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On Deception and Lying: An Overview of Over 100 Years of Social Science Research

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license for the current study, and so are not publicly available. The data are however available from the first author upon reasonable request and with permission of Clarivate Analytics.

Abstract

This article provides an overview of over 100 years of social science research on deception and lying. The aim is to raise awareness on the full scope of research findings on deception and lying to help the scientific community to communicate these research findings to practitioners who assess the veracity of individuals statements, further future research, better understand the research field of deception and lying, and bridge gaps that are relevant to scholars and practitioners interested in deception and lying. To begin, Web of Science is introduced, and the steps undertaken to build our database are described. Then, the yearly evolution of research findings on deception and lying is presented. Finally, the journals and the research areas, as well as the authors, the institutions and the countries that contributed the most to the deception and lying literature are highlighted, as well as the most used keywords and cited articles.

Keywords: Deception, Lying, Deception Detection, Lie Detection, Bibliometrics.

On Deception and Lying: An Overview of Over 100 Years of Social Science Research

From 2009 to 2011, the Fox network aired Lie To Me. The drama series was based on the premise that the main character, Cal Lightman, "the world's leading deception expert" (Fox, n.d.), had the ability to "catch liars" using facial expressions. For the very first time, the issue of deception detection, also known as lie detection, was at the core of a television show aimed at the general public. Far from the spotlight, however, social science research on deception and lying had been conducted for decades by the scientific community. A host of peer-reviewed articles, chapters and books, some summarizing research findings on those subjects (e.g., Granhag & Stromwall, 2004; Knapp, 2008; Vrij, 2008), had been published. And research findings had already contributed to dispelling misconceptions about deception and lying. For example, DePaulo and colleagues (2003) had confirmed that using cues to "catch liars", as often depicted in the media, was not grounded in evidence. Unfortunately, this did not prevent misconceptions from being promoted six years later in Lie to Me, and still to this day, on traditional and social media, including in YouTube videos viewed by millions where dubious claims from so-called experts are made with disarming confidence (Denault, Duran, & Delmas, 2021; Tait, 2021). Nor did it stop unfounded and discredited claims from being disseminated in large organizations, including those operating in the field of security.

The SPOT program is one of the most striking examples. Implemented in several TSA-regulated airports starting in 2006, this program claimed to identify aviation security threats based on nonverbal cues and behaviors (U.S. Government Accountability Office, 2010). However, in 2017, the U.S. Government Accountability Office concluded that 98% of the sources provided by the TSA to determine the validity of the SPOT program were irrelevant (U.S. Government Accountability Office, 2017). This came to no surprise after The Intercept

published a list of unfounded and discredited "signs of deception" used in the SPOT program, including gazing down, fast eye blink rate, excessive throat clearing, and change in voice pitch (Winter & Currier, 2015). But the claims had been disseminated to thousands of agents, all for an estimated annual cost of $212 million (U.S. Government Accountability Office, 2010, 2017). Such questionable programs are not limited to large organizations operating in the field of security. Law enforcement organizations all over the world, for example, have turned to "behavioral analysis" programs promoting unfounded and discredited claims (Smith, 2020; Denault et al., 2020).

Several reasons may explain why important organizations such as the TSA turned to unfounded and discredited claims. As Denault and colleagues (2020) hypothesized, organizations may have problems to solve, and their lack of scientific knowledge, their ignorance of the importance of science, and their underestimation of the dangers of pseudoscience could make them particularly vulnerable to what is offered as "immediate and easy solutions to complex challenges". Added to this is the lack of access to scientific journals which increases the challenge of convincing practitioners to adopt evidence-based practices. But how can research findings on deception and lying be adequately communicated if the full scope of this research is unknown to practitioners?

The body of scientific knowledge on deception detection and lie detection, for example, is quite substantial. Interest in distinguishing honesty from dishonesty started several thousands of years ago (Trovillo, 1939), but foundations of today's research dates back decades. In the 1960's, Ekman and Friesen (1969) asserted that very brief face and body movements, occurring outside of conscious awareness, were relevant for "catching liars". The Leakage Hypothesis, and

the importance of behavioral observation, at the foundation of the drama series Lie To Me, echoed what Darwin (1872) had written almost 100 years earlier:

> … when movements, associated through habit with certain states of the mind, are partially repressed by the will, the strictly involuntary muscles, as well as those which are least under the separate control of the will, are liable still to act; and their action is often highly expressive (p. 48).

Although the Leakage Hypothesis had, and still has, a major influence on deception detection research (Levine, 2018a, 2018b; Luke 2019, 2020), it has been subject to much criticism. Research on nonverbal cues and behaviors to detect deception was even described as a "blind alley" (Brennan & Magnussen, 2020). Given the growing body of scientific knowledge on the limited impact of behavioral observation to distinguish honesty and dishonesty, other approaches were developed, including the Assessment of Criteria Indicative of Deception (Colwell, Hiscock-Anisman, & Fede, 2013), Strategic Use of Evidence (Granhag, Strömwall, Willén, & Hartwig, 2013), Verifiability Approach (Nahari, 2018), and Cognitive Credibility Assessment (Vrij, Fisher, & Blank, 2017; see also Vrij, Fisher, & Leal, 2022). However, as Nortje and Tredoux (2019) highlight, "currently most research is applied, and methods are developed with little theoretical grounding" (p. 501). But how can theoretical foundations on deception detection and lie detection be improved if the full scope of research findings on deception and lying is unknown to researchers? What is beyond deception detection and lie detection?

While the body of scientific knowledge on deception detection and lie detection is quite substantial, the scientific community addresses other concepts related to deception and lying such as dishonesty, perjury, fabrication, malingering, misleading, and cheating, and issues such

as lying aversion, children lying behavior, police interviewing, physiological response, guilty knowledge, and marketing messages. Furthermore, considerable research on deception and lying is conducted in disciplines other than psychology, such as economics, linguistics, and behavioral sciences, and sub-disciplines of psychology, such as developmental, social and educational psychology. But beyond the "silos" of each scholarly discipline, however, little is generally known about the extent of the deception and lying literature.

This article provides an overview of over 100 years of social science research on deception and lying. The aim is to raise awareness on the full scope of research findings on deception and lying to help the scientific community to 1) communicate these research findings to practitioners who assess the veracity of individuals statements, 2) further future research, 3) better understand the research field of deception and lying, and 4) bridge gaps that are relevant to scholars and practitioners interested in deception and lying.

To achieve these objectives, we turned to bibliometrics. Compared to meta-analysis and systematic reviews that collect, analyze and summarize research results from different studies on a given topic, bibliometrics provides macroscopic views of research fields, and allows to understand research trends. This is the case for over 100 years of social science research on deception and lying. As Sugimoto and Larivière (2018) points out,

> Bibliometrics are particularly useful when the amount of data exceeds human capabilities to process. For example, a reviewer is well equipped to make a judgment on a single document or small set of documents. An author can fairly easily ascertain the number of publications he or she produced. However, measurements of the production of an institution or country are harder to gauge. Furthermore, relational data—like citations are nearly impossible to manually analyze even at the level of an individual. Therefore,

measurements of research have their greatest utility at scale— to bring into the light that which is not easily observed by the individual. (p. 3-4)

To begin, the database used to conduct our descriptive analysis, Web of Science, is introduced, and the steps undertaken to build our database are described. Then, the yearly evolution of research findings on deception and lying is presented. Finally, the journals and the research areas, as well as the authors, the institutions and the countries that contributed the most to the deception and lying literature are highlighted, as well as the most used keywords and cited articles. Based on our descriptive analysis, we discuss challenges and opportunities for scholars and practitioners interested in deception and lying.

Methods

The Web of Science database

The Web of Science (originally named the Science Citation Index) database was created in the 1960s to facilitate retrieval of relevant scholarly literature through citation indexing (Garfield & Sher, 1963). Web of Science also allowed for the development of large-scale bibliometric studies and for the measurement of research activities through the metadata of scholarly literature. In addition to authors and journals names, the Web of Science database indexes other metadata, including years of publications, keywords, and institutions of authors, as well as different indicators of research impact. Web of Science was chosen for this article because of the quality of its metadata compared to Google Scholar, and of the historical depth of its indexing compared to Scopus (Mongeon & Paul-Hus, 2016; Sugimoto and Larivière, 2018). Examples of bibliometric studies that used Web of Science carried out on topics similar to those addressed in this article, include Dodier (2019) analysis of the recovered memory controversy in the 21st century, Plusquellec and Denault (2018) analysis of the 1000 most cited papers on

visible nonverbal behavior, and Nadeau, Mongeon and Larivière (2018) analysis of the influence of various disciplines in criminology literature.

The identification of the articles

To build our database, the first issue to address was the identification of the boundaries of the research field of deception and lying. That is, what concepts should be included or excluded in our database? Researchers interested in deception and lying use different words (e.g., dishonesty, perjury, fabrication, malingering, misleading, cheating), but how is it possible to compare articles if different words are used to describe similar concepts? Where does the research field of deception and lying starts, and where does it end? There is much to say, for example, about deception in conspiracy theories, but are conspiracy theories part of the research field of deception and lying?

The second issue to address was the identification of articles within the boundaries of this research field. That is, what articles should be included or excluded in our database? The answer is sometimes clear. DePaulo and colleagues (2003) seminal meta-analysis on deception cues is an example. But it is not clear at other times. For example, Ceci and Bruck (1993) address the suggestibility of child witness, but in their article, there is a whole section on the social and cognitive mechanisms of lying, not to mention that "deception" is listed in Web of Science's keywords. Should Ceci and Bruck (1993) be included or excluded?

In other words, how is it determined that an article is, in fact, an article addressing deception or lying? If an article addressing deception or lying also turns to other subjects, should the article be included or excluded in our database? Do we turn to the research questions? Do we turn to the references cited? Do we turn to the percentage of words about deception or lying? If deception or lying is not the main aspect of the article, but the results presented are relevant, and

are widely cited in the research field of deception and lying, should the article be included? When are results considered widely cited? When are results considered relevant? The answer to those questions is arbitrary. This makes the identification of the boundaries of the research field of deception and lying, and the identification of articles within those boundaries a challenging task.

Therefore, after several trials and errors, in order to include or exclude articles consistently, it was decided to focus on the essentials, that is, the article titles and keywords, both the author's keywords and Web of Science's keywords (Keywords Plus), and to include all articles that involved deception or lying in any way (see Table 1). This search query was considered a good trade-off, even if the importance given to deception and lying could vary from one article to another. Not to mention that the search could still result in false positives, that is, articles included that should have been excluded, and false negatives, that is, articles excluded that should have been included. This limitation is inherent to bibliometric studies.

Therefore, on April 25, 2022, we carried out a three-step search. First, using the "Social Sciences Citation Index (SSCI)—1900-present" collection of Web of Science, papers that had one of the keywords in their title or in their keywords (see Table 1) were retrieved, for a total of 12 257 results. Second, the results were refined by document type, and only articles and reviews articles were kept, for a total of 8079 articles and 333 review articles. Book reviews, meeting abstracts, editorial materials, and other formats were rejected. This first search wielded 8412 articles, including 8150 in English (see Table 2)[1]. Those results were downloaded from Web of Science to an Excel worksheet.

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[1] A search was also conducted on April 25, 2022, using the Topic field of Web of Science. This field, in addition to titles and keywords, searches in abstracts. However, the number of false positives was substantial. In the 1000 most cited articles using the Topic field, 240 results were found in the 8150 articles in English, 760 results were not found

[Insert Table 1 here]

[Insert Table 2 here]

Then, 45 articles with no author identified, and 156 articles without a publication year were removed. This leads us to 7949 articles. However, because several of the 7949 articles in English used "liar" OR "liars" OR "lie" OR "lies" OR "lying" in ways irrelevant for our descriptive analysis (e.g., familiar, anomalies, applying, lying ahead, lying below, lying within), articles retrieved because of one of those keywords in their title or in their keywords were assessed, one at a time, to determine if "liar" OR "liars" OR "lie" OR "lies" OR "lying" in their title or in their keywords was used in a way relevant (or irrelevant) to deception and lying. This resulted in the inclusion of 7290 articles and the exclusion of 659 articles out of the 7949. Thus, our database consists of a total of 7290 articles in English.

Results

Web of Science's metadata of scholarly literature includes a wealth of information to better understand the evolution of a research field. We reviewed part of them, and the results presented hereafter are divided in nine sections. The number of articles addressing deception and lying published per decades is presented. This is followed by the Top 15 journals, and the Top 15 research areas addressing deception and lying since the 1900s. Then, the Top 15 authors, Top 15 institutions, and the Top 15 countries publishing on deception and lying are introduced, and the Top 15 most used keywords is presented. Finally, the Top 10 most cited articles on deception

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in the 8150 articles in English, and in the 760 results, only about 10 articles could be considered relevant. This confirmed that the three-step search we carried out was appropriate.

and lying, then those related to deception detection and lie detection, to children lying behavior, and to child deception detection and lie detection are presented.

The decades. As shown in Table 3, the highest number of articles addressing deception and lying were published in scientific journals during the last decade (2010-2019) with a total of 3245 articles (44.51% of all articles published on since 1900). The number of articles from the previous decade (2000-2009) is less than half that number with a total of 1385 articles (19.00%). The number of articles published during the last decade (2010-2019) is all the more important considering it amount to approximately half of articles on deception and lying published since 1900, the first year covered by the "Social Sciences Citation Index (SSCI)—1900-present" collection of Web of Science. While the growth over the last decade can be associated with the growth in research papers overall, this growth surpasses that observed in all fields combined (National Science Foundation, 2019).

Considering the number of articles published per decades, it could be argued that the research field of deception and lying, as it is known today, took off in the 1960s, with almost 99% of articles in our database published since then. Still, although only 104 articles out of the 7290 (1.44%) were published from 1900 to 1959, their impact (positive or negative) on scholars and practitioners should not be neglected. For example, in 1953, John E. Reid and Richard O. Arther advocated that "The lie-detector examiner should be able to recognize each subject's various behavior symptoms and then be able to determine the suitable procedure to be followed" (p. 108). To our knowledge, this is one of the first times behavior symptoms, similar to what was promoted by the SPOT program, was explicitly mentioned in law enforcement literature. Also, at the time the three-step search was conducted, 110 articles out of the 7290 were published in 2022.

[Insert Table 3 here]

[Insert Figure 1 here]

The journals. The 7290 articles in English were published in a total of more than 1700 different journals. Table 4 presents the Top 15 journals addressing deception and lying. Applied Cognitive Psychology, with an Impact Factor of 2.005, takes the first place with 2.15% of the articles ($n = 157$). This serves as a reminder that regardless of its Impact Factor, a journal can be highly influential within a research field. With a higher Impact Factor (2.988) and 1.99% of the articles ($n = 145$), Frontiers in Psychology takes the second place, and also with a higher Impact Factor (3.004) and 1.59% of the articles ($n = 116$), Personality and Individual Differences takes the third place. Despite the growing body of scientific knowledge on deception and lying, no journal in the Top 15 is dedicated to deception and lying, and no journal clearly stands out for the number of publications. This is not surprising considering that, as shown in Table 5, the research areas covered by the journals are extremely varied.

[Insert Table 4 here]

The research areas. Although several of the 15 journals that published the most on the deception and lying are psychological journals, several other specific research areas address those subjects. As shown in Table 5, journals dealing with Business & Economics ($n = 1158$), Government & Law ($n = 1010$), Criminology and Penology ($n = 420$), and Neurosciences and Neurology ($n = 406$), for example, also address deception and lying. This clearly shows this

research field is highly interdisciplinary, and the importance, if not the necessity of dialogue between scholars of different disciplines to fully understand deception and lying. It should be noted that in Web of Science, multiple research areas are sometimes assigned to journals.

[Insert Table 5 here]

The authors. According to our database, more than 8700 different authors contributed to the 7290 articles in English. Table 6 presents the 15 authors that published the most on deception and lying, regardless of the authorship rank (e.g., first, second, third author). Aldert Vrij from the University of Portsmouth ($n = 201$) takes the first place with almost 3% of all the articles, more than twice the number of articles from the author in the second place, Kang Lee from the University of Toronto ($n = 90$). Pär Anders Granhag from the University of Gothenburg ($n = 82$) holds the third place. It is worth noting that Paul Ekman, whose research inspired the drama series *Lie To Me*, is not featured in the Top 15[2]. This illustrates that popularity among the public is not necessarily related to the number of publications on a specific subject. The same goes for the impact in a research field. Bella M. DePaulo, as shown later, is the first author of the most cited article addressing the issue of deception detection and lie detection. She comes at the 14th position in the Top 15. But considering more than 8700 different authors contributed to the 7290 articles in English, being at the 14th place is far from trivial.

Furthermore, for each of the 15 authors that published the most on deception and lying, Table 6 features the total number of citations for their articles, considering Web of Science's Core Collection, and their average number of citations per article. This offers another way assess

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[2] If should be noted, however, that using a slightly different methodology, Ekman is the most cited author on visible nonverbal behavior (Plusquellec & Denault, 2018).

the contributions of authors in the research field of deception and lying. Bella DePaulo, for example, has the second highest total number of citations (n=5087), preceded by Aldert Vrij (n=6866). However, DePaulo's average number of citations per article (n=158.97) is more than 4 times higher than Vrij's (n=34.16). This indicates that the number of publications on a specific subject is one way, but not the only way to assess the impact of authors in a research field. Paul Ekman, for example, has 16 articles in the database, but his total number of citations (n=3279), and his average number of citations per article (n=204.94) exceed those of almost all authors in Table 6.

[Insert Table 6 here]

Subsequently, to better understand patterns of scientific collaborations in the research field of deception and lying, our database was exported in VOS Viewer for a co-authorship analysis. The minimum number of articles of an author was set up at 5, and articles with more than 25 authors were ignored. The largest set of connected authors is shown in Figure 2.

[Insert Figure 2 here]

The institutions. As shown in Table 7, the institution (of corresponding authors) with the highest number of articles on deception and lying is the University of Portsmouth ($n = 173$). This should come as no surprise considering Aldert Vrij, the author that published the most on deception and lying, is affiliated with that institution. Samantha Mann and Sharon Leal, respectively at the fourth and fifth position of the Top 15 authors, are also affiliated with that

institution. The University of Arizona ($n = 67$) and University of Gothenburg ($n = 66$) takes the second and third place. According to our database, the corresponding authors of the 7290 articles in English are affiliated with more than 1700 different institutions. This clearly shows the popularity of the subject, and the possibility for graduate students to study deception and lying in several different institutions.

[Insert Table 7 here]

The countries. According to our database, the country (of corresponding authors) with the highest number of articles on deception and lying is the United States ($n = 2854$), with more than three times the number of articles from United Kingdom ($n = 861$), the country in second place, and more than five times the number of articles from Canada ($n = 502$), the country in the third place. The first place of the United States, however, should come as no surprise considering more than half of the Top 15 institutions (i.e., University of Arizona, Northwestern University, University of California, San Diego, University of Pennsylvania, University of Virginia, University of Chicago, Harvard University, Michigan State University, University of Michigan, Stanford University, University of Illinois, Cornell University, Columbia University, University of Wisconsin) are located in this country, and the number of scholars living there compared to other countries (UNESCO, 2021). According to our database, the authors of the 7270 articles in English are located in almost 70 different countries. In other words, the research field of deception and lying is of worldwide interest.

[Insert Table 8 here]

The keywords. As shown in Table 9, the Top 15 most used keywords (author's keywords and Web of Science's keywords), other than those used to carry out the three-step search, shows the interest of the scientific community in different aspects of the research field of deception and lying. The most used keyword is "behavior", suggesting a large part of research findings addresses behavior related issues to deception and lying. Almost a third of all articles in our database use one of the first five keywords, suggesting issues of lie detection, information, accuracy, and cues are central to the deception and lying literature. Furthermore, Table 9 highlights the importance of child related issues in the research field of deception and lying. This is highlighted even more in the Top 10 most cited articles on deception and lying.

[Insert Table 9 here]

Subsequently, to better understand patterns of thematic groups in the research field of deception and lying, our database was exported in VOS Viewer for a keywords co-occurrence analysis. The minimum number of occurrences of a keyword was set up at 5, and the 1000 keywords with the greatest total link strength were selected. The result is shown in Figure 3.

[Insert Figure 3 here]

The articles. The Top 10 most cited articles on deception and lying, considering Web of Science's Core Collection, shows a variety of issues other than deception detection and lie detection. In the most cited articles ($n = 3166$), for example, Wimmer and Perner (1983)

addresses the representations and constraining function of false beliefs in young children understanding of deception. Articles addressing false beliefs and theory of mind related issues in the Top 10 also include the second ($n = 2318$) from Wellman, Cross, and Watson (2001), sixth ($n = 1284$) from Happé (1994), the seventh ($n = 1230$) from Carlson and Moses (2001), and the tenth ($n = 1130$) from Onishi and Baillargeon (2005).

Tausczik and Pennebaker (2010) then takes the third place ($n = 2124$) with their review article on Linguistic Inquiry and Word Count (LIWC) and computerized text analysis methods. In the fourth place ($n = 1309$), Mazar, Amir, and Ariely (2008) present the theory of self-concept maintenance which asserts that individuals who think of themselves as honest will engage in dishonesty enough to profit but without damaging their self-image, and in the fifth place ($n = 1306$), DePaulo and colleagues (2003) present their seminal meta-analysis on deception cues. Considering the subjects addressed in the five most cited articles, DePaulo and colleagues (2003) can be considered the most cited article on the issue of deception detection and lie detection (Table 11). In the eight place ($n = 1179$), Ellison, Heino and Gibbs (2006) addresses the issue of online impression management, and in the ninth place ($n = 1145$), Frith and Frith (1999) focus on the "the capacity to understand and manipulate the mental states of other people and thereby to alter their behavior" (p. 1692).

[Insert Table 10 here]

Because of the popularity of deception detection and lie detection among the public, a search was carried out in titles and keywords to extract the Top 10 most cited articles related to those subjects (Table 11). The keyword "detect" was used. Then, because of the importance of

child related issues in the research field of deception and lying, a search was carried to extract the Top 10 most cited articles related to children lying behavior. The keywords "child" and "lying" were used respectively to search in titles, and in titles and keywords (Table 12). Finally, to extract the Top 10 most cited articles related to child deception detection and lie detection, the keywords "child" and "detect" were used respectively to search in titles, and in titles and keywords (Table 13).

The above results emphasize that the impact in a research field is not necessarily related to the number of publications on a specific subject. Bella M. DePaulo, Charles F. Bond, and Paul Ekman, for example, all have two publications in the Top 10 most cited articles related to deception detection and lie detection, but only DePaulo is featured in the Top 15 authors publishing on deception and lying. Thus, while Aldert Vrij is, by far, the author that published the most on deception and lying, Bella M. DePaulo, Charles F. Bond, and Paul Ekman can be considered the most impactful authors on deception detection and lie detection. The impact of authors in a research field, however, is not necessarily indicative of agreement among the scientific community. Authors can be cited frequently, because their work has been criticized repeatedly.

[Insert Table 11 here]
[Insert Table 12 here]
[Insert Table 13 here]

Discussion

This article provided an overview of over 100 years of social science research on deception and lying. To begin, the database used to conduct our descriptive analysis, Web of Science, was introduced, and the steps undertaken to build our database were described. This quickly revealed the challenge of identifying the boundaries of the research field of deception and lying, and the articles within the boundaries of this research field. However, the three-step search (Table 1) resulted in a total of 7290 articles in English. Then, the yearly evolution of research findings since the 1900s was presented, and showed that, although interest in distinguishing honesty from dishonesty started several thousands of years ago (Trovillo, 1939), the highest number of articles were published in scientific journals during the last decade (2010-2019) with a total of 3245 articles.

Finally, the journals and the research areas, as well as the authors, the institutions and the countries that contributed the most to the deception and lying literature were highlighted, as well as the most used keywords and cited articles. Our descriptive analysis showed that this research field is highly interdisciplinary, and of worldwide interest.

Furthermore, our descriptive analysis highlighted that social science research goes far beyond deception detection and lie detection. For example, in psychology, where most of the social science research on deception and lying takes place, scholars also studied, among other things, the prevalence of lying (e.g., DePaulo & Kashy, 1998), the concept of self-deception (e.g., Tomaka, Blascovich, & Kelsey, 1992), and beliefs about deception (e.g., Kassin et al., 2007). In development psychology, a subdiscipline of psychology, scholars thoroughly investigated the development of lie-telling behavior in children, including the motivations for lying, the children's understanding of lies, and the relation between beliefs and actions (e.g., Wellman, Cross, & Watson, 2001; Talwar & Crossman, 2011; Talwar & Lee, 2008). In

economics, for example, the consequences of deception (e.g., Gneezy, 2005; Reuben, & Stephenson, 2013), when and why people lie (e.g., Cappelen, Sørensen, & Tungodden, 2013; Jacobsen, Fosgaard, & Pascual-Ezama, 2018), and gender differences in honesty and dishonesty (e.g., Grosch, & Rau, 2017; Gylfason, Arnardottir, & Kristinsson, 2013) were studied. Because the research field of deception and lying is highly interdisciplinary, these subjects can, obviously, be studied in disciplines other than psychology. Hence the importance of adequately communicating research findings on deception and lying to practitioners who assess the veracity of individuals statements.

But given so-called experts offer "immediate and easy solutions to complex challenges" (Denault et al., 2020, p. 7), the scientific community has the difficult task of convincing practitioners of the very high value of scientific knowledge on deception and lying. This article provides an additional argument because it shows the wealth of the research field of deception and lying, which includes thousands of articles, developed all over the world, and published for decades, where everything is available to support or criticize in full knowledge of the fact, because research findings are published in scientific journals. So-called trainings do not come close to this level of evidence. That being said, researchers should not neglect the experiential knowledge and daily reality of practitioners. For example, within the justice system, as noted by Vrij and Granhag (2012),

> For deception research to really make a difference, researchers must provide criminal investigators with techniques that will help them to produce evidence that will stand up in court. It is not just about assessing whether a suspect is lying or telling the truth, it is also about maximising the value of the evidence so that prosecutors can present it 'beyond reasonable doubt', the standard of proof typically required in criminal courts. (p. 115)

In addition to helping the scientific community adequately communicating research findings to practitioners who assess the veracity of individuals statements, it is hoped that this article can assist researchers in further future research on deception detection and lie detection research. The lack of dialogue between research groups, for example, likely slows down the development of empirical studies. This adds to the emphasis placed on experimental designs over descriptive studies:

> Early researchers created experimental designs that appear to have excluded important types of information. Subsequent researchers systematically built upon earlier designs such that an entire literature developed around variations in a single basic design. Although this literature has certainly advanced knowledge, this knowledge may be much more limited than it might have been. Had early studies started with descriptive work, the literature may well have progressed differently and more efficiently (Park et al., 2002, p. 155).

> This article, however, allows for a broader view on research findings on deception detection and lie detection, and offers researchers the opportunity to step out of their comfort zone, and to look at deception and lying from different angles, offering the possibility of developing new hypothesis, and discovering new methodologies. And even if our descriptive analysis can challenge established positions, and cause discomfort, theoretical foundations of deception detection and lie detection research can only come out on top.

At last, beyond communicating of research findings on deception and lying to practitioners who assess the veracity of individuals statements, and furthering future research on deception detection and lie detection, our descriptive analysis allows, quite simply, to better understand over 100 years of social science research on deception and lying, and bridge gaps that

are relevant to scholars and practitioners interested in deception and lying. This should not be overlooked because deception and lying can have extremely harmful consequences.

For example, within justice systems, deception and lying can distort the course of investigations and the outcome of trials, and lead to miscarriage of justice (Denault, 2020). The implication within justice systems, however, is not limited to criminal justice. Deception and lying during family trials, administrative trials, and civil trials also have extremely harmful consequences. If research findings on deception and lying are not adequately communicated to practitioner, the well-being of children, the health of workers, and the existence of businesses can be jeopardized, and the public confidence in justice systems can be undermined. And because justice systems are pillars of democratic societies based on the rule of law and their proper functioning is contingent upon the public confidence, it might as well be said that, ultimately, deception and lying are issues of democracy.

Conclusion

Our descriptive analysis provided an opportunity to raise awareness on the full scope of research findings on deception and lying, and discuss challenges and opportunities for scholars and practitioners interested in deception and lying. The results will, of course, differ from those in other citation indexes, but they were intended to provide an overview of over 100 years of social science research on deception and lying. Furthermore, because of the search query, and the boundaries of the research field of deception and lying, and the articles within the boundaries of this research field, other subjects related to deception and lying were not exhaustively addressed. Conspiracy theories, phishing attacks, phone scams, and identity thefts, are only a few examples among many others. However, given this first attempt to account for the research field of

deception and lying, it is hoped that our descriptive analysis will allow a better understanding of the past for a better undertaking of the future.

References

Brennan, T., & Magnussen, S. (2020). Research on non-verbal signs of lies and deceit: A blind alley. *Frontiers in Psychology, 11*, 613410.

Ceci, S. J., & Bruck, M. (1993). Suggestibility of the child witness: A historical review and synthesis. *Psychological Bulletin, 113*(3), 403–439.

Cappelen, A. W., Sørensen, E. Ø., & Tungodden, B. (2013). When do we lie? *Journal of Economic Behavior & Organization, 93*, 258-265.

Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*(4), 1032–1053.

Clarivate (n.d.). Authors / Researchers: What is your impact? Retrieved from https://clarivate.libguides.com/authors/impact

Colwell, K., Hiscock-Anisman, C. K., & Fede, J. (2013). Assessment Criteria Indicative of Deception: An example of the new paradigm of differential recall enhancement. In B. S. Cooper, D. Griesel, & M. Ternes (Eds.) Applied issues in investigative interviewing, eyewitness memory, and credibility assessment (pp. 259-292). New York.

Craig, K. D. (2009). The social communication model of pain. *Canadian Psychology/Psychologie canadienne, 50*(1), 22–32

Darwin, C. (1897). The expression of the emotions in man and animals. New York: D. Appleton and Company. (Original work published 1872).

Denault, V. (2020). Misconceptions about nonverbal cues to deception: A covert threat to the justice system? Frontiers in Psychology – Personality and Social Psychology, 11, 573460.

Denault, V., Duran, G. et Delmas, H. (2021). La communication non verbale dans les médias télévisuels: Un regard critique sur un « décryptage » lors du procès d'Aaron Hernandez. Criminologie, 54(1), 171-196.

Denault, V., Plusquellec, P., Jupe, L. M., St-Yves, M., Dunbar, N. E., Hartwig, M., … van Koppen, P. J. (2020). The analysis of nonverbal communication: The dangers of pseudoscience in security and justice contexts. Anuario de Psicología Jurídica, 30, 1-12.

DePaulo, B. M., Lindsay, J. J., Malone, B. E., Muhlenbruck, L., Charlton, K., & Cooper, H. (2003). Cues to deception. *Psychological Bulletin, 129*(1), 74-118.

DePaulo, B. M., & Kashy, D. A. (1998). Everyday lies in close and casual relationships. *Journal of Personality and Social Psychology, 74*, 63-79.

Dodier, O. (2019). A bibliometric analysis of the recovered memory controversy in the 21st century. *Applied Cognitive Psychology, 33*, 571-584.

Ekman, P., & Friesen, W. V. (1969). Nonverbal leakage and clues to deception. *Psychiatry, 32*(1), 88-106.

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication, 11*(2), 415–441.

Fox (n.d.). About Lie to Me. Retrieved from https://www.fox.com/lie-to-me/about-lie-to-me/

Frith, C. D., & Frith, U. (1999). Interacting minds—A biological basis. *Science, 286*(5445), 1692–1695.

Garfield, E., & Sher, I. H. (1963). New factors in the evaluation of scientific literature through citation indexing. *American Documentation, 14*(3), 195-201.

Gneezy, U. (2005). Deception: The role of consequences. *American Economic Review, 95*(1), 384-394.

Granhag, P.A., & Stromwall, L.A. (Eds.). (2004). The detection of deception in forensic contexts. Cambridge University Press.

Granhag, P.A., Strömwall, L.A., Willén, R., & Hartwig, M. (2013). Eliciting cues to deception by tactical disclosure of evidence: The first test of the Evidence Framing Matrix. *Legal and Criminological Psychology, 18*, 341-355.

Grosch, K., & Rau, H. A. (2017). Gender differences in honesty: The role of social value orientation. *Journal of Economic Psychology, 62*, 258-267.

Gylfason, H. F., Arnardottir, A. A., & Kristinsson, K. (2013). More on gender differences in lying. *Economics Letters, 119*, 94-96.

Happé, F. G. E. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders, 24*(2), 129–154.

Jacobsen, C., Fosgaard, T. R., & Pascual-Ezama, D. (2018). Why do we lie? A practical guide to the dishonesty literature. *Journal of Economic Surveys, 32*, 357-387.

Kassin, S. M., Leo, R. A., Meissner, C. A., Richman, K. D., Colwell, L. H., Leach, A.-M., et al. (2007). Police interviewing and interrogation: A Self-report survey of police practices and beliefs. *Law and Human Behavior, 31*, 381-400.

Knapp, M. L. (2008). Lying and deception in human interaction. Penguin.

Levine, T. R. (2018a). Ecological validity and deception detection research design. *Communication Methods and Measures, 12*, 45-54.

Levine, T. R. (2018b). Scientific evidence and cue theories in deception research: Reconciling findings from meta-analyses and primary experiments. *International Journal of Communication, 12*, 2461-2479.

Luke, T. J. (2019). Lessons from Pinocchio: Cues to deception may be highly exaggerated. *Perspectives on Psychological Science, 14*(4), 646-671.

Luke, T. J. (2020). A meta-analytic review of experimental tests of the interrogation technique of Hanns Joachim Scharff. Applied Cognitive Psychology, *35*(2), 360-373.

Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research, 45*(6), 633-644.

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: a comparative analysis. *Scientometrics, 106*(1), 213-228.

Nahari, G. (2018). The applicability of the Verifiability Approach to the real world. In P. Rosenfeld (Ed.). Detecting concealed information and deception: Verbal, behavioral, and biological methods (pp. 329-350). Academic Press.

National Science Foundation (2019). Publications Output: U.S. Trends and International Comparisons. Retrieved from https://ncses.nsf.gov/pubs/nsb20206

Nadeau, F., Mongeon, P., & Larivière, V. (2018). Les influences disciplinaires de la criminologie (1991-2014). *Criminologie, 51*(1), 17-53.

Nortje, A., & Tredoux, C. (2019). How good are we at detecting deception? A review of current techniques and theories. South African Journal of Psychology, 49(4), 491–504.

Onishi, K. H., & Baillargeon, R. (2005). Do 15-month-old infants understand false beliefs? *Science, 308*(5719), 255-258.

Park, H. S., Levine, T. R., McCornack, S. A., Morrison, K., & Ferrara, M. (2002). How people really detect lies. *Communication Monographs, 69*(2), 144-157.

Plusquellec, P. et Denault, V. (2018). The 1000 most cited papers on visible nonverbal behavior: A bibliometric analysis. Journal of Nonverbal Behavior, 42(3), 347-377.

Reid, J. E., & Arther, R. O. (1953). Behavior symptoms of lie-detector subjects. *Journal of Criminal Law and Criminology, 44*(1), 104-108.

Reuben, E., & Stephenson, M. (2013). Nobody likes a rat: on the willingness to report lies and the consequences thereof. *Journal of Economic Behavior and Organization, 93*, 384-391.

Smith, J. (2020). The junk science cops use to decide you're lying. *The Intercept*. Retrieved from https://theintercept.com/2020/08/12/blueleaks-law-enforcement-police-lie-detection/

Sugimoto, C. R., & Larivière, V. (2018). *Measuring research: What everyone needs to know.* Oxford University Press.

Tait, A. (2021). Body Language Pseudoscience Is Flourishing on YouTube. *Wired*. https://www.wired.com/story/youtube-body-language/

Talwar, V., & Crossman, A. (2011). From little white lies to filthy liars: The evolution of honesty and deception in young children. *Advances in Child Development and Behavior, 40*, 139-179.

Talwar, V., & Lee, K. (2008). Social and cognitive correlates of children's lying behavior. *Child Development, 79*, 866-881.

Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology, 29*(1), 24–54.

Tomaka, J., Blascovich, J., & Kelsey, R. M. (1992). Effects of self-deception, social desirability, and repressive coping on psychophysiological reactivity to stress. *Personality and Social Psychology Bulletin, 78*, 616-624.

Trovillo, P. V. (1939). History of lie detection. *Journal of Criminal Law and Criminology, 29*(6), 848-881.

UNESCO (2021). UNESCO Science report: The race against time for smarter development. Retrieved from https://www.unesco.org/reports/science/2021/en

U.S. Government Accountability Office. (2010). Aviation security: Efforts to validate TSA's passenger screening behavior detection program underway, but opportunities exist to strengthen validation and address operational challenges. Retrieved from https://www.gao.gov/ products/GAO-10-763

U.S. Government Accountability Office. (2017). Aviation security: TSA does not have valid evidence supporting most of the revised behavioral indicators used in its behavior detection activities. Retrieved from https://www.gao.gov/products/GAO-17-608R

Vrij, A. (2008). Detecting lies and deceit: Pitfalls and opportunities. Wiley.

Vrij, A., Fisher, R., Blank, H. (2017). A cognitive approach to lie detection: A meta-analysis. *Legal and Criminological Psychology, 22*, 1-21.

Vrij, A., Fisher, R., & Leal, S. (2022). How researchers can make verbal lie detection more attractive for practitioners. *Psychiatry, Psychology and Law*. Advance publication online.

Vrij, A., & Granhag, P. A. (2012). Eliciting cues to deception and truth: What matters are the questions asked. *Journal of Applied Research in Memory and Cognition, 1*, 110-117.

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 72*(3), 655-684.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs - representation and constraining function of wrong beliefs in young children understanding of deception. *Cognition, 13*(1), 103-128.

Winter, J., & Currier, C. (2015). Exclusive: TSA's secret behavior checklist to spot terrorists. *The Intercept*. Retrieved from https://theintercept.com/2015/03/27/ revealed-tsas-closely-held-behavior-checklist-spot-terrorists/

Table 1: Parameters of the search in Web of Science

CORE COLLECTION: Social Sciences Citation Index (SSCI)—1900-present
TI=(decei* OR decept* OR "liar" OR "liars" OR "lie" OR "lies" OR "lying") OR AK=(decei* OR decept* OR "liar" OR "liars" OR "lie" OR "lies" OR "lying") OR KP=(decei* OR decept* OR "liar" OR "liars" OR "lie" OR "lies" OR "lying")
Results: **12 257**
[and] **DOCUMENT TYPE:** Article AND Review Articles
Results: **8412**
[and] **LANGUAGE:** English
Results: **8150**

Table 2: Language of the 8412 results

Language	Number of articles
English	8150
German	131
French	42
Spanish	28
Russian	25
Czech	7
Japanese	6
Italian	5
Slovenian	5
Dutch	3
Croatian	2
Norwegian	2
Portuguese	2
Turkish	2
Hebrew	1
Unspecified	1

Table 3: The number of articles addressing deception and lying

Years	Number of articles	Percentage of all articles
1900-1909	3	0.04%
1910-1919	4	0.05%
1920-1929	16	0.22%
1930-1939	24	0.33%
1940-1949	24	0.33%
1950-1959	34	0.47%
1960-1969	104	1.43%
1970-1979	236	3.24%
1980-1989	380	5.21%
1990-1999	884	12.13%
2000-2009	1385	19.00%
2010-2019	3245	44.51%
2020-present	951	13.05%

Figure 1: The number of articles addressing deception and lying

Figure 2 : Co-authorship analysis

Figure 3: Keywords co-occurrence analysis
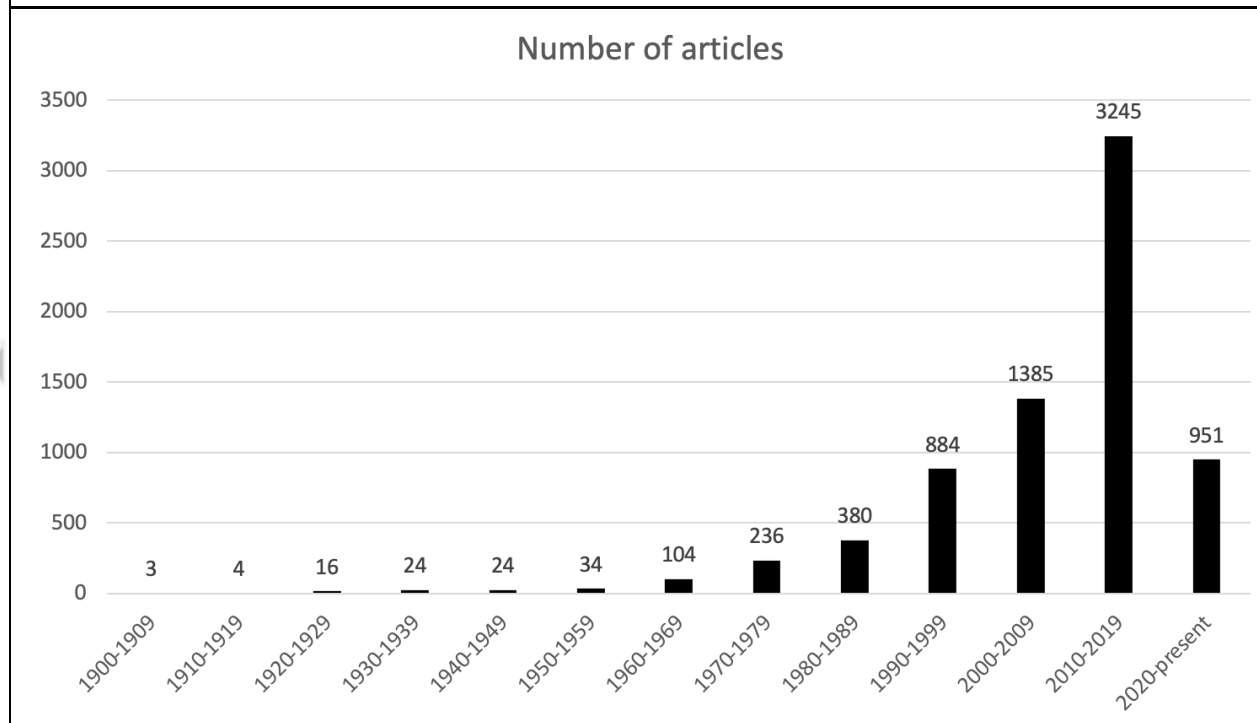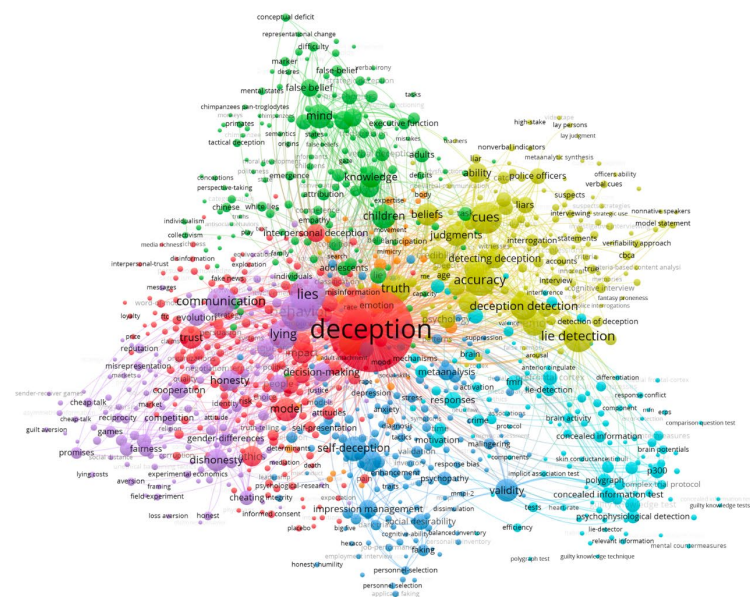
	Journals	Number of articles	IF (2020)	Percentage of all articles
	Table 4: Top 15 journals addressing deception and lying			
1	Applied Cognitive Psychology	157	2.005	2.15%
2	Frontiers in Psychology	145	2.988	1.99%
3	Personality and Individual Differences	116	3.004	1.59%
4	Psychology Crime & Law	98	2.019	1.34%
5	Journal of Economic Behavior & Organization	95	1.635	1.30%
6	Journal of Personality and Social Psychology	78	7.673	1.07%
7	Journal of Business Ethics	74	6.430	1.02%
8	Law and Human Behavior	73	3.795	1.00%
9a	Psychophysiology	71	4.016	0.97%
9b	Plos One	71	3.240	0.97%
10	Legal and Criminological Psychology	69	2.743	0.95%
11a	Journal of Nonverbal Behavior	63	2.938	0.86%
11b	International Journal of Psychophysiology	63	2.997	0.86%
12a	Personality and Social Psychology Bulletin	62	4.376	0.85%
12b	Journal of Experimental Child Psychology	62	2.610	0.85%
13	Child Development	60	5.899	0.82%
14	Developmental Psychology	54	3.845	0.74%
15	British Journal of Developmental Psychology	48	2.238	0.66%

	Table 5: Top 15 research areas addressing deception and lying		
	Research Areas	Number of articles	Percentage of all articles
1	Psychology	3664	50.26%
2	Business & Economics	1158	15.88%
3	Government & Law	1010	13.85%
4	Criminology & Penology	420	5.76%
5	Neurosciences & Neurology	406	5.57%
6	Communication	343	4.71%
7	Psychiatry	249	3.42%
8	Computer Science	208	2.85%
9	Linguistics	177	2.43%
10	Behavioral Sciences	172	2.36%
11	Social Issues	148	2.03%
12a	Biomedical Social Sciences	147	2.02%
12b	Physiology	147	2.02%
13	Sociology	129	1.77%
14	Information Science & Library Science	125	1.71%
15	Philosophy	124	1.70%

	Authors	Number of articles	Percentage of all articles	Total number of citations	Average number of citations per article
Table 6: Top 15 authors publishing on deception and lying					
1	Aldert Vrij	201	2.76%	6866	34.16
2	Kang Lee	90	1.22%	3764	41.82
3	Pär Anders Granhag	82	1.12%	2989	36.45
4	Samantha Mann	79	1.08%	2659	33.66
5	Sharon Leal	78	1.07%	1803	23.12
6	Bruno Verschuere	67	0.92%	1577	23.54
7	Victoria Talwar	65	0.89%	2527	38.88
8	Judee K. Burgoon	60	0.82%	2850	47.50
9	J. Peter Rosenfeld	53	0.73%	1566	29.55
10a	Genyue Fu	45	0.62%	1026	22.80
10b	Timothy R. Levine	45	0.62%	1744	38.76
11a	Ronald P. Fisher	40	0.55%	1752	43.80
11b	Leif A. Strömwall	40	0.55%	1665	41.63
12	Jaume Masip	36	0.49%	1013	28.14
13	Gail D. Heyman	33	0.45%	660	20.00
14a	Angela D. Evans	32	0.44%	662	20.69
14b	Bella M. DePaulo	32	0.44%	5087	158.97
14c	Stephen Porter	32	0.44%	1531	47.84
15	Ewout H. Meijer	31	0.43%	715	23.06

Table 7: Top 15 institutions publishing on deception and lying

	Institutions	Number of articles	Percentage of all articles
1	University of Portsmouth	173	2.37%
2	University of Arizona	67	0.92%
3	University of Gothenburg	66	0.91%
4a	University of British Columbia	60	0.82%
4b	Northwestern University	60	0.82%
5a	McGill University	57	0.78%
5b	University of Toronto	57	0.78%
6	University of Amsterdam	53	0.73%
7	Maastricht University	51	0.70%
8a	University of California San Diego	45	0.62%
8b	University of Pennsylvania	45	0.62%
9	University of Virginia	41	0.56%
10a	University of Chicago	40	0.55%
10b	Harvard University	40	0.55%
11a	Michigan State University	38	0.52%
11b	University of Michigan	38	0.52%
12	Stanford University	37	0.51%
13	University of Illinois	36	0.49%
14a	Cornell University	34	0.47%
14b	Columbia University	34	0.47%
15	University of Wisconsin	33	0.45%

	Countries	Number of publications	Percentage of all publications
	Table 8: Top 15 countries publishing on deception and lying		
1	USA	2854	39.15%
2	United Kingdom	861	11.81%
3	Canada	502	6.89%
4	Germany	343	4.71%
5	Netherlands	218	2.99%
6	Australia	217	2.98%
7	China	214	2.94%
8	Israel	151	2.07%
9	Italy	149	2.04%
10	Spain	118	1.62%
11	Sweden	104	1.43%
12	France	93	1.28%
13	Japan	66	0.91%
14	Switzerland	58	0.80%
15	Belgium	49	0.67%

	Keywords	Number of articles	Percentage of all articles
	Table 9: Top 15 most used keywords of articles		
1	Behavior	611	8.38%
2	Lie detection	481	6.67%
3	Information	439	6.02%
4	Cues	423	5.80%
5	Accuracy	392	5.38%
6	Communication	377	5.17%
7	Truth	362	4.97%
8	Deception detection	329	4.51%
9	Self-deception	271	3.72%
10a	Memory	249	3.42%
10b	Mind	249	3.42%
11	Children	246	3.37%
12	Trust	244	3.35%
13a	Dishonesty	227	3.11%
13b	Model	227	3.11%
14	Judgments	225	3.09%
15	Validity	223	3.06%

Table 10: Top 10 most cited articles on deception and lying		
	Articles	Citation counts
1	Wimmer, H., & Perner, J. (1983). Beliefs about beliefs - representation and constraining function of wrong beliefs in young children understanding of deception. *Cognition, 13*(1), 103-128.	3166
2	Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development, 72*(3), 655-684.	2318
3	Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology, 29*(1), 24–54.	2134
4	Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research, 45*(6), 633-644.	1309
5	DePaulo, B. M., Lindsay, J. J., Malone, B. E., Muhlenbruck, L., Charlton, K., & Cooper, H. (2003). Cues to deception. *Psychological Bulletin, 129*(1), 74-118.	1306
6	Happé, F. G. E. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders, 24*(2), 129–154.	1284
7	Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*(4), 1032–1053.	1230
8	Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication, 11*(2), 415–441.	1179
9	Frith, C. D., & Frith, U. (1999). Interacting minds—A biological basis. *Science, 286*(5445), 1692–1695.	1145
10	Onishi, K. H., & Baillargeon, R. (2005). Do 15-month-old infants understand false beliefs? *Science, 308*(5719), 255-258.	1130

	Table 11: Top 10 most cited articles related to deception detection and lie detection	
	Articles	Citation counts
1	DePaulo, B. M., Lindsay, J. J., Malone, B. E., Muhlenbruck, L., Charlton, K., & Cooper, H. (2003). Cues to deception. *Psychological Bulletin, 129*(1), 74-118.	1306
2	Haynes, J.-D., & Rees, G. (2006). Decoding mental states from brain activity in humans. *Nature Reviews Neuroscience, 7*(7), 523–534.	1121
3	Bond, C. F., Jr., & DePaulo, B. M. (2006). Accuracy of Deception Judgments. *Personality and Social Psychology Review, 10*(3), 214–234.	879
4	Buller, D. B., & Burgoon, J. K. (1996). Interpersonal deception theory. *Communication Theory, 3*, 203–242.	561
5	Ekman, P., & O'Sullivan, M. (1991). Who can catch a liar? *American Psychologist, 46*(9), 913–920.	550
6	Ekman, P., & Friesen, W. V. (1974). Detecting deception from the body or face. *Journal of Personality and Social Psychology, 29*(3), 288–298.	436
7	Farwell, L. A., & Donchin, E. (1991). The truth will out: Interrogative polygraphy ("lie detection") with event-related brain potentials. *Psychophysiology, 28*(5), 531–547.	340
8	Viswesvaran, C., & Ones, D. S. (1999). Meta-analyses of fakability estimates: Implications for personality measurement. *Educational and Psychological Measurement, 59*(2), 197–210.	288
9	Gilovich, T., Savitsky, K., & Medvec, V. H. (1998). The illusion of transparency: Biased assessments of others' ability to read one's emotional states. *Journal of Personality and Social Psychology, 75*(2), 332–346.	286
10	Hartwig, M., & Bond, C. F., Jr. (2011). Why do lie-catchers fail? A lens model meta-analysis of human lie judgments. *Psychological Bulletin, 137*(4), 643–659.	253

	Table 12: Top 10 most cited articles related to children lying behavior	
	Articles	Citation counts
1	Talwar, V., & Lee, K. (2008) Socio-cognitive correlates of children's lying behaviour: Conceptual understanding of lying, executive functioning, and false beliefs. *Child Development, 79*(4), 866-881.	257
2	Talwar, V., & Lee, K. (2002). Development of lying to conceal a transgression: Children's control of expressive behaviour during verbal deception. *International Journal of Behavioral Development, 26(*5), 436–444.	203
3	Talwar, V., Murphy, S. M., & Lee, K. (2007). White lie-telling in children for politeness purposes. *International Journal of Behavioral Development, 31*(1), 1–11.	133
4	Lee, K. (2013). Little liars: Development of verbal deception in children. *Child Development Perspectives, 7*(2), 91–96.	130
5	Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2002). Children's conceptual knowledge of lying and its relation to their actual behaviors: Implications for court competence examinations. *Law and Human Behavior, 26*(4), 395–415.	128
6	Evans, A. D., & Lee, K. (2013). Emergence of lying in very young children. *Developmental Psychology, 49*(10), 1958–1963.	120
7	Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2004). Children's lie-telling to conceal a parent's transgression: Legal implications. *Law and Human Behavior, 28*(4), 411–435.	119
8	Bussey, K. (1992). Lying and truthfulness: Children's definitions, standards, and evaluative reactions. *Child Development, 63*(1), 129–137.	113
9	Lee, K., Cameron, C. A., Xu, F., Fu, G., & Board, J. (1997). Chinese and Canadian children's evaluations of lying and truth telling: Similarities and differences in the context of pro- and antisocial behaviors. *Child Development, 68*(5), 924–934.	104
10	Wimmer, H., Gruber, S., & Perner, J. (1984). Young children's conception of lying: Lexical realism—moral subjectivism. *Journal of Experimental Child Psychology, 37*(1), 1–30.	88

Table 13: Top 10 most cited articles related to child deception detection and lie detection

	Articles	Citation counts
1	Vrij, A., Akehurst, L., Soukara, S., & Bull, R. (2004). Detecting deceit via analyses of verbal and nonverbal behavior in children and adults. *Human Communication Research, 30*(1), 8–41.	88
2	Feldman, R. S., Jenkins, L., & Popoola, O. (1979). Detection of deception in adults and children via facial expressions. *Child Development, 50*(2), 350–355.	83
3	Goodman, G. S., & Melinder, A. (2007). Child witness research and forensic interviews of young children: A review. *Legal and Criminological Psychology, 12*(1), 1–19.	82
4	Leach, A.-M., Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2004). "Intuitive" lie detection of children's deception by law enforcement officials and university students. *Law and Human Behavior, 28*(6), 661-685.	63
5	Orcutt, H. K., Goodman, G. S., Tobey, A. E., Batterman-Faunce, J. M., & Thomas, S. (2001). Detecting deception in children's testimony: Factfinders' abilities to reach the truth in open court and closed-circuit trials. *Law and Human Behavior, 25*(4), 339–372.	59
6	Talwar, V., & Crossman, A. M. (2012). Children's lies and their detection: Implications for child witness testimony. *Developmental Review, 32*(4), 337–359.	48
7a	Crossman, A. M., & Lewis, M. (2006). Adults' ability to detect children's lying. *Behavioral Sciences & the Law, 24*(5), 703–715.	43
7b	Edelstein, R. S., Luten, T. L., Ekman, P., & Goodman, G. S. (2006). Detecting lies in children and adults. *Law and Human Behavior, 30*(1), 1–10.	43
8a	Feldman, R. S., & White, J. B. (1980). Detecting deception in children. *Journal of Communication, 30*(2), 121–128.	41
8b	Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2006). Adults' judgments of children's coached reports. *Law and Human Behavior, 30*(5), 561–570.	41
9	Lee, K., Cameron, C. A., Doucette, J., & Talwar, V. (2002). Phantoms and fabrications: Young children's detection of implausible lies. *Child Development, 73*(6), 1688–1702.	38
10	Vrij, A., Akehurst, L., Brown, L., & Mann, S. (2006). Detecting lies in young children, adolescents and adults. *Applied Cognitive Psychology, 20*(9), 1225–1237.	36