**Auditory distraction during reading: A Bayesian meta-analysis of a continuing controversy**

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Abstract

*Keywords*: auditory distraction, reading, background noise, speech, music

Imagine that you are sitting in an open-plan office and reading a paper, while a couple of your colleagues are having a loud conversation just a few meters away. Is this external noise going to affect the time it takes you to read the paper or your ability to understand its contents? For many people, the intuitive answer to this question is “Yes”, as it would seem reasonable that external sounds such as noise, speech or music influence how we read sentences by acting as a distractor. Indeed

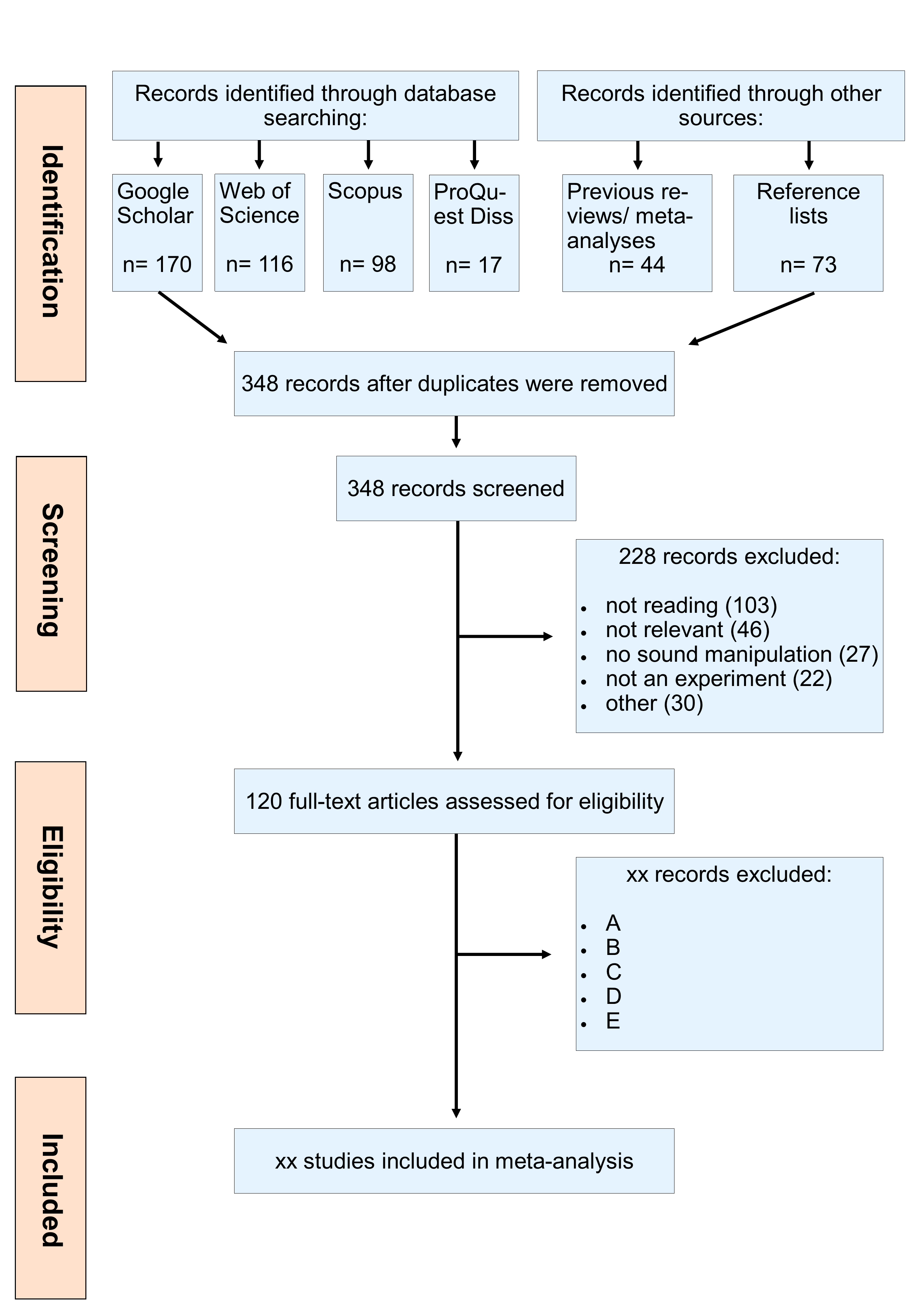
Researchers have occupied themselves with this question for at least 80 years.

Citations for: speech is perceived as distracting by office workers (see Haapakangas et al., 2014)

**Method**

**Literature Search**

The search of the literature was conducted by following the PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & Prisma Group, 2009). A flowchart of the process is presented in Figure 1[[1]](#footnote-1). In August 2016, Google Scholar, Scopus, the Web of Science, and ProQuest Dissertations were searched with the following keywords: “background noise AND reading”, “background speech AND reading”, “background music AND reading”. The search for each of the three background sounds was done separately. Additionally, the reference list of screened articles and previous literature reviews and meta-analyses (Beaman, 2005; Clark & Sörqvist, 2012; Dalton, & Behm, 2007; Kämpfe, Sedlmeier, & Renkewitz, 2010; Klatte, Bergström, & Lachmann, 2013; Shield & Dockrell, 2003; Szalma & Hancock, 2011) were also examined. The identified articles were evaluated against the inclusion criteria presented in Appendix A. In short, the studies had to experimentally manipulate background noise, speech or music in a reading task, have a sound methodological design, and include silence as a baseline reading condition. Information about the included studies and their effect sizes are presented in Appendix B.



*Figure 1*. A flowchart illustrating the stages of the literature search process.

**Effect Size Calculation**

Standardized effect sizes were calculated from the reported descriptive statistics in the papers by first calculating Cohen’s *d* and then applying Hedges’ *g* correction for studies with small effect sizes. If descriptive statistics were unavailable or incomplete, the effect sizes were calculated by digitalizing graphs (Rohatgi, 2015) or converted from the reported test statistics by using existing formulas (Borenstein, 2009). For the comprehension accuracy analysis, studies were coded so that negative effect sizes indicate lower comprehension accuracy in the experimental sound conditions. Conversely, in the analysis of reading speed, positive effect sizes indicate slower reading speed in the experimental sound conditions.

**Publication Bias**

**Data Analysis**

**Results**

**Discussion**

**Acknowledgments**

M.R.V was supported by a PhD studentship from Bournemouth University. The funding body had no role in the design, analysis, the writing of this paper, or decisions to publish.

**Appendix A**

**Appendix B**

Table B1

*A Summary of the Studies and Their Effect Sizes That Were Included in the Meta-analysis*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID | Reference | NC | NE | Sample | Design | Task | Sound | Type | dB(A) | ES | var |
| 1 | Somebody et al. (2006) | 67 | | children | within | RC | noise | white | 60 | 1.23 | 1.23 |
| 2 | Somebody else (2007) | 30 | 30 | adults | between | PR | speech | native | 55 | -.03 | 0.10 |

*Note*: NC: number of participants in the control (silence) condition. NE: number of participants in the experimental (sound) condition. RC: Reading comprehension. PR: Proofreading. ES: Effect size in Hedges’ g.

**References**

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1. One eligible (unpublished) study by the first author was also included. [↑](#footnote-ref-1)