The Diffusion of Evidence-Based Practice: Reviewing the Evidence-Based Practice Networks in the United States and German-Speaking Countries

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Abstract

Evidence-based practice (EBP) has had a major influence on U.S. social work while it has rarely been adapted in German-speaking countries. This study investigates how knowledge about EBP is diffused within and across geographical contexts. Network analysis methods reveals different diffusion patterns and provide reasons for these differences. For example, the U.S. discourse is self-contained and based on a more homogeneous knowledge base, while the German discourse is more heterogeneous and focuses on a notion of reflexive professionalism. The different conceptual influences within the U.S. and German discourses are discussed in light of future directions of disciplinary social work.

Evidence-based Practice in Social Work

The question of whether social work can be considered a science has led to thought-provoking debates among scholars (Brekke, 2012; Briar-Lawson, 2012; Longhofer & Floersch, 2012; Marsh, 2012; Shaw, 2014, 2016; Sommerfeld, 2014). Brekke (2012) suggested that social work is poised to define itself as a science because of its research productivity. His argument focused on social work in the United States. Perron and colleagues (2016) provided evidence of the vast growth of social work research worldwide, as indicated by the ongoing founding of new journals in the discipline. The growth of scientifically generated knowledge and the claim that social work is conceived as a profession (Abbott, 1988; Sommerfeld, 2014)—although this professional status is unclear or even rejected by some scholars (see Staub-Bernasconi, 2013, for a summary about the corresponding discussion in German-speaking countries)—has led to increasing attention on the intersection of scientific knowledge and practice.

According to the analysis of Okpych and Yu (2014), the orientation towards scientifically generated empirical knowledge is a fundamental part of the current paradigm in social work practice. Their analysis identified the empirical clinical practice movement (cf. Reid, 1994) as the starting point of a new paradigm, whereas the model of evidence-based practice (EBP) has carried the transition forward from an authority-based to an empirically based paradigm. Other scholars have even labeled EBP itself as a paradigm (Gambrill, 2006, p. 339; Howard, Himle, Jenson, & Vaughn, 2009, p. 263; Howard, McMillen, & Pollio, 2003, p. 234).

Initially founded in medicine (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996) and transferred to social work (Gambrill, 1999), EBP describes a five-step process to address a practical problem: (1) formulating an answerable question relevant to the given problem, (2) identifying information needed to solve the problem, (3) critically appraising this information, (4) applying the results to the situation and triangulating scientific knowledge

with the given circumstances including one's own experience and the client's values and preferences, and (5) evaluating the outcome. Although this definition of EBP, often described as a bottom-up approach (Okpych & Yu, 2014, p. 25), has hardly been unchallenged, the individual understanding of EBP varies (Rubin & Parrish, 2006). This confusion might be at least partly caused by interpreting the term EBP as advocating research-supported interventions (cf. Downing, 1996; Thyer, 2015), which is often referred to as a top-down approach (Gambrill, 1999).

EBP has been extensively discussed, especially in the United States, where the Journal of Evidence-Informed Social Work (formerly the Journal of Evidence-Based Social Work) was founded. The historical analysis of social work practice by Okpych and Yu (2014) also focused on the developments in the United States. Hence, their analysis did not answer whether the major influence of EBP on social work practice is evident in other geographical contexts as well. EBP has also had a crucial influence on other countries such as Australia (Barber & Dunston, 2004), England (e.g., Sheldon & Chilvers, 2004), and Sweden (Sundell, Soydan, Tengvald, & Anttila, 2010). For instance, a citation analysis revealed evidence of the influence of EBP beyond the United States (Hodge, Lacasse, & Benson, 2012). According to that study, the British Journal of Social Work article by British author Stephen Webb (2001), which critically reflected on EBP, has received more attention than any other article published in a journal dedicated to social work (Hodge et al., 2012).

Although EBP has provoked a strong response in social work, geographical differences seem to exist. In Germany, for instance, the influence of EBP does not seem to fit the historical analysis of Okpych and Yu (2014). Students of social work in German universities are rarely taught about EBP, and many of them have never heard anything about it. Although this claim is only based on our own experiential evidence, there seems to be a crucial difference in the extent to which EBP has been adapted in social work between the founding country (the United States) and Germany. There have been attempts to elaborate on

the reasons for the different adaptations of EBP (James, 2016; Otto, 2007; Sommerfeld, 2016). These outlined differences imply the first hypothesis:

H1: The core of the EBP debate is located in the United States.

The main goal of this research is to investigate whether differences exist in the intellectual structure of the EBP discourses between two geographical contexts and why the same knowledge corpus (underlying EBP) seems to be adapted differently. Previous work might provide explanations for different adaptations of EBP in the German and U.S. discourses. For example, a recent study by Kreisberg and Marsh (2016) revealed that disciplinary social work in the United States mainly focuses on research, whereas European social work focuses on theory. Since EBP might inherently apply a research focus and neglect theory, even though considering theory is not excluded (Thyer, 2013), it might have provoked a strong response in the United States and not in German-speaking countries.

H2: The EBP discourse in the United States differs from the German discourse in terms of the focus of the publications (theory focus in German speaking countries versus empirical focus in the United States).

Knowledge diffusion in scientific disciplines

This study aims to analyze the knowledge construction processes around EBP and how the underlying knowledge has diffused in the United States and in German-speaking countries. This section introduces our theoretical perspective, as well as the hypotheses derived from it, followed by the methodological approach applied to investigate knowledge diffusion processes within the social work discipline.

Theoretical background

In the last decades, the importance of knowledge, innovations, and research has continuously grown. This development is conceptualized under the term "knowledge society" (United Nations Educational, Scientific, and Cultural Organization, 2005; Välimaa & Hoffman, 2008). There is a strong political movement aiming for more inclusive and accessible knowledge for all citizens (United Nations Educational, Scientific, and Cultural Organization, 2014). Scientific disciplines are considered central to a transition to a knowledge society and even seen as "the premier knowledge institution[s] throughout the world" (Knorr-Cetina, 1999, p. 1). Scientific disciplines ideally generate new knowledge about phenomena based on existing scholarly work. Knowledge accumulation is often proposed as ideal for scientific disciplines (Bird, 2007). However, accumulation cannot be understood as a linear process of summing up different pieces of knowledge (Abbott, 2006). Although knowledge diffusion can be defined as "the adaptations and applications of knowledge documented in scientific publications and patents" (Chen & Hicks, 2004, p. 199), it is not assumed to be a technical, linear process, as might be implied by this definition. The local standards and conventions influence the way knowledge is adapted (Crane, 1972; Knorr-Cetina, 1981; Rogers, 2003), which might lead to specific knowledge constructions and specific local accumulations (Abbott, 2001). This claim is supported by network analysis results showing a certain degree of disunification of social science disciplines hindering the dissemination of knowledge (Yan, 2014). Accordingly, it would not be surprising if scientific communities of different geographical contexts adapt EBP differently, especially if the underlying knowledge diffuses and circulates differently within certain entities, for instance, scientific communities.

Diffusion is a social process and a specific kind of communication (Rogers, 2003). Liu and Rousseau (2010) differentiated two ways of knowledge diffusion within scientific disciplines: diffusion by publications and diffusion by citations. Diffusion by publications "originates from an internal mechanism by which the group itself expands its borders" (Liu &

Rousseau, 2010, p. 340). However, publications alone are not sufficient to spread knowledge. To influence the scientific discourse, they need to be referred to by others; this is indicated by whether and how often the publications receive citations. The ways of diffusion, by publications and by citations, can be seen as complementary. The hypotheses stated earlier, as well as the next hypotheses, focus on diffusion by publications. They are based on the observation that EBP has not been adapted in Germany (James, 2016) but has had a huge influence on U.S. social work (Okpych & Yu, 2014).

> H3: EBP has been diffused through publications in the United States.
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> H4: EBP has not been diffused through publications in German-speaking countries.

Diffusion by publications is a process in which the knowledge sender (author) publishes scientifically generated knowledge that enables others (knowledge recipient) to adapt the knowledge. The publication itself is a crucial element of diffusion processes which serves as communication channel (Rogers, 2003). The diffusion process is most effective when the publications are freely available online (Davis, 2011). Although many journal publications are not freely available and many scholars have no access to specific online journals (depending on the university they are employed in), one can assume that publishing in journals compared with other publication formats, for instance, monographs, comes with a higher chance of others receiving the published knowledge. Furthermore, in most scientific disciplines, the double-blind peer-review process—which is primarily done for journal publications—might also be one reason for the scientific community to acknowledge and adopt journal publications more than other publication formats. An increase of journal publications within a scientific discipline might, therefore, go along with a more homogeneous knowledge base on which knowledge can freely flow and be exchanged. A

relatively limited knowledge exchange about EBP might, therefore, be one reason why EBP has rarely been discussed in German-speaking countries.

H5: The U.S. EBP discourse differs from the German EBP discourse in terms of the publication format (journal publications vs. other publication formats).

Besides the mechanism of knowledge diffusion through publishing, a second kind of diffusion is indicated by citations (Liu & Rousseau, 2010). Citations can be seen as a valid indicator that disciplinary knowledge flows from a sender to a recipient (Yan, 2014). Citations also indicate a semantic relationship between the citing and the cited publication (Garfield, 1994a). Despite some counterevidence to this assumption (Greenberg, 2009; Harter, Nisonger, & Weng, 1993), it is widely accepted that citation patterns can reveal intellectual commonalities or the intellectual foundation that the field is based on. They also indicate scientific communication or structural ties (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011; Cronin, 1994; Gmür, 2003; Peters, Braam, & van Raan, 1995). Accordingly, citation analyses can identify patterns of social structure, communication, and knowledge flows within scientific communities (Crane, 1972). Regarding our research focus and the assumption of differences between the EBP discourse in the United States and in German-speaking countries, particularly between "epistemic cultures" (Knorr-Cetina, 1999), this would mean that EBP publications of these two discourses differ in their intellectual structure, as indicated by different citations.

H6: The EBP discourses in the United States and in German-speaking countries are influenced by different schools of thought.

Knowledge diffusion is determined by specific citation patterns of actors within national contexts (Jaffe & Trajtenberg, 1999). Shaw (2014, p. 521) claimed that this also applies to social work and that scholars apply an "inward gaze," mainly referring to scholarly work from their own countries. Therefore, the next hypotheses are based on the assumption that scientific disciplines as well as discourses within certain disciplines are self-contained (Yan, 2014).

H7: The EBP discourse network is self-contained in the United States.

H8: The EBP discourse network is self-contained in German-speaking countries.

The consideration of citations as a proxy for knowledge flow allows for the consideration of scientific disciplines as networks. The underlying presumption is that a scientific network consists of different actors or nodes (e.g., publications), which are interconnected with other actors or nodes by ties or edges (e.g., citations). Various network concepts are applicable to investigating scientific networks (Borgatti, Everett, & Johnson, 2013). One of the most often applied concepts is centrality, which was introduced by Bavelas (1950). He investigated how structural properties of actors within groups influence the effectiveness of their communication and group performance. In general, centrality can be seen as an indicator of social capital, which provides central actors with opportunities to influence others or receive (e.g., knowledge) flows (Borgatti et al., 2013, p. 164). The more central the position of an actor in a network, the higher its structural importance. Applied to our research focus, a highly central EBP publication can be perceived as a proxy for the opportunity to forward knowledge (Haythornthwaite, 1996). Different highly central publications between two networks might therefore lead to different conceptual embeddings of the scientific discourses, which would mean that the initial knowledge about EBP is merged with other knowledge claims embedded in other publications.

H9: The EBP discourses in the United States and in German-speaking countries differ in their conceptual embedding.

The degree of knowledge flow is determined by the individual (Szulanski, 1996) and structural properties of a network (Yan, 2014). For instance, referring to Crane's (1972) concept of invisible colleges, Abbott (2001, 2006) claimed that these more or less dense networks tend to share a set of conventional assumptions. If we assume that these assumptions can be embedded in scientific publications, then a network in which a certain piece of knowledge can be diffused has to show a certain degree of homogeneity. Hence, this presumption might serve as an explanation for why EBP seems to be widely adapted in the United States and rarely adapted in German-speaking countries.

H10: The EBP discourse in the United States is more homogeneous than the EBP discourse in German-speaking countries.

Methodological approaches to investigating knowledge diffusion in scientific disciplines
To test our hypotheses, we used network and citation analyses, which will be discussed in the following sections.

Citation analyses
The rapid change in information storage and the development of software tools to analyze disciplinary information (often referred to as scientometrics) have led to increasing efforts to systematically investigate scientific communities, including social work (Perron et al., 2016). Scientometrics is a discipline dedicated to the "quantitative study of science, communication in science, and science policy" (Hess, 1997, cited by Leydesdorff & Milojevic, 2015). Largely influenced by the work of Garfield (e.g., 1972) and de Solla Price (e.g., 1965), scientometrics

has a long tradition in the analysis of citation patterns. Citation analysis has become a major method to evaluate scholarly impact in diverse disciplines. The most widespread measurements are the journal impact factor (Garfield, 1972) and the newer h-index, which is applicable on an author level (Hirsch, 2005). Despite the criticism of citation analysis for evaluating the performance of individual work (e.g., Garfield, 1998), it is commonly used as a proxy to evaluate scholarly work. This is also true for social work. In addition to the journal impact factor or related citation indexing methods applied to social work journals, citation analysis has also been used by individual scholars to systematically investigate the discipline of social work (e.g., Barner, Holosko, & Thyer, 2014; Bloom & Klein, 1995; Bush, Epstein, & Sainz, 1997; Hodge et al., 2012; Holden, Rosenberg, Barker, & Lioi, 2009; Ligon, Thyer, & Cobb, 2012; Lindsey & Kirk, 1992).

For citation analysis, different units of analysis can be applied. Citation data can be aggregated on the level of journals (e.g., Holden et al., 2009) or faculty (Barner et al., 2014). However, the most used units of analysis are authors or documents (Gmür, 2003). In this study, we focus on documents, particularly on scientific publications. Citation data can be investigated through various methods (Boyack & Klavans, 2010). The simplest form of citation analysis is the use of direct citations, that is, to count the number of citations that a specific publication, author, or journal has received. Citations can also be analyzed by considering the context in which they appear: bibliographic coupling or co-citations (Garfield, 2001). Bibliographic coupling analyzes the occurrence of the same citation in different publications. Two publications are coupled if at least one common reference appears in their reference lists. Through this method, one can investigate similar citation patterns of different authors. While bibliographic coupling searches for associations between citing publications or authors, co-citation analysis investigates associations between cited articles or authors. The number of co-citations of two publications (a pair of publications appear in one reference list) indicates the closeness of the co-cited documents or authors as perceived by the investigated

discipline (White & Griffith, 1981). Co-citations provide promising data to identify various "conversation topic[s] within the discipline" (Healy, 2013, para. 5). Hence, co-citation patterns can reveal the conceptual influence on the construction of EBP and related topics.

Science mapping

Citation analysis methods have often been combined with network analysis. This combination can be found among different methodological concepts, such as "science mapping" (Cobo et al., 2011), "scientography" (Garfield, 1994b), "bibliometric mapping" (Noyons, 1999), and "mapping knowledge domains" (Börner, Chen, & Boyack, 2003; Shiffrin & Borner, 2004). Throughout this study, we refer to science mapping when talking about network analysis based on bibliographic data (even though it is not restricted to bibliographic data, see Cobo et al., 2011). Science mapping is seen as a useful tool to "describe how specific disciplines, scientific domains, or research fields are conceptually, intellectually, and socially structured" (Cobo et al., 2011, p. 1382). The network of co-citation data, for instance, can be visualized by considering each publication as a node and each appearance with another publication within a reference list as an edge. The result would be a weighted network in which each edge has a specific weight according to the frequency a specific pair of publications is cited together within one other publication. Network analysis methods allow to map and analyze the resulting network. The spatial representation of the data can enhance the analysis process by depicting physical proximity and relative locations of individual articles or authors (Small, 1999). Science mapping techniques have also been used in social work (Baker, 1992; Martínez, Cobo, Herrera, & Herrera-Viedma, 2015). A recent study by Martínez and colleagues (2015), for instance, combined the h-index data with a co-word analysis (which and how often specific words occur together within the unit of analysis, e.g., in one article) to depict thematic networks about the evolution of the social work discipline. Network analysis includes a large number of different analytical approaches, and their description is far beyond

the scope of this article (for an elaborated introduction, see Scott, 2013). This article will focus on two basic network concepts: density and network centrality. Density describes "the general level of linkage among the points in a graph" (Scott, 2013, p. 69) and represents the ratio of actual edges between nodes to the maximum possible number of edges. The more nodes, for instance, scientific publications, are connected to each other, the denser the network will be. Applied to our research interest, a low density within a co-citation network would indicate that many of the citations appear rarely or only once within the reference lists of EBP publications. A high density would be associated with a certain degree of homogeneity of knowledge that is referred to by EBP writings. The second concept we want to introduce is network centrality. When investigating a scientific field, the use of network centrality is complementary to citation analysis methods (Yan & Ding, 2009). There are different ways of conceptualizing and measuring centrality (Borgatti, 2005). Perhaps the most widespread centrality measures are closeness centrality, betweenness centrality, and degree centrality (Valente, Coronges, Lakon, & Costenbader, 2008). This study is based on degree centrality and a variation of it called eigenvector centrality. These centrality measures are appropriate for investigating knowledge flows (Borgatti, 2005). Degree and eigenvector centrality can be subsumed under degree-like measures because they focus on the direct surroundings of a node by analyzing the direct edges with other nodes (Borgatti & Everett, 2006).

Degree centrality is measured by the number of edges a specific node has with other nodes (Borgatti et al., 2013, p. 165). Hence, it implies how well connected a node is to its surroundings and indicates the likelihood of being able to influence and becoming influenced by other nodes. In a direct network based on citations, in which each node represents either a cited publication or a citing publication (two-mode network), a node has a high degree centrality when it receives relatively many citations. A high degree centrality in a co-citation network means that a publication is often cited together with other specific publications. This

connectedness implies that the scientific knowledge of these pairs of publications flows to one another and is merged within another publication. Therefore, a publication with a high degree centrality indicates a high chance of having influence on the scientific discourse.

Eigenvector centrality takes into consideration how well connected the node connected to the analyzed node is (Bonacich, 2007). It can be seen as a variation of degree centrality in which the adjacent node is weighted by its centrality (Borgatti et al., 2013, p. 168). In contrast to a simple degree centrality, this can lead to a low centrality of a highly connected node if this node is connected to only low central nodes. Accordingly, a node can have a high eigenvector centrality if it is connected to only a few other nodes and these adjacent nodes have a high centrality. Hence, in a co-citation network, a low-cited publication can also highly influence the scientific discourse if it is often cited together with one central publication. For our analysis of EBP networks, this means that a rarely cited publication has a high "risk" (Borgatti, 2005, p. 61) of influencing the discourse if its citations occur together with the first article about EBP in social work by Gambrill (1999), which is assumed to be a central one within the discourse.

Method

Literature search and data preparation

A comprehensive literature search was conducted to identify publications relevant to the research questions. Since we expected to find most of the publications of German authors in printed books, a search strategy that went beyond the common databases was necessary. Therefore, the search started with the most common generic and specific databases and was stopped to search other databases once no additional publications could be identified (cf. Blanke, Bandemer, Nullmeier, & Wewer, 2005, p. 100). We retrieved records from the following databases: Social Service Abstracts, Social Citation Index, Education Resources Information Center, PsycINFO, SocIndex, Scopus, ProQuest Social Sciences, Sociological

Abstracts, Wirtschaft and Soziales, Psyndex, Sozialwissenschaftliches Fachportal, Bielefeld Academic Search Engine, FIS Bildung, Fachportal Pädagogik, PubPsych, and DZI Solit. We also searched the databases of Social Care Institute for Excellence, the Journal of Evidence-Informed Practice, Google Scholar, and Google Books. In all these databases, we searched for publications fulfilling the following inclusion criteria:

- Title includes "evidence-based practice" OR "evidence-informed practice" OR "evidence-based social work" OR "evidence-informed social work" AND "social work" included in keywords OR journal title OR subject terms OR title

- Published from 1996 to 2015

- Language: German OR English

This search strategy was complemented by a hand search, which proved to be relevant especially for German publications. A snowball search (Petticrew & Roberts, 2006) was applied until we could no longer find new publications. We eventually identified 961 publications. After excluding 211 duplicates, we ended up with 750 publications for further screening (see Figure 1). Through this screening, we identified 18 publications that have been published more than once. For instance, sometimes a journal article was also found as a book chapter. We only excluded these double publications if they were 100% identical. Due to this clear operationalization, an interrater reliability check was not necessary. The same is true for the exclusion of book reviews (n = 86) and the exclusion of publications from other disciplines (n = 27). If the term "social work" was not found within the publication, it was not considered part of the disciplinary social work discourse. One record was excluded because the existence of the publication could not be verified by a hand search.

We recognized that many of the remaining publications did not seem to report any relevant information about EBP itself but rather presented research-supported interventions that do not reflect the conceptual background of EBP. Therefore, we decided on two more exclusion criteria: First, we excluded those publications in which the inclusion terms

regarding the title did not appear in a row (n = 92). We inferred this criterion from the finding that many titles had a structure like "Therapy X: An evidence-based approach for social work practice" (fixed terms such as "evidence-based policy and practice" were not excluded). Second, we excluded publications using the plural "evidence-based/-informed practices" in the title. Those publications usually focus on research-supported interventions and are, therefore, not relevant to our research questions. After these exclusion processes, the result was 482 publications (worldwide).

INSERT FIGURE 1 ABOUT HERE

Since many of the stated hypotheses focus on a comparison of the EBP discourses in the United States and in German-speaking countries, we had to identify the corresponding publications from the remaining sample. Therefore, each publication was coded by the affiliation of the first author. For instance, a publication written by a first author from the United States was considered part of the disciplinary discourse in the United States. German-speaking countries included Germany, Austria, and Switzerland. One publication from South Tyrol in Italy (which is mainly a German-speaking region) was also classified as originating from a German-speaking country. From the identified German and U.S. samples, we had to exclude records of edited book authorships, which led to 302 publications written by U.S. authors and 33 written by German-speaking authors.

A further screening of the German and U.S. samples still showed that many of the remaining publications did not provide any definition of or reflections on EBP. Hence, another exclusion criterion was applied, namely, the exclusion of non-conceptual contributions, as indicated by publications reporting on research findings or practice reports. Two independent coders coded 50% of the publications (n = 166) based on three categories:

mainly empirical (publications presenting primary data and systematic reviews), mainly conceptual (publications conceptually elaborating on EBP), and technical (publications presenting concrete practice projects, such as the presentation of a school of social work or the implementation of an intervention in a specific organization). The coding reached an appropriate interrater reliability with a Cohen's kappa value of 0.82. The remaining conceptual EBP publications from the United States (N = 209) and German-speaking countries (N = 26) served as the basis for further analyses.

Operationalization of variables

Table 1 summarizes the operationalization of the other variables under study. The operationalization of the diffusion of EBP (H3 and H4) is based on Chen and Hick's (2004) argument that knowledge diffusion has occurred if the number of publications exponentially increases. For the comparison of the most central publications within both networks (H6–H9), we excluded the founding publications represented by Gambrill's article (1999), which transferred EBP from medicine to social work, aswell as Sackett and colleagues' (1996) article, which is often claimed to be the first work about evidence-based medicine (although it can be seen as a collaborative result of the Evidence-Based Medicine Working Group established in the early 1990s; cf. Evidence-BasedMedicineWorking Group, 1992). Besides these two publications, we also excluded the first textbook about evidence-based medicine (Sackett, Straus, Richardson, Rosenberg, & Haynes, 1997, 2000). This book is considered the first publication to systematically summarize the origins and underlying concepts of evidence-based medicine (Gambrill, 2010). The rationale behind this exclusion is that most EBP publications refer to these articles and aim to investigate differences regarding the links between the initial EBP idea and other disciplinary knowledge.

Network construction

The present study aims to examine, among other topics, which concrete intellectual ideas have had an influence on the EBP discourses. Therefore, for a small-grained analysis, scientific publications representing concrete ideas were used as the unit of analysis. We retrieved each reference from 26 German publications. To make the German and U.S. citations comparable, we took a random sample of 26 U.S. publications and retrieved the citations from this sample. Since our samples included many monographs and book chapters, it was not possible to process this data retrieval automatically (for most journal publications, it is possible to automatically retrieve the references from different databases, such as Web of Knowledge). Hence, we manually transferred the references (N = 2,823) to Microsoft Excel and prepared a two-mode matrix with two dimensions: the citing documents and the cited documents (cf. Everett & Borgatti, 2013). On the one hand, this matrix represents a directed network, which means that the knowledge from the cited document flows to the citing document. On the other hand, the resulting network is unvalued, since the matrix includes only ones and zeros (document A cites or does not cite document B). The resulting network was used to test H1–H5.

Since we were also interested in the influence of the cited documents, we excluded the dimension of the citing documents and transformed the two-mode network into a one-mode network (through a specific feature provided by UCINET; cf. Borgatti, Everett, & Freeman, 2002), which represents an undirected network. This matrix is called co-occurrence matrix (cf. Leydesdorff & Vaughan, 2006) because both dimensions are equal and the values in the cells represent how often two documents co-occur within one citing document. Since the values can be greater than one, this kind ofmatrix represents a valued network. For instance, if

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document A co-occurs with document B four times, the edge between them has a weight of four.

Some scholars have suggested normalizing the data for science mapping techniques (Martínez et al., 2015). However, there are ambiguous standpoints on how to do so and whether co-occurrence matrices should be normalized (Leydesdorff, 2007; Leydesdorff & Vaughan, 2006; Wallace, Gingras, & Duhon, 2009; Waltman & van Eck, 2007). To yield a more empirically valid picture, we decided to follow the suggestion by (Wallace et al., 2009) to use raw data. Normalization was not required because we did not apply advanced networking methods. The constructed co-citation networks consisted of 1,389 nodes with 126,092 edges for the U.S. sample and 833 nodes with 33,442 edges for the German sample.

In terms of centrality measures, several different methods have been developed for weighted networks (Opsahl, Agneessens, & Skvoretz, 2010). Although different measures often correlate with each other, they can be considered related but still distinct concepts (Valente et al., 2008). For instance, in the case of eigenvector centrality, if there are a few high-degree nodes connected to many low-degree ones, which we can expect in our citation data, then the result might differ from the results of other centrality measures (Bonacich, 2007). Therefore, different centrality measures are complementary to each other. Due to the underlying concepts introduced above (see "Science mapping"), we used eigenvector centrality and degree centrality. Degree centrality was calculated on weighted degrees, defined as the sum of each co-occurrence of a publication with another publication (Borgatti et al., 2013, p. 178f). These two measures can be applied to weighted networks without any significant modifications. To depict the network and to calculate and represent the centrality outcome, we used Gephi, a network visualization software (Bastian, Heymann,&Jacomy, 2009). The graph drawingwas based on the algorithm of Fruchterman and Reingold (1991).

Results

Diffusion of EBP by publications (RQ1)

EBP publications worldwide (H1)

Hypothesis 1 states that the core of the EBP discourse(s) is located in the United States. Table 2 shows the distribution of EBP publications by country. Since German and English written publications were included, Germany and Switzerland had a relatively high number of publications. Most of the publications were written by authors from the United States, which verifies our hypothesis.

INSERT TABLE 2 ABOUT HERE

Empirical versus theory focus (H2)

Hypothesis 2 assumes differences between the U.S. discourse and the German-speaking discourse regarding the focus of the publications. It is assumed that the U.S. discourse have a stronger focus on empirical work while the German discourse applies a theory focus. Out of the 302 EBP publications from the United States, 85 (28.15%) were identified as mainly empirical, eight (2.65%) as technical, and 209 (69.2%) as mainly conceptual. The German sample consisted of three (10.34%) empirical and 26 (89.66%) conceptual publications. Although these results show that the U.S. discourse applies a stronger research focus, conceptual publications were the most common in both samples. A statistical comparison of the conceptual and empirical publications from both samples (technical publications were not considered for this analysis since it was not relevant to the hypothesis under study) confirmed a significant association between the country and the type of publication, $\chi2\ (1) = 4.59$, $p < .05$.

Diffusion of EBP through publications (H3 and H4)

Hypotheses 3 and 4 state that a process of EBP diffusion has happened in the United States but has been absent in German-speaking countries. To depict the dynamics of the publication patterns, the years of publication (of conceptual EBP publications) are compared in Figure 2. The figure shows that the discourse about EBP in the United States started to increase immediately after the article by Gambrill was published in 1999. The discourse reached its peak in 2008 with 32 publications and started to diminish afterwards. It should be noted, however, that the number of publications per year has increased since 2013. In the sample of German-speaking countries, the first article was published in 2005. The most publications per year, namely five, appeared in 2012. Overall, there are fewer publications per year from German-speaking countries, and there appears to be a consistent time lag of 1 to 3 years, with increases and decreases showing a similar pattern as the United States. Regarding the hypothesis that a diffusion of EBP has occurred in the United States, the results show that there have been two phases of diffusion, as indicated by the exponential growth of the number of publications between 1999 and 2004, as well as between 2005 and 2008. The absence of this growth in the German sample provides evidential support for H4.

INSERT FIGURE 2 ABOUT HERE

Publication formats (H5)

Table 3 depicts the publication formats of the identified conceptual EBP publications. It supports our hypotheses that conceptual knowledge about EBP is mainly spread through journal publications in the United States (58.37%) and through other publication formats (chapters and monographs) in German-speaking countries (61.54%). This difference barely missed statistical significance, $\chi2$ (1) = 3.72, p = .054. Nineteen out of the 26 publications in

the German sample are written in German. Moreover, the analysis identified two journals that seem to represent the main communication channel for EBP knowledge: Research on Social Work Practice and Journal of Evidence-Informed Social Work.

INSERT TABLE 3 ABOUT HERE

Diffusion of EBP by citations (RQ2)

Influence of different schools of thought (H6)

The next step in the analysis was to test the assumption that different schools of thought underlie the EBP discourses in the United States and in German-speaking countries. Table 4 provides an overview of publications frequently cited by the EBP publications under study. The 10 most cited EBP publications of U.S. authors include the canonical works about evidence-based medicine by Sackett and his colleagues (1996, 2000; Straus, Richardson, Glasziou, & Haynes, 2005), as well as about EBP in social work by Gambrill (1999, 2013) and Gibbs (2003). Publications about practice guidelines have also influenced the U.S. discourse (Howard & Jensen, 1999; Rosen & Proctor, 2003).

Among the most cited publications within the German discourse network is one by McNeece and Thyer (2004) proposing a hierarchy of evidence. The article by Webb (2001) challenging the validity of EBP is also highly cited within the German sample, in addition to Pawson's (2002) work, which challenges the consideration of meta-analyses as the gold standard for EBP (cf. McNeece & Thyer, 2004). Moreover, the works by Hüttemann (2006) and Otto and Ziegler (2006) are highly cited German publications critically appraising the underlying concepts of EBP, particularly the concrete application of EBP in German-speaking countries. Ideas of reflexive professionalism (Dewe & Otto, 2012) or, more generally, a hermeneutic-oriented theory of professionalization (Oevermann, 1996) can also be found in

these most cited publications. These findings support the claim that different scientific knowledge has influenced the German and U.S. discourses.

INSERT TABLE 4 ABOUT HERE

Self-contained EBP networks (H7 and H8)

Hypothesis 7 states that the majority of the most cited publications within the U.S. discourse network are written by authors from the United States. After excluding the founding papers (see "Operationalization of variables"), the U.S. network includes seven most cited papers by authors from the United States and three by authors from other countries (Table 4). This indicates a self-contained network. Hence, H7 can be verified. In contrast, H8 is rejected because the most cited publications referred to by German authors were mainly written by authors from other countries (four from German-speaking countries and six from other countries).

Conceptual embedding of the EBP discourses (H9)

Hypothesis 9 implies different knowledge construction processes by stating that the conceptual embedding of EBP differs between the German and U.S. discourses. Figure 3 and 4 present spatial representations of the co-citation networks of both samples. The black nodes indicate highly central positions based on eigenvector and degree measures. Each cluster depicted within the whole network represents a reference list of a specific publication under study that is more or less connected with the core of the networks. As shown in Figure 3 (right), some publications are co-cited within one document but rarely connected across different documents. For instance, the distant cluster on the lower left is rarely connected to the main network. The most central (black) nodes seem to be distributed among two different groups. The enlarged network (left) shows the labels of the most central nodes. The nodes at

the core of the network (lower right corner) appear to be the most central ones; these publications are also among the most cited publications.

INSERT FIGURE 3 ABOUT HERE

INSERT FIGURE 4 ABOUT HERE

Besides these most cited publications, other publications seem to influence the EBP discourse in the United States. For instance, the code of ethics by the National Association of Social Workers (NASW, 1996) has the highest eigenvector centrality (see Table 5). The accreditation standards by the Council on Social Work Education (CSWE, 2008) also have a high eigenvector centrality. The code of ethics and the accreditation standards are not among the most highly cited publications, nor do they show a high degree centrality. This means they are co-cited with relatively central publications. The same is true for Guyatt and Rennie's (2002) manual for evidence-based clinical practice. In addition, we identified several central publications that focus on clinical contexts (American Psychiatric Association, 2000; Chambless & Hollon, 1998; Institute of Medicine, National Academy of Science, 2001). Contributions about critical thinking skills appear to be influential publications as well (Gambrill, 2013; Gibbs & Gambrill, 1999).

Furthermore, the results indicate that the discussion about the role of theory in research (Marsh, 2004) and practice (Green, 2000) has an influence on the EBP discourse in the United States. Although both publications do not appear among the most central ones, they are depicted in Figure 3 due to their high eigenvector centrality (0.97). Both authors advocate the importance of theory. The same applies for the research article by Bledsoe and colleagues (2007; eigenvector centrality = 0.97), which shows that most social work training programs in the United States do not offer training for empirically supported psychotherapy.

Figure 4 represents the co-citation network of the German sample. The whole network (right) shows two independent networks. On the rightmost side, we can see a small network that is unconnected to the main network. This means that the references found in one EBP publication were not found in any other publication. Setting aside this isolated network, the big network indicates an interconnected EBP discourse. In addition, there seems to be a core of publications that highly influence the discourses. These core publications are depicted in the enlarged image on the left side. The image shows that the publication by McNeece and Thyer (2004) has the highest degree centrality, which is confirmed by the centrality outcomes in Table 5. The lower part of the network shows relatively dense connections between different central publications. Since direct citations and degree centrality are related to each other, the highly cited publications are found in the core network (Table 5). For example, Pawson and Tilley's (1997) influential publication about "realistic evaluation" often appears in the German EBP discourse. Their theory-driven evaluation approach emphasized the need to consider the context and underlying mechanisms when evaluating practice outcomes.

Moreover, several other highly central publications did not appear in the list of highly cited publications. For instance, a high eigenvector centrality and a high degree centrality were found for the conference report by Kindler (2005) about evidence-based diagnosis. Schmidt's (2006) article, which advocated the advantages of EBP, also has a high degree centrality. A high eigenvector centrality was also found for Grove, Zald, Lebow, Snitz, and Nelson's (2000) meta-analysis about the accuracy of clinical judgement versus mechanical prediction, as well as for Ziegler's (2003) critical publication in which he associated EBP with managerialism and the risk of losing professionalism.

In conclusion, the founding publications of EBP are embedded differently within other scientific knowledge. The U.S. discourse and the German discourse do not share a single publication that appeared as highly central in both networks.

Homogeneity of EBP discourses (H10)

The final analysis aimed at testing our assumption that the co-citation network of the EBP discourse in the United States is more homogeneous than that of German-speaking countries. For this analysis, the co-citation network was treated as an unvalued network for two reasons: (1) to avoid the unclear definition of density in weighted networks (Scott, 2013), and (2) because the result based on an unvalued network is considered sufficient to interpret the overall connectedness of the EBP discourse. Scott (2013) emphasized the problems related to the comparison of the density of two differently sized networks. A larger network (in our case, the U.S. network) tends to result in a lower density value. Since the results even show a higher density in the larger U.S. network (0.131) than in the smaller German network (0.097), we can conclude that the U.S. discourse is based on a more homogeneous intellectual ground.

Discussion

In this section, we discuss the findings in relation to the two research questions: (1) how EBP is diffused by publications, and (2) how EBP is diffused by citations. We also relate these findings to our own experiences with EBP discourses in the United States and in German-speaking countries. The interpretation of science mapping results requires specific knowledge about the domain, particularly about the discourse under study (Cobo et al., 2011). In addition, the results were discussed with two domain experts from Switzerland and Germany. Although we are familiar with both EBP discourses, we want to encourage other scholars to complement our interpretations with their disciplinary experiences.

Diffusion of EBP by publications (RQ1)

Our analysis located most of the EBP publications in the United States (H1). Out of 482 publications, 310 were written by first authors affiliated in the United States. The second most productive country is the United Kingdom, with 67 publications. Regarding the publications from German-speaking countries, we included publications in both the German and English language, which means that the numbers cannot be compared with those of other countries whose native language is not German or English. Furthermore, it would be interesting to relate the absolute number of EBP publications to the total number of social work publications of each country. Although we have not done this yet, one might speculate that, for instance, Sweden would have a high percentage compared with other countries, with 22 EBP publications out of all social work publications.

The U.S. publications include more empirical work than the German sample (H2). Although the majority of EBP publications from the United States focus on theory as well, research publications were identified three times more often within the U.S. sample than the German sample (30.8% vs. 10.34%). This difference was found to be statistically significant which supports previous findings that revealed a stronger research orientation in the United States than in Europe (Kreisberg & Marsh, 2016). This research orientation might be one reason why EBP could be diffused in the United States and not in German-speaking countries, since EBP can be considered atheoretical in nature (Thyer, 2013).

The comparison of the publication years of conceptual EBP publications in German-speaking countries and the United States revealed major differences (H3 and H4). A diffusion of EBP has never happened in German-speaking countries (H4). One explanation for this might be the preferred communication channel (H5). The majority of contributions in the German sample were not published in disciplinary journals (and only one out of 26 were published in international journals, which hinders the general exchange of knowledge), whereas most EBP publications in the United States have appeared in journals. It is important

to consider that the results were very close to being significant (p = .054). Even though our hypothesis has to be formally rejected, this finding indicates a very strong tendency toward different publication habits in the United States and in German speaking countries. Since we assume that our sample was comprised of most written (conceptual) EBP publications, the descriptive difference can also be considered as meaningful evidence for future debates and research. The identified tendency of U.S. scholars to use journals as communication media might have supported the diffusion of EBP in the United States (H3). Our analysis revealed two periods of diffusion in theUnited States. The first diffusion process seemed to be triggered by the seminal work of Gambrill (1999). Although the number of publications dropped from 2004 to 2005, a second diffusion process was observed within the following years. Six years after the first EBP publication was published (Gambrill, 1999), the first publication appeared in German-speaking countries. An international conference about EBP organized by Otto and colleagues at the Centre of Social Service Studies (University of Bielefeld) in 2005 can be seen as an important driver for bringing EBP into the German scholarly discourse. Moreover, the comparison of publication years revealed that the times in which many EBP publications appeared in the United States might have led to a growth of publications in German-speaking countries. However, since the German sample is small, this assumption has to be tested in further research.

Regarding the progression of EBP publications, we want to point out what might be interpreted as a revival of EBP. In the United States, we found a peak of publications in 2008 and a decrease afterwards that lasted until 2013. However, in the following two years, the number of publications increased again. In the timeline of publications from the United States and German-speaking countries, there was a period of start-up in the United States that was followed a few years later by German-speaking countries. Furthermore, a similar pattern (although with a lower number of publications) can be discerned in the number of

publications in the U.S. and German groups, but a time lag exists between the pattern in the United States and the pattern in German-speaking countries.

Although it is not represented in our data, EBP is currently attracting attention in German-speaking countries. Our review included articles that were published until December 2015. At the time of writing, it was already clear that an edited book would be published in 2016 with at least five chapters fulfilling our inclusion criteria (Borrmann & Thiessen, 2016). This edited book is based on contributions from a 2015 conference held by the German Social Work Association (Deutsche Gesellschaft für Soziale Arbeit) dedicated to the topic of EBP. These observations fit our general impression that EBP has recently become more important within the discipline. However, the development has to be further observed to verify our hypothesis of a revival of EBP.

Diffusion of EBP by citations (RQ2)

Network analysis methods were used to answer the question of how knowledge about EBP has been diffused by citation patterns. The analyses identified some key players whose publications are highly influential in both the U.S. and German discourses. Specifically, different publications of Sackett and colleagues (1996, 2000) and Gambrill (1999) are central contributions. This finding is not surprising since a conceptual work about EBP without making reference to the origin of EBP would be incomplete. Other publications by Gambrill (2001, 2013) are frequently cited in both samples, which might be partly influenced by the "Matthew Effect." According to Merton (1968, p. 58), "the Matthew effect consists in the accruing of greater increments of recognition for particular scientific contributions to scientists of considerable repute and the withholding of such recognition from scientists who have not yet made their mark." This effect might be evident not only in citations for Gambrill but also in citations for all scholars of considerable reputation in the corresponding

communities. Of course, this does not raise any objections to the scientific value of these contributions.

Interestingly, the publications by Sackett and Gambrill are the only ones central in both networks. None of the centrality measures identified additional publications central in both discourses. The findings imply crucial differences regarding the conceptual influence in discussing EBP in German-speaking countries and theUnited States (H6,H9).One specific finding among the German sample is the influence of the notion of reflexive professionalism on EBP, as indicated by some of the most cited titles (see "Further interpretations"). This might be caused by the specific historical evolution of German social work. The theoretical work in Germany has been strongly influenced by social pedagogy rooted in the humanities, which has led to many popular theories following a hermeneutical and phenomenological tradition (Lambers, 2012). Another influential difference regarding the constitution of social work in both countries is that U.S. social work has a strong focus on clinical contexts, particularly on "psychologically grounded practice" (Epstein, 2016, p. 495), whereas a systemic/system-theoretical paradigm is claimed to be predominant in Germany (Miller, 2010). These differences might have hindered the diffusion of EBP in German-speaking countries since both the norms of social systems, as well as the perceived compatibility of an innovation with the own values and past experiences is key for a successful diffusion process (Rogers, 2003).

Contrary to our expectations (H8), the present study provided evidence that the German discourse is not self-contained.Most of the analyzed citations refer to work outside of German-speaking countries. However, the U.S. discourse is self-contained, as indicated by the studies mainly citing publications from the United States (H7). This difference might support the findings that local standards predict the way knowledge is adapted (Knorr-Cetina, 1981). If the knowledge diffused by citations was constructed within the authors' own community, it might have a higher chance of being adapted since it already reflects the local conventions,

methodologies, and assumptions. Given the assumption of disunified social science disciplines (Yan, 2014), knowledge from other geographical contexts might be hindered from flowing into another entity (Jaffe & Trajtenberg, 1999), which might explain why EBP was never diffused in the German discourse. The German EBP discourse also seems less unified than the U.S. discourse, as indicated by its lower density (H10). Concrete scientific claims, represented by our unit of analysis, namely scientific publications, are less connected in German-speaking countries. Since knowledge diffusion requires knowledge flow between a sender and a recipient, this finding can further explain why EBP has been diffused in the United States but not in German-speaking countries.

Further interpretations

Before presenting further interpretations about the findings, it should be emphasized that these interpretations are based on our own educated guesses and not supported by additional research methods. Hence, a more in-depth analysis is needed to support our claims.

We have the impression that the German discourse is strongly based on criticism about the underlying concepts of EBP (e.g., Otto & Ziegler, 2006; Webb, 2001; Ziegler, 2003). Of course, there are also central publications tending to advocate EBP (Kindler, 2005; Schmidt, 2006). However, compared with the U.S. sample, the increased number of critical publications within the German sample is remarkable. The critique might be based on an assumed hierarchy of evidence inherent in EBP, as indicated by the fact that the article of McNeece and Thyer (2004) was the most central publication (based on direct citations and degree centrality). In their article, they proposed a hierarchy of evidence and defined meta-analysis as the gold standard, followed by randomized controlled trials (RCTs). The high citation count of the work by Pawson (2002), which challenged the value of meta-analyses, might be a direct reaction to this hierarchy. The same might be the case for the high centrality of the study by Pawson and Tilley (1997), which proposed a realistic evaluation approach and

emphasized the crucial role of context and mechanisms underlying practice outcomes. For instance, Otto, Polutta, and Ziegler (2010) used the reference to Pawson and Tilley (1997) to point out the weaknesses of RCTs in generating mechanisms of causal effects. Otto underpinned this critique by referencing Shadish, Cook, and Campbell's (2002) work about experimental research (which is also highly cited within the German sample), in which they described this weakness of experimental studies.

In conclusion, the existence of an overarching hierarchy of evidence is largely rejected (Gambrill, 2015; Rubin, 2015) even though an evidence hierarchy is undoubtedly applicable in relation to specific questions (for instance, RCTs can be seen as the gold standard for efficacy questions due to their high internal validity). In this regard, it is interesting that alternative considerations about this topic were not influential in the German network, although the topic seems to be at the core of the discourse (e.g., Fisher, 2013; Gambrill, 2006, 2015; Gray, 2001; Mullen, 2016; Petticrew & Roberts, 2003). Much effort is put into arguing against the hierarchy, although the question of whether a hierarchy exists has, internationally speaking, tended to become obsolete. As Hüttemann (2006) and Gambrill (2015) pointed out, the discussion about qualitative versus quantitative research and positivism versus interpretivism might distract our attention from the potential of EBP to further develop the professional ground of social work. Nevertheless, there might be a well-justified critique on the concrete application of EBP, such as how social policy has adapted and then transformed the underlying ideas of EBP (cf. Otto, 2007; Ziegler, 2003). Regardless of the content of these debates, the underlying conflict between measurement and meaning might be inherent in scientific disciplines (Abbott, 2001).

In contrast to the German critical perspective, most scholars in the United States seem to agree on the importance of EBP. The underlying rationale might be as follows: First, attempts to foster social workers' application of scientific knowledge have failed. The authors of the publications under study (Jenson, 2005, p. 131, 2007, p. 570; Mullen, Bledsoe, &

Bellamy, 2008, p. 325) often referred to the highly influential work by Kirk and Reid (2002) to support their call to enhance EBP skills. Second, a closer look at the publications citing the most central publication, namely the code of ethics by the (NASW, 1996), shows that this code of ethics is cited because of the stated requirements for practitioners to apply research-supported interventions (e.g., Farley et al., 2009, p. 247; Macgowan, 2006, p. 4f). This is similar to the cited accreditation standards by the CSWE (2008) that also require social workers to apply research-supported interventions. This is interesting because Gambrill (1999), in her seminal publication, criticized the frequent use by social work of these kinds of authorities to justify professionalism.

We further interpret the findings as an indicator of a conceptual focus in German-speaking countries and a pragmatic focus in the United States. This claim is supported by the finding that the majority of the 10 most cited publications are about how to teach or practice EBP (or also "critical thinking"; cf. Gambrill, 2013), including work about practice guidelines. Moreover, EBP in the United States seems to be influenced by the notion of EBP as a top-down approach, which is shown by the corresponding central publications (e.g., Bledsoe et al., 2007; Chambless & Hollon, 1998). Besides the entanglement with management aspects (cf. Ioannidis, 2016), this might be one reason for the critical perspective in German-speaking countries, since a sole application of scientific knowledge is widely seen as inappropriate from a specific profession-theoretical point of view (Dewe, 2013; Otto, Polutta, & Ziegler, 2009).

The German discourse is highly influenced by profession-theoretical work by Dewe and Otto (2012), Hüttemann (2006), Oevermann (1996), and Otto and Ziegler (2006). On the one hand, there were publications under study directly relating EBP to a reflexive professionalism (e.g., Otto et al., 2009). On the other hand, the analysis revealed several highly central publications advocating reflexivity as a feature of professional action. For instance, the publication by Dewe and Otto (2012) about this topic appeared to be highly

central in all three analyses (direct citations and centrality measures of co-citations). The same applies to the professionalization theory by Oevermann (1996), which is related to the notion of reflexive professionalism because it requires that social workers have justifications for conducted interventions and for "substitutional problem solving," which goes along with the ability of hermeneutical judgements. The related focus on case-based and reconstructive problem-solving approaches has already been described as a specific difference between the German and U.S. EBP discourses (James, 2016). In conclusion, the results indicate that the U.S. discourse aims to answer the question of how EBP can be implemented, whereas the German discourse aims to answer the question of whether it should be implemented.

The U.S. writings seem to focus less on major theoretical work. Although two of the identified central publications emphasize the need to link theory with EBP (Green, 2000; Marsh, 2004), we could not identify a clear theoretical position towards which the discourse is (explicitly) oriented. The impression of a lack of theoretical contributions among the most central publications within the U.S. discourse must be seen as relative to the German sample. Of course, there is elaborated theoretical work embedded in several of those publications (e.g., Gambrill, 1999, 2013; Gray, 2001; Kirk & Reid, 2002; Rosen & Proctor, 2003). However, to infer theory patterns that mainly influence the U.S. discourse, a more in-depth analysis is needed.

Limitations and conclusions

Although the present study is, to our knowledge, the first one to empirically investigate differences between EBP discourses, the results have to be interpreted against the background of several limitations.

First, the a priori definition of two clusters can be challenged. One might argue that the German and U.S. discourses should not be assumed as separate, because different discourse boundaries might exist beyond national borders. Hence, the next step should be to

run a cluster analysis of the whole citation database (German and U.S. publications). This additional analysis might identify different networks, particularly epistemic cultures (Knorr-Cetina, 1999), spanning beyond national borders.

Second, we are well aware of the existence of more publications conceptually elaborating on EBP. For instance, some publications have titles containing idiomatic expressions that do not allow us to infer the content. For instance, Schrödter (2005) entitled his article about evidence-based practice "Will the Dodo Bird Also Be Hunting Social Work?" Those titles are hard to capture through a comprehensive literature search based on bibliometric information. For the sake of scientific rigour and for our literature search to have the appropriate level of specificity and sensitivity, we decided to stick to the inclusion and exclusion criteria described earlier.

Third, our decision against normalizing the co-citation data leads to an increased likelihood of a high centrality outcome for citations occurring within a long reference list. This mechanism has to be considered especially for the German sample since it included four monographs with long reference lists (compared with one in the U.S. sample). For instance, we can assume that this effect led to the high centrality of Schmidt (2006), which only received three direct citations but was cited within two monographs.

The last limitation is the fact that the analysis regarding H7 and H8 (self-contained EBP networks) was solely based on highly cited publications. To obtain a more valid picture of the networks, a citation analysis of the whole networks is necessary.

Despite these limitations, our study provides evidence that is promising in several respects. Our results show significant differences between the German and U.S. discourse networks in terms of knowledge diffusion processes related to EBP. They show that diffusion by publications about EBP has never happened in German-speaking countries, whereas EBP has been strongly diffused in the United States. The analyses further revealed evidence about possible reasons for this difference. For instance, EBP has been related to different knowledge

corpora important within the different geographical contexts. Hence, one can assume that the underlying conceptual understanding of EBP differs between the United States and German-speaking countries. These content-wise differences, as well as the finding of a more heterogeneous knowledge base in German-speaking countries, provide plausible explanations for the absence of EBP diffusion.

Our study also provides some practical implications. The results can be used by social work researchers, lecturers, historians, policy makers, and students who want to become familiar with EBP and to identify the most central EBP literature. There is widespread confusion and misconceptions about EBP (cf. McNeill, 2006; Straus & McAlister, 2000). These misconceptions could be avoided by learning about the canonical and most influential publications. Generally speaking, and in accordance with one of the main goals of this research, the results can help clarify the confusion around EBP since knowing about different conceptual influences is key to understanding different standpoints. Therefore, it is important that scholars engaging in EBP discourse disclose their own perspectives on the underlying concepts. This need is also indicated by our literature search results, which support the findings by Shlonsky and Gibbs (2004) that the label "evidence-based" is frequently used for any empirical study investigating social work practice regardless of the quality of the evidence. This is an issue not only in social work but also in other fields (Ioannidis, 2016).

Moreover, the results might be used by practitioners actively involved in social work practice research projects. The comprehensive literature review, as well as the corresponding findings, might foster a better understanding of EBP, which is closely related to the concepts underlying social work practice research. The findings indicating the ubiquity of EBP at least in the U.S. social work might also sensitise practitioners for EBP and its relevance for social work. Finally, it is important to point out the advantage of this methodological approach and to give suggestions for future research. The finding that many relevant publications have appeared in non-electronic formats supports the assumption that automatic retrieval of

citations might lead to biased results. Manually retrieving citations is time consuming and suitable for a limited sample size. However, it can lead to a more valid picture of a scientific discourse. Although recent attempts have been made to automatically retrieve citations from books (Kousha & Thelwall, 2015), the manual method still remains superior for specific research questions. In general, science mapping techniques can be usefully applied to study the discipline of social work. Even though scientometric methods have rarely been used in social work research, they have become increasingly important due to the development of advanced indexing methods. For instance, Perron and colleagues' (2016) work provides a promising step towards making scientometric data applicable to social work scientists without a background in computer sciences.

Regarding the investigation of EBP discourse, we suggest the following two approaches for future research. First, network analysis methods might cluster specific discourse networks to identify "invisible colleges" (Crane, 1972) within the discipline. In terms of the comparison of the German and U.S. samples, it seems promising to look for authors who connect the dialogue and serve as transnational bridges between them (cf. Everett & Valente, 2016). Although we plan further analyses, we are open to sending our data to interested researchers who want to investigate this issue in more detail. Second, the interpretation of science mapping results requires informed judgement by domain experts. The meaning of citation data is ambiguous, and the conclusions beyond the descriptive results can only serve as hypotheses. Hence, to acquire a more detailed picture of the concrete disciplinary argument, a discourse analysis, for instance, one oriented towards the sociology-of-knowledge approach to discourse (Keller, 2005), might complement our results and lead to a deeper understanding of EBP discourses.

Acknowledgments

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Table 1. Operationalization of Variables.

Hypothesis	(Dependent) variable	Operationalization
Research Question (RQ) 1: How has the knowledge about EBP been diffused by publications?		
H1: The core of the EBP debate is located in the United States.	Discourse dominance	H1 is rejected if most EBP publications do not have first authors from the United States.
H2: EBP publications from the United States apply a research focus, and those from GER apply a theory focus.	Focus of publication	H2 is rejected if there is a significant difference between the U.S. discourse and the GER discourse in terms of the focus of their publications.
H3 and H4: EBP has been diffused by publications in the United States but not in GER.	Diffusion of EBP	H3 is rejected if the number of EBP publications has not exponentially increased in the United States. H4 is rejected if the number of EBP publications has exponentially increased in GER.
H5: EBP is spread mainly by journal publications in the United States and by other publication formats in GER.	Publication format	H5 is rejected if the publication format significantly differs between the U.S. network and the German network.
Research Question (RQ) 2: How has the knowledge about EBP been diffused by citations?		
H6: The EBP discourses in the United States and in GER are influenced by different schools of thought.	Influence of different schools of thought	H6 is rejected if the most cited publications within the U.S. and GER discourses do not differ.
H7 and H8: Both discourses are self-contained.	Self-contained	H7 is rejected if a minority of the most cited publications in the U.S. sample are written by authors from the United States. H8 is rejected if a minority of the most cited publications in the German sample are written by authors from GER.
H9: The conceptual embedding of the EBP discourses differs between the United States and GER.	Conceptual embedding	H9 is rejected if the most central publications within the co-citations networks of both discourses are identical.
H10: The EBP discourse in the United States is more homogeneous than that of GER.	Discourse homogeneity	H10 is rejected if the co-citation network of the EBP discourse in GER is denser than that of the United States.

Note. GER = German-speaking countries.

Table 2. Identified EBP Publications Worldwide (N = 482).

Country	Number of Publications
United States	310
United Kingdom	67
Canada	24
Germany	22
Australia	18
Sweden	13
Switzerland	9
Israel	4
Netherlands	3
China	2
Hong Kong	2
Denmark	2
Finland	2
South Korea	1
Romania	1
Austria	1
Italy	1

Table 3. Publication Format of Conceptual EBP Publications.

Source First author's affiliation in the United States	Number of publications	%
Edited book chapter	66	31.58
Monograph	21	10.05
Journal of Evidence-Based (-Informed) Social Work	21	10.05
Research on Social Work Practice	21	10.05
Families in Society	8	3.83
Journal of Social Work Education	7	3.35
Clinical Social Work Journal	6	2.87
Social Work	5	2.39
Journal of Social Work	4	1.91
Social Work Research	4	1.91
Brief Treatment and Crisis Intervention	3	1.44
Journal of Teaching in Social Work	3	1.44
American Journal of Orthopsychiatry	2	0.96
British Journal of Social Work	2	0.96
Child Welfare	2	0.96
European Journal of Social Work	2	0.96
Journal of Religion & Spirituality in Social Work	2	0.96
Smith College Studies in Social Work	2	0.96
Social Service Review	2	0.96
Social Work in Mental Health	2	0.96
Other journals (with one publication each)	24	11.48
Total	209	100.00
First author's affiliation in German-speaking countries		
Edited book chapter	12	46.15
Monograph	4	15.38
Blätter der Wohlfahrtspflege	2	7.69
Research on Social Work Practice	2	7.69
Other journals (one publication each)	6	23.10
Total	26	100.00

Table 4. Most Cited References Within Conceptual EBP Publications.

Publication	Number of Citations
Most cited publications by authors from the United States (total citations = 1,679)	
Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000	16
Gibbs, 2003	14
Gambrill, 1999	13
Howard, McMillen, & Pollio, 2003	12
Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996	12
Rosen & Proctor, 2003	9
Gambrill, 2013	7
Gray, 2001	7
Howard & Jenson, 1999	7
Straus, Richardson, Glasziou, & Haynes, 2005	7
Most cited publications by authors from German-speaking countries (total citations = 1,144)	
McNeece & Thyer, 2004	14
Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996	11
Gambrill, 1999	9
Dewe & Otto, 2012	8
Webb, 2001	8
Gambrill, 2001	7
Chaffin & Friedrich, 2004	5
Hüttemann, 2006	5
Oevermann, 1996	5
Otto & Ziegler, 2006	5
Pawson, 2002	5
Proctor & Rosen, 2003	5
Sackett et al., 2000	5
Shadish, Cook, & Campbell, 2002	5

Table 5. Centrality Measures of Co-citation Networks.

Publication	(Weighted) Degree	Publication	Eigenvector
Ten Most Central Publications in the United States			
Sackett et al., 2000	837	NASW, 1996	1.00
Gibbs, 2003	790	Gambrill, 2013	.99
NASW, 1996	781	Institute of Medicine, 2001	.99
Gambrill, 2013	766	American Psychiatric Association, 2000	.99
Institute of Medicine, 2001	705	Chambless et al., 1998	.99
American Psychiatric Association, 2000	696	Kirk & Reid, 2002	.98
Gambrill, 1999	663	Rubin & Babbie, 2005	.98
Sackett et al., 1996	647	Guyatt & Rennie, 2002	.98
Chambless et al., 1998	631	Gibbs & Gambrill, 1999	.98
Howard, McMillen, & Pollio, 2003	627	CSWE, 2008	.97
Ten Most Central Publications in German-Speaking Countries			
McNeece & Thyer, 2004	638	Sackett et al., 1996	1.00
Sackett et al., 1996	565	Gambrill, 2001	.91
Dewe & Otto, 2012	455	Pawson & Tilley, 1997	.89
Gambrill, 2001	441	Dewe & Otto, 2012	.87
Webb, 2001	425	Kindler, 2005	.85
Pawson & Tilley, 1997	387	Webb, 2001	.81
Gambrill, 1999	379	Ziegler, 2003	.81
Kindler, 2005	334	McNeece & Thyer, 2004	.80
Oevermann, 1996	309	Oevermann, 1996	.79
Schmidt, 2006	306	Grove et al., 2000	.78

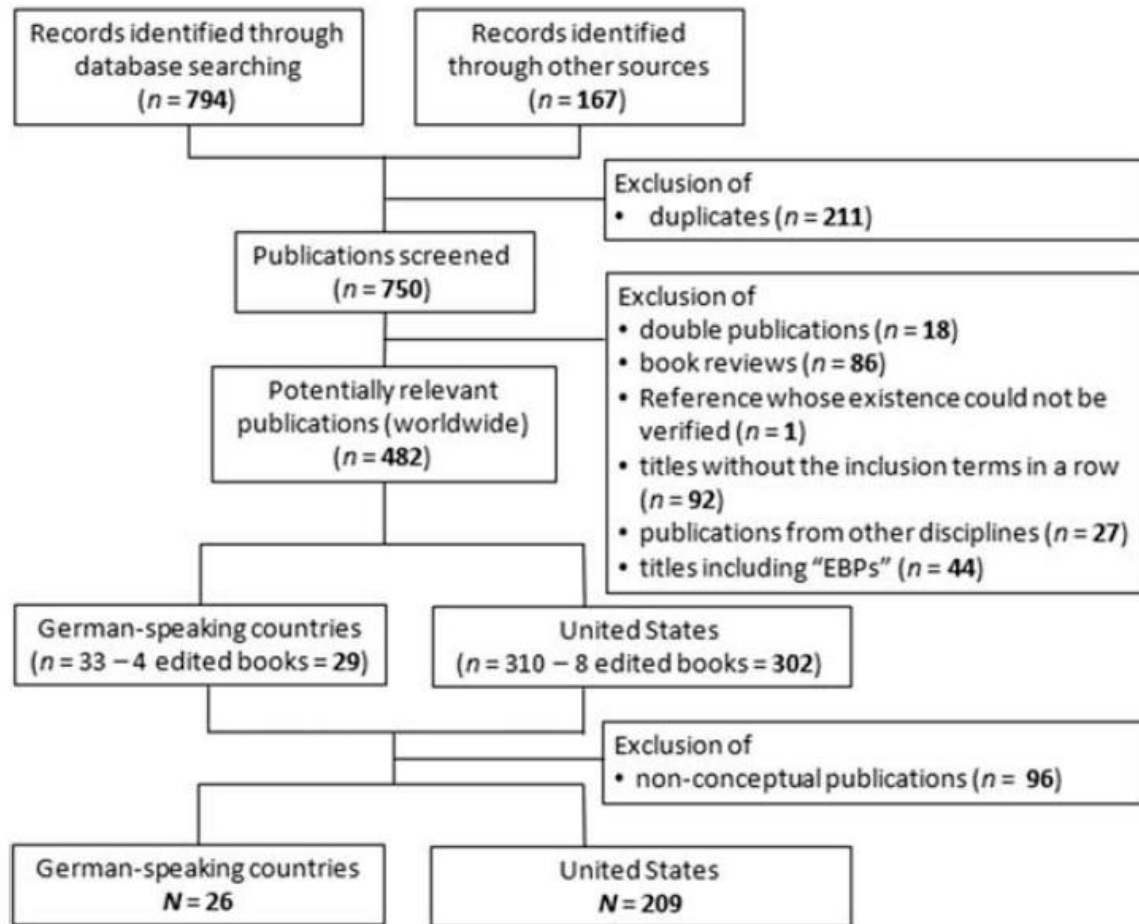Figure 1. Flow diagram of inclusion and exclusion process.

Figure 2. Number of publications per year in the United States and in German-speaking countries.
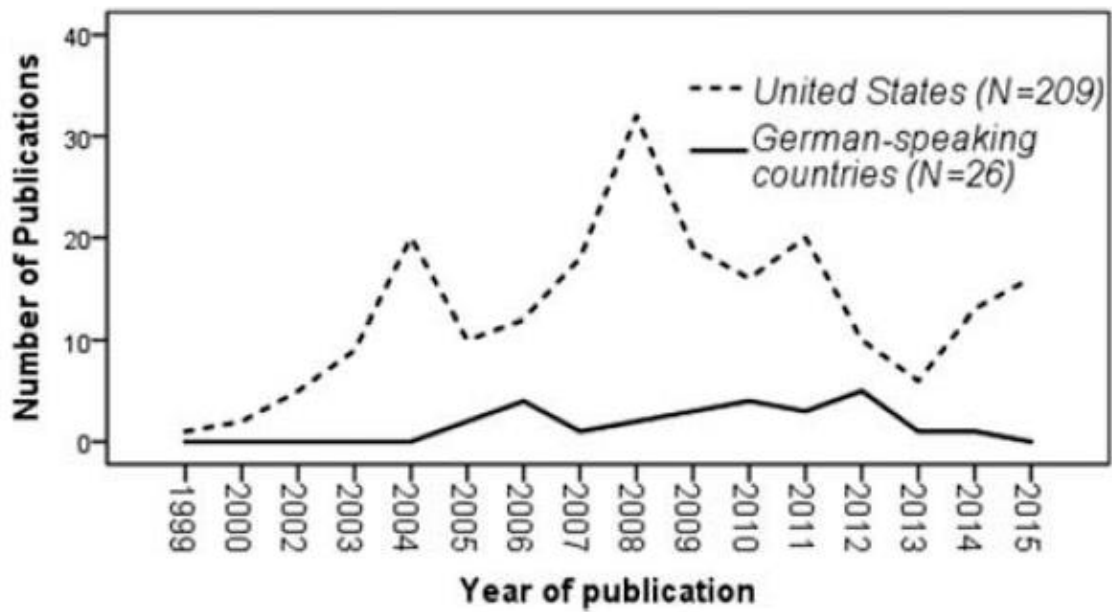
Figure 3. Co-citation network (no. of nodes = 1,389, no. of edges = 126,092) of the EBP discourse in the United States (right) and the most central publications within this network (left).
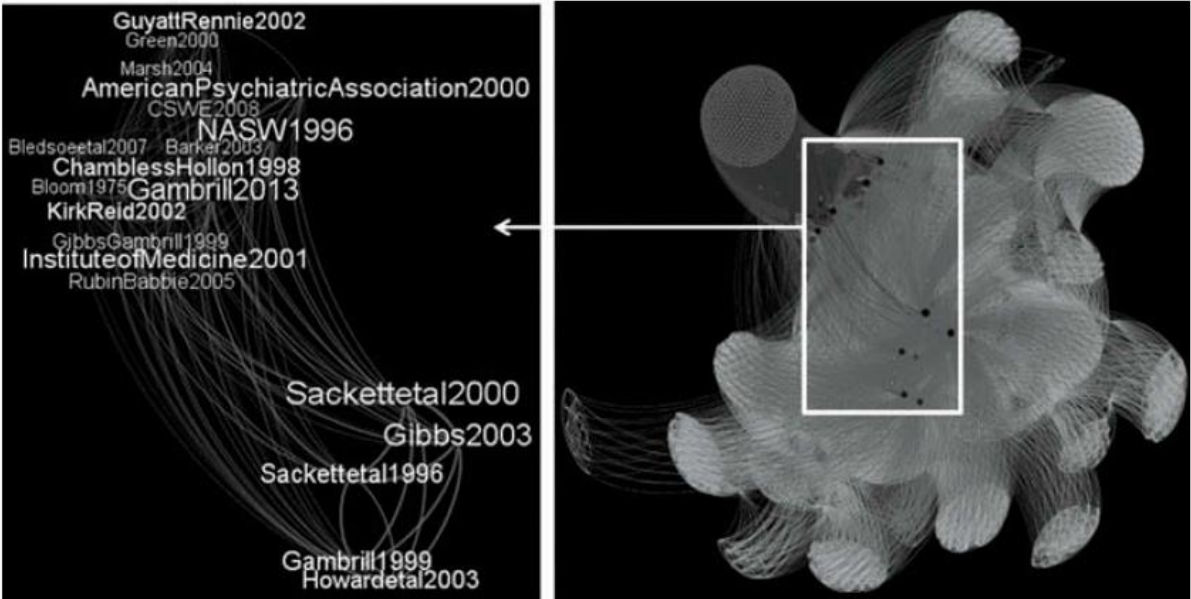
Figure 4. Co-citation network (no. of nodes = 833, no. of edges = 33,442) of the EBP discourse in German-speaking countries (right) and the most central publications within this network (left).