Measuring attention bias in clinical disorders: systematic problems of reliability and heterogeneity

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Introduction

- **Attentional bias** refers to preferential allocation of attention to certain information over other information.
- Attentional bias may manifest in many **clinical disorders**, from anxiety and depression to obesity.
- There are different **measuring tasks** such as dot probe task.
- How **varied** and **reliable** are the tasks used to measure attention bias?

Methods

1. **Searching** empirical papers in **five databases** (Web of Science, PubMed, PsycINFO, Scopus and ProQuest; see **Fig. 1**).
2. **Screening** recent articles (between 2020 and April 2021).
3. **Coding** measures of reliability, task parameters, stimuli, and outcome measures.

Fig. 1

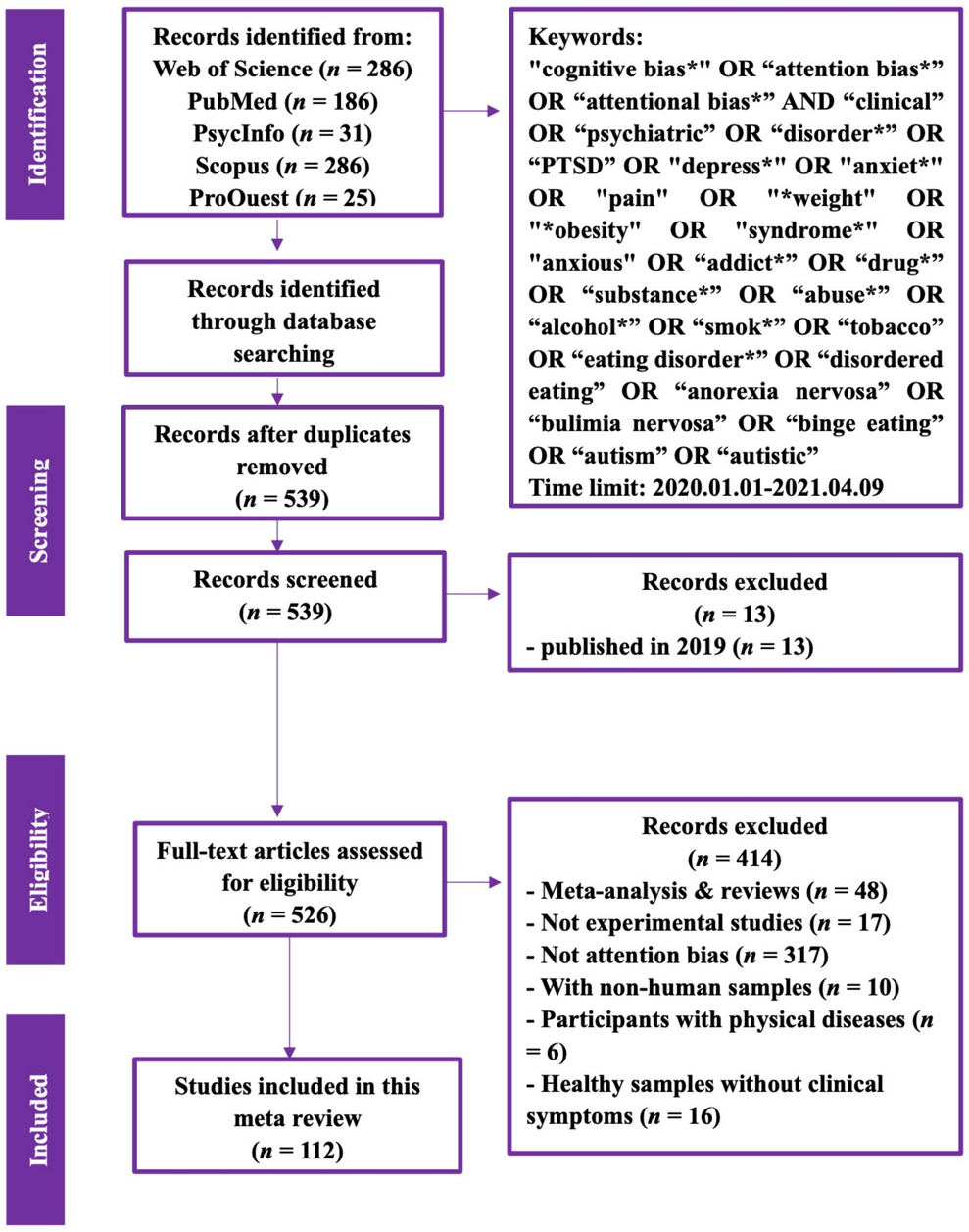


Figure 1. PRISMA flowchart

Fig. 2

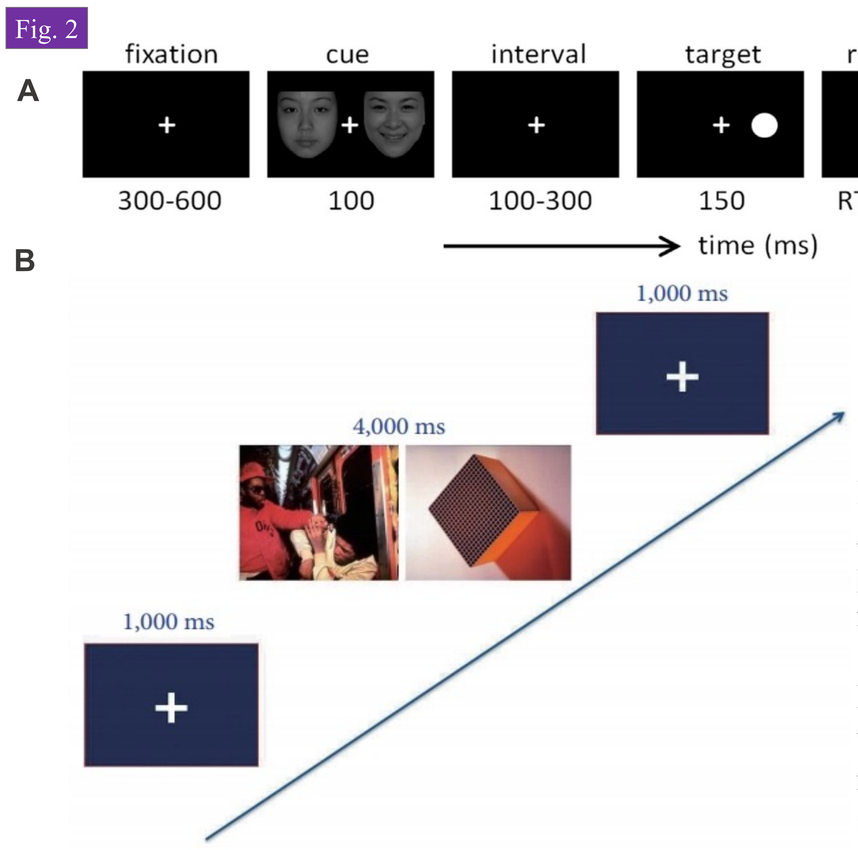
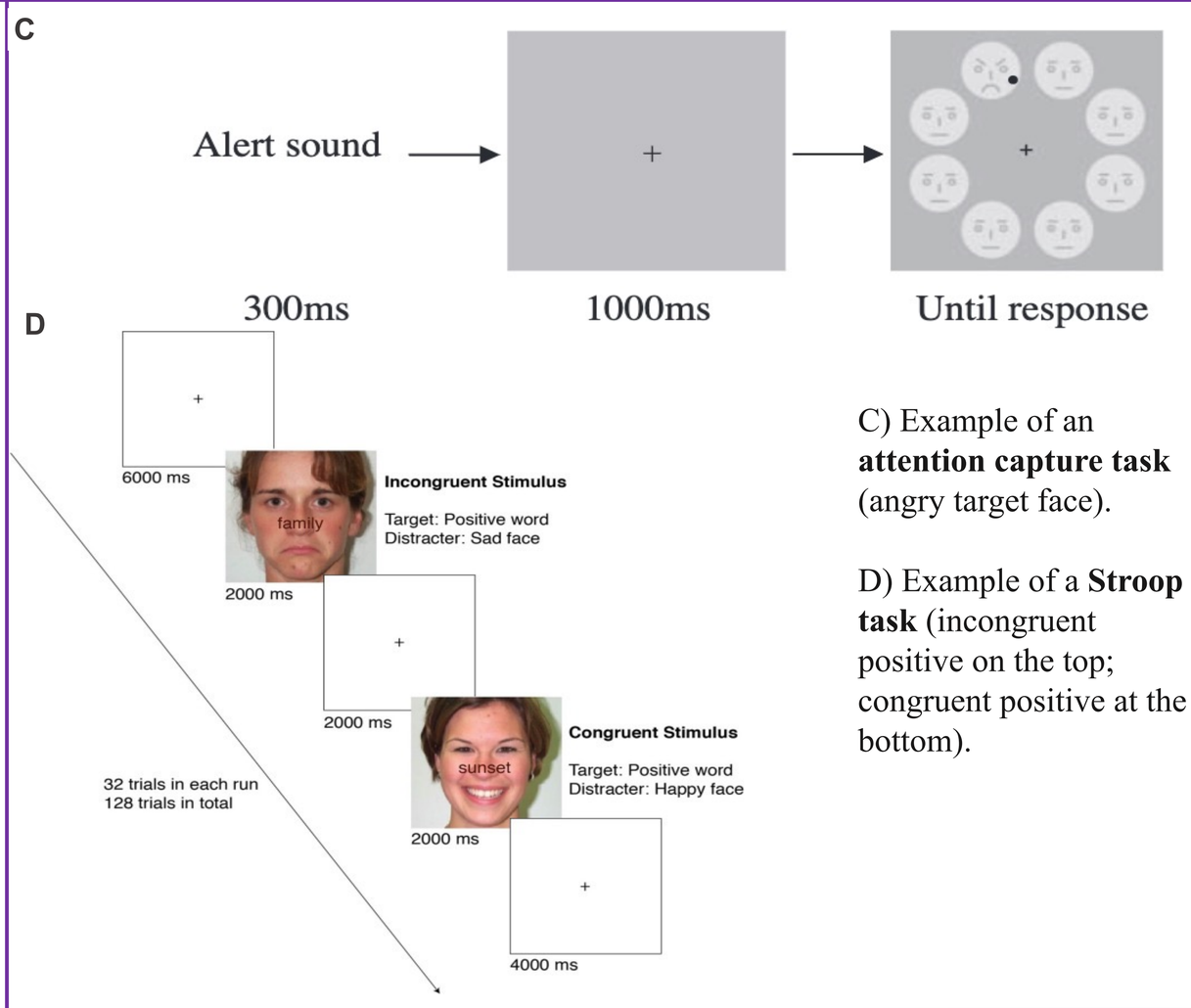


Figure 2.
A) Example of a **dot-prove task** (angry & neutral faces).

B) Example of a **free-viewing task** (one negative target picture and one control picture).



C) Example of an **attention capture task** (angry target face).

D) Example of a **Stroop task** (incongruent positive on the top; congruent positive at the bottom).

Results

Reliability was rarely measured or mentioned in most of the publications.
There were systematic **heterogeneity** in measuring attentional bias, such that:
1) **many different tasks** were employed, from the dot probe task and its variants, to free-viewing tasks and distracting tasks such as attention capture task and Stroop task (Figure 2 and Figure 3);
2) within the same genre of task, there were a **wide range of stimuli parameters**, including **presentation duration** (explained below as a case study).

Fig. 3

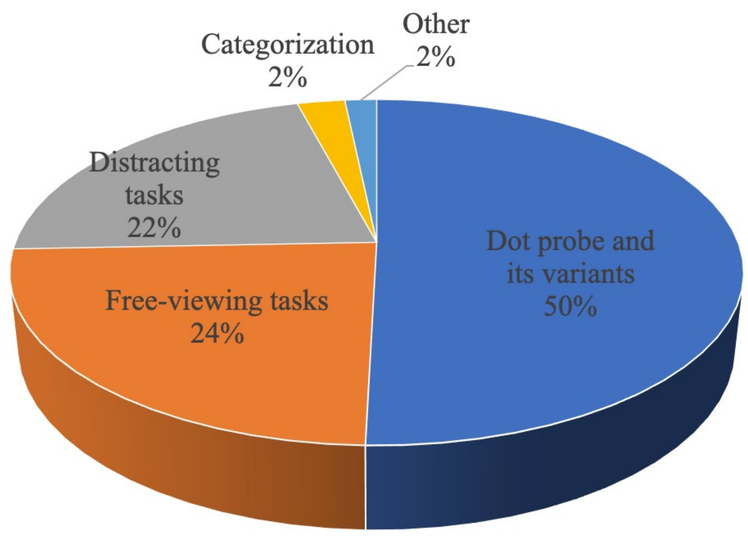


Figure 3. Distribution of different types of paradigm

Stimulus presentation duration

- Studies with presentation duration **from 500 ms to 1000 ms** focused on attention orienting and vigilance (Siev et al., 2020); duration **above 1000 ms**, attention avoidance (e.g., of threat) (Marotta et al., 2020; Mekawi et al., 2020)
- Presentation duration as short as **50 ms** was used, too (in Richter et al., 2020, which focused on orienting of attention to negative stimuli), in addition to those with duration as long as **6000 ms** (Cannito et al., 2020, which focused on attentional bias towards virus-related stimuli).
- Durations in free-viewing tasks were typically **longer than 1 s** (only one study shorter than 1s).
- Durations in distracting tasks were typically **in between 1 to 5 s** (only one study shorter than 1s).

Discussion

These systematic problems of reliability and heterogeneity suggest an urgent need to reevaluate current practice in attentional bias research. Without a reliable measurement, we would not be able to classify individuals based on their attentional responses. Heterogeneity in measurement further suggests that these tasks and parameters cannot possibly tap into the same psychological process, as is commonly assumed.

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