enhance conceptual RB. It is possible that information gained from a stimulus early in processing has more influence than information gained relatively late in processing on whether the stimulus is consolidated in episodic memory. If a given word was semantically primed by a previous word, its semantic information may be available sooner, and the semantic similarity across repeated C1 and C2 targets could be more influential in producing RB. Also, the large proportion of related words in O'Reilly and Neely's word lists may have prompted participants to encode these word lists conceptually.

Kanwisher and Potter (1990) found no RB for synonym pairs presented in English language sentences. It may be that conceptual RB is not strong enough to span synonym pairs that may have different connotations for participants. For example, "cellar-basement" was one of the synonym pairs used by Kanwisher and Potter, but to the first author at least, cellar is often thought of as an underground dirt room used to store wine and a basement is thought of as a finished living space within a house—two very different concepts. Altarriba and Soltano (1996) also found no evidence for conceptual RB. In contrast to MacKay and Miller (1994), these authors reported no RB for word pairs that were semantically identical but from two different languages. The null finding of Altarriba and Soltano (1996, Experiment 1b) may be explained by the fact that the English and Spanish words were not intermixed as in MacKay and Miller's experiment. Instead, each sentence was effectively divided into two parts—one English, one Spanish. For cross-language RB trials, the C1 word was always presented in one half of the sentence (in English or Spanish) and the C2 word was presented in the other half. The change from one language to another in mid-sentence may serve as a salient episodic division between C1 and C2, effectively eliminating any conceptual RB that may have been found with their cross-language targets. Several studies have suggested that RB is not found when manipulations are employed that highlight the distinctiveness of C1 and C2 (e.g. Chun & Potter, 1993; Ward et al., 1997; but see also Park & Kanwisher, 1994). For example, Ward et al. (1997) found no RB discernable apart from the level of AB when they removed the filler stream items between C1 and C2, yet continued to mask these targets. Also, the change from English to Spanish in the study by Altarriba and Soltano (1996) occurred at the level of language codes, which may have biased participants to process the words at this code level as opposed to a more conceptual level (but see Altarriba, Kroll, Sholl, & Rayner, 1996).

However, in their experiment 2, Altarriba and Soltano (1996) removed many of the above problems. They removed the clear episodic division between C1 and C2 by using pseudo-randomly mixed English and Spanish lists. Furthermore, they used all four possible combinations of C1 language (English or Spanish) and C2 language (English or Spanish) and presented these conditions randomly within blocks. With these procedures, Altarriba and Soltano found repetition priming for semantic translations (e.g. red-rojo) relative to

unrelated translations (e.g. cold-rojo), but found RB for exact repetitions (e.g. red-red) relative to unrelated same-language words (e.g. key-red). The finding of priming for semantic translations is important, as it demonstrates that participants were encoding the words semantically. Why was there priming for the semantic translations and RB for the identical words? Altarriba and Soltano concluded that RB cannot be mediated by semantic information. However, it is worth noting that the within-language and semantic translation conditions differed in a crucial way that could also account for the pattern of results. There were only three words presented in each list (in list positions 3–5), with the first, second, sixth and seventh positions holding repeated symbol strings (e.g. %%%%). In the within-language conditions, all three words were English in the English condition, and all three words were Spanish in the Spanish condition). However, in the mixed-language conditions, two of the words were in one language and one was in another. On half of all mixed-language trials (whether English-Spanish or Spanish-English), the C2 word was presented in a language different from both other words, thereby making C2 the only word to appear in a different language. It is very likely under these conditions that the C2 word would present considerable distinctiveness or salience, possibly enough to produce priming instead of RB. The critical statistical test (the language order  $\times$  language of intervening item interaction) that would allow us to discern whether this was a possible explanation for Altarriba and Soltano's pattern of data was not presented.

## Lexical Repetition Blindness

The present finding of reduced RB for one's own name cannot be explained by either absolute or relative word frequency. As noted in the Introduction, Bavelier et al. (1994) reported that RB is not sensitive to absolute word frequency, which is thought to occur during or after lexical access (Forster & Davis, 1984; Scarborough et al., 1977). However, RB is sensitive to relative neighbourhood frequency organization, with higher relative frequencies producing more RB than lower relative frequencies (Bavelier et al., 1994). Hochhaus and Mihura (1992) have reported large effects of absolute word frequency, with large RB for high-frequency words and no RB for obscure words. Both of these results suggest that, if word frequency (relative or absolute) does mediate RB, then higher-frequency words would produce more RB. One's own name is surely more frequent (in absolute frequency) than another neutral name held by none of one's close friends or family. One's own name is also very likely to be more frequent relative to its orthographic neighbours than another neutral name. Therefore, a word frequency explanation would predict more RB for one's own name relative to a neutral other name, as opposed to the present finding of less RB for one's own name compared to the other name.

If lexical factors were responsible for the reduced RB for one's own name, it is much more likely that this was the result of the lexical salience possessed by one's own name. The results of Hochhaus and Mihura (1992) could also be explained in terms of the obscure words possessing lexical salience given their extreme novelty. (A few of our own RSVP participants have anecdotally commented that very unusual words stand out from the others.) In this manner, the salience of the obscure words may have captured attention and subsequently led to reduced RB.

## On the Nature of Repetition Blindness

In the present experiments we found reduced RB for one's own name despite the fact that repetitions of one's own name possessed the same orthography, the same phonology and the same semantics. This is unusual; exact repetitions generally lead to large and robust RB. Typically, RB is reduced only when C1 and C2 differ on one or more of the above dimensions.

However, as discussed above, RB appears to be reduced when C1 and C2 are emphasized as distinct (e.g. Ward et al., 1997). Repetition blindness is also reduced when spatial or temporal separability is emphasized. Kanwisher and Potter (1989) found that displaying the first half of a sentence (which contained C1) in a different spatial position than the second half (which contained C2) reduced the amount of RB. Interestingly, Chun and Potter (1993) found no RB for coloured C1 and C2 letters presented among black letters, suggesting that the distinctiveness of C1 and C2 from the rest of the stream items may also modulate the amount of RB. In the present study, one's own name was lexically and conceptually salient, and may have captured attention more readily or more completely, thereby creating an episodic token for both C1 and C2 and subsequently reducing RB for own name targets. It appears that featural, conceptual and lexical distinctiveness of C1 and C2 can all act to reduce RB. Because these attributes are so varied, it is possible that RB will be reduced whenever C1 and C2 are successfully distinguished from the rest of the stream items or more readily attended. For example, phonological distinctiveness of C1 and C2 may reduce RB, as may visual manipulations such as size. The importance of conceptual salience *per se* could perhaps be tested by comparing the magnitude of RB for shocking or slightly obscene words to the amount obtained for more neutral words.

The present findings demonstrate that there is lexical or semantic activation for C2 despite the subject's unawareness of C2's presentation. This finding corresponds nicely with both behavioural (Shapiro et al., 1997a, 1997b) and electrophysiological (Luck, Vogel, & Shapiro, 1996) findings and theories (Shapiro, Arnell, & Raymond, 1997c) regarding the attentional blink phenomenon. Although subjects are often unable to report the presence of a second target when it is presented within approximately half a second of the first target,

this second target demonstrates a normal N400 electrical evoked potential, indicating that it is sensitive to the semantic mismatch between the second target and a previous context word (Luck et al., 1996). This second target has also been shown to prime responses to a third target, even when subjects were unaware of its occurrence (Shapiro et al., 1997b). It therefore appears that second targets in both repetition blindness and attentional blink paradigms can undergo substantial processing, up to the level of semantics, yet not be consciously available for report. Furthermore, the semantic content of this second target can influence the magnitude of these dual-task report deficits, perhaps by allowing the subject's attention to be captured more readily, or allowing the second target to be processed more efficiently if it has been previously primed or is highly salient.

We have suggested that the participants in our study encoded words conceptually, and that the lexical or conceptual salience of one's own name meant that both C1 and C2 captured participants' attention, and reduced the amount of RB accordingly. Such an explanation follows from the token individuation hypothesis, which essentially explains RB as a problem in determining that C1 and C2 are separate, distinct entities. While the present explanation does emphasize "on-line" encoding, it does not eliminate the role of memory in the production of RB. As discussed in the Introduction, RB is often reduced when participants are provided with contextual cues from the stream (e.g. the word in between C1 and C2) at the time of report (Whittlesea & Podrouzek, 1995). These researchers suggest that intact tokens are formed for both C1 and C2, but repetitions are reported less frequently because participants cannot fully recall the context of both items. Our emphasis on salience is also consistent with such a view. The increased salience of some stream items may allow participants to more fully encode the immediately following item in the stream, and subsequently recall the context of both C1 and C2 better. Our emphasis on salience is consistent with both attentional and memory views of RB. In fact, it is possible that lexical and conceptual salience (and other types of salience as well) affect both "on-line" processing and subsequent memory reconstruction processes.

The present findings and model are amenable to both on-line encoding (i.e. attentional capture) and memory-based (i.e. contextual recall) accounts of RB. Regardless of which model one prefers, the present findings clearly indicate that lexical and conceptual information interact with at least one of the mechanisms which produces RB.

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## APPENDIX 1

### Stimulus Materials for Experiments 1 and 2A

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#### Experiment 1 Target Names

Female: Karen & Julie or Karen & Susan

Male: Scott & David or Scott & Jason

#### Experiment 2A Target Names

Female: Karen & Julie

Male: Kevin & Jason

#### Filler Names (all participants)

Keith	Kelly	Janet	James
Stacy	Sarah	Donna	Derek
Brian	Aaron	Lorne	Marie
Trent	Lloyd	Carol	Nancy
Laura	Geoff	Peter	Tanya

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## APPENDIX 2

Stimulus Materials for Experiment 2B

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**Target Names**

Female: Karen &amp; Julie

Male: Kevin &amp; Jason

**Filler Nouns (all participants)**

knife	kayak	jelly	joker
truck	toast	skunk	snail
dress	devil	wagon	crown
apple	llama	arena	board
chair	water	piano	floor

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