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Research Progress and Thematic Evolution of Psychological Distance—A Co-Word Analysis Based on Bibliometric Research

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Abstract
Psychological distance provides a mechanistic and integrated theoretical framework for multidisciplinary and interdisciplinary research; however, its research status and developmental trends remain to be clarified. This study used Citespace, Bibexcel, and Netdraw to construct scientific maps and performed co-word analysis, social network analysis, and cluster analysis of data from 1371 published studies on psychological distance that were retrieved from the Web of Science database. The results and conclusions were as follows: (1) The relevant research identified four periods: an infancy period, exploration period, growth period, and outbreak period. (2) Research on psychological distance has been mainly within the fields of psychology, economics, business, social psychology, and management. (3) Chronologically, the relevant research evolved from an individual psychological level to a social developmental level, and then to an individual behavioral level. (4) Clustering analysis of high-frequency keywords identified six research themes: "psychological construction process," "individual emotions and reactions," "social cognition and decisions," "marketing and consumer behavior," "international trade," and "environmental protection and social responsibility." These themes indicate that studies on psychological distance have involved theory generation, theory driving, and theory diffusion. Finally, this study combined the data and literature analysis to construct a model of developmental trends to highlight possible directions for future research.

Keywords Psychological distance · Construal level · Co-word analysis · Cluster analysis

Introduction

One goal of psychology research is to understand the ways in which individuals evaluate objects and events. However, assessment depends not only on the quality and desirability of an object, but also on the ways in which individuals perceive psychology. Psychological distance is a tool for assessing the fit or integration between the perceptual subject and object, which is an important determinant of whether primary, essential characteristics or secondary, peripheral characteristics are used as the basis for evaluation. For example, in our daily life, we may feel that polite words increase the sense of distance (Levinson and Brown 1987; Stephan et al. 2010), and visual and linguistic fluency decrease the psychological distance (Alter and Oppenheimer 2008; Roose et al. 2019). Or, for instance, when purchasing goods, if the time interval is long, consumers are susceptible to the influence of high explanatory level information such as consumption goals and product attributes (remote psychological distance); If the time interval is short, consumers are more influenced by low explanatory level information such as advertisement, promotion and consumption situation (proximal psychological distance) (Trautmann and Kuilen 2012). Indeed, the study of psychological distance helps to clarify the ways in which individuals evaluate events and serves as a scientific tool to uncover the processes of generation, control and adjustment of individual psychological perception. Psychological distance provides a systematic and integrated theoretical framework for multidisciplinary and interdisciplinary research.

Distance in nature science usually refers to the distance between objects in space or time. In 1912, Edward Bullough, a Swiss psychologist, first proposed the concept of psychological distance and applied it to the aesthetic principle, which proposes that beauty is generated from the psychological distance between the subjective perception of the

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viewer and an artwork (Bullough 1912). Subsequently, the concept of distance was no longer confined to real objects, and it began to appear in research as an abstract concept. Shapira et al. (2012) have indicated that distance and abstraction are cognitively associated. To better explain how psychological distance affects individual thoughts and behaviors, scholars have introduced construal level theory (CLT). CLT originated from the time construal theory (Liberman and Trope 1998), which regards time as a psychological distance affecting the level of individual interpretation and consequently other aspects of the individual's cognition and behavior. Construal levels are mental representations in which certain features of events or objects taken into account are selected. Among these levels, high level construal is highly schematic and decontextualized, and focuses on the central characteristics of an event/object, whereas low level construal is more concrete and tends to detect the details of the object. Construal levels can form the basis for a series of assessments and behavioral consequences of psychological distance events (Trope and Liberman 2003). Trope et al. (2007) have noted that CLT explains how psychological distance affects individual thoughts and behaviors, and explained the relationship between CLT and psychological distance in detail. Trope and Liberman (2010) have formally proposed a unified psychological distance CLT. This theory introduced the central concept of "psychological distance" to explain individuals' reaction mechanisms with respect to object cognition and evaluations or decisions. It proposes that psychological distance is self-centered, i.e., its point of reference is the self in the here and now, and that different ways in which objects move from this point—such as spatial, temporal, social distance, and hypotheticality—constitute different distance dimensions. Spatial distance refers to how distal in space the target is from the perceiver; temporal distance indicates how much time (past or future) separates the perceiver's present time and the target event; social distance indicates how distinct the social target is from the perceiver's self; and hypotheticality refers to how likely is the target event is to occur or how close it is to reality, as construed by the perceiver. The zero-anchoring point of all four dimensions is the perceiver's direct experience: the stimuli sensed in the here and now. Extensive research has verified that as psychological distance increases, construal becomes more abstract, and as the level of construal increases, so too do perceptions of psychological distance (Suzuki 2019).

In addition, scholars have studied psychological distance from the perspective of social psychological distance and defined it as "the individual's subjective perception and emotional experience to the relationship between others and himself after the integration of various social information" (Agnew et al. 2004). Psychological distance emphasizes that the individual has a subjective experience of the goal, and the reference point of the distance is the observer itself. Psychological distance mainly describes the affinity relationship between the subject and the object. The existing research mainly focus on interpersonal psychological distance (Huang 2015), organizational psychological distance (Chen and Li 2018; Li and Chen 2019; Vanderstukken et al. 2019), and transactional psychological distance (Li et al. 2019). Psychosocial distance mainly refers to a subjective judgment of distance between the individual and the perceived object, on the basis of the degree of intimacy and acceptance, which is used to describe the degree of fit or blending between the subject and the perceived object. The core of this concept is to accept the degree of identity, which is a subjective judgment. The study of psychological distance from the perspective of society provides a direct tool for defining the relationship between subject and object. Relatively less research has been performed on psychological distance from the perspective of society, but this theory is nonetheless important.

At present, research on psychological distance has mainly been discussed from two aspects of theoretical construction and application. In the construction of psychological distance theory, the inner mechanism of psychological distance has primarily been discussed, including descriptions of what psychological distance is (Liberman et al. 2002; Genschow et al. 2019), the relationship between psychological distance and CLT (Trope and Liberman 2003; Trope and Liberman 2010), and the structural dimension of psychological distance (Spence et al. 2012). Research on the construction of psychological distance theory has provided the theoretical foundation and basis for individual cognitive events or objects. In the application of psychological distance, discussions have focused on how to use psychological distance to solve problems in real life, to better promote the development of society. Psychological distance is widely used in marketing (Theodorakis and Painesis 2018), management (Vanderstukken et al. 2019), trade (Chabowski et al. 2018), environment (Duan et al. 2019), public health (Rogers et al. 2018), and other fields, thus providing new perspectives to interpret the formation mechanisms of individual psychological and behavioral disorders in each field. Although research on psychological distance has made some progress, no comprehensive study has been conducted on psychological distance, and the current status and developmental direction of research on this topic remain unclear. Therefore, it is of great theoretical and practical significance to discuss the research progress and evolution of psychological distance. First, to fully understand the current status of research on this topic, we used scientific measurement software such as Citespace, Bibexcel, and Netdraw to conduct a visualization analysis based on the relevant research obtained from the Web of Science database which includes sources of abundant and reliable literature data especially in psychology, economics, and other social science fields. We determined the number of research studies, the major countries publishing on this topic,

and the journal distribution to assess the current status of research in this area and evaluate the developmental trends at different periods (i.e., infancy, exploration, growth, and outbreak). Second, this study clarified the developmental trends and research themes of psychological distance research hotspots by using high-frequency keyword co-word analysis and cluster analysis. Finally, by combining the results of the data analysis and the literature analysis, we propose the developmental trends as well as future research directions. By reviewing the existing literature, this study fills the gap with respect to the research progress and developmental trends of psychological distance, providing a framework for future research.

Methods and Procedures

Methods

Co-word analysis is a bibliometric analysis method derived from the concepts of citation coupling and co-citation in bibliometrics. Small (1988) published an academic monograph on co-word analysis. The method counts the frequency of keywords that appear together in the same document and constructs a co-word matrix to facilitate hierarchical clustering. From the clustering results, the relationships among words can be revealed, and changes in the structure of research categories and themes can be analyzed. Co-word analysis is a well-developed and effective method that can reveal the knowledge structure of a given research category (Ronda-Pupo and Guerras-Martin 2011). The more keywords appearing in the same document, the closer the topic represented by these two words. Therefore, by counting the frequency of keywords that co-occur within a group of studies within the same document, a co-word network of word-pair associations can be formed. The distance between the network nodes reflects the relationship of the theme and represents the principle of co-word analysis. Literature theme keywords are taken as the object, including a variety of statistical methods such as inclusion coefficient and cluster analysis. The complex network of co-words within many studies is expressed intuitively with numerical values and knowledge maps. Six steps are involved in literature analysis with the method of co-word analysis: (1) identifying the analyzed problems; (2) determining the keywords; (3) extracting high-frequency keywords; (4) counting the frequency of co-occurring keywords and constructing the co-word matrix; (5) analyzing the co-word matrix by using cluster analysis, factor analysis, and multidimensional scaling analysis; and (6) analyzing and interpreting the results of co-words (Zhong and Li 2008).

Cluster analysis analyzes multivariate data to identify groups or clusters of homogeneous observations through a numerical method (Everitt 1980; Wade and Ghahramani 2018). The method can identify statistical variables that measure the degree of similarity between samples or indicators, and construct the co-word matrix from a number of indicators derived from the samples. The degree of similarity between samples (variables) or sample composition can be determined on the basis of the co-word matrix. According to the degree of similarity, closely related samples (variables) are gathered into a small classification unit to more intuitively show the differences and connections among the classified objects (i.e., individuals or indicators). This method has been widely applied in the fields of medicine (Moore et al. 2010), organization management (Guo et al. 2017), occupational health (Liu et al. 2018), social psychology (Chen et al. 2019), and other areas. This study used cluster analysis to summarize the relevant studies on psychological distance to clarify the main research categories in psychological distance research and the relationships among them.

Data Collection and Processing

This study used a systematic process to retrieve data from reliable sources. Pluye et al. (2016) believe that the premise of a literature review entails the selection of appropriate keywords, which are used to search and retrieve literature from the database. Literature reviews summarize and categorize existing research on key topics (Seuring et al. 2005). This study involved four steps: identifying the data, screening the initial data, determining eligibility, and determining the final data (Fig. 1). Journal studies published during the period 1900–2018 were retrieved from the Web of Science database, because this database includes citations as early as 1900 and

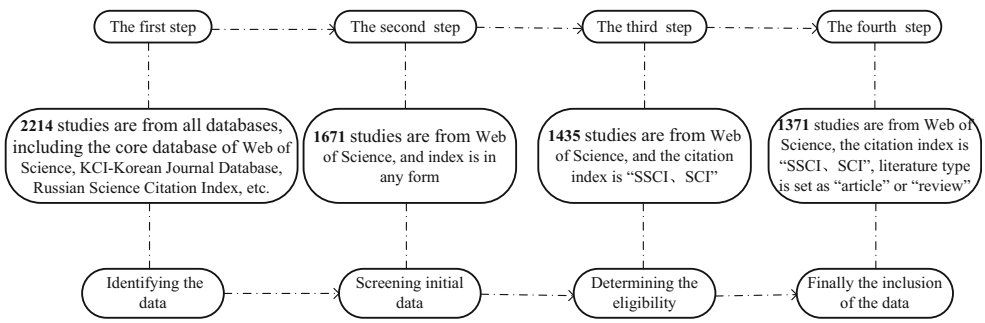

Fig. 1 Identification process for relevant literature
Note: SSCI: Social Science Citation Index; SCI: Science Citation Index.

covers approximately 12,000 leading journals worldwide (Boyle and Sherman 2006). Moreover, it includes sources of abundant and reliable literature data especially in psychology, economics, and other social science fields (Apriliyanti and Alon 2017). It is a reliable and high-quality data source that is used extensively for research purposes because it allows researchers to index high-quality content (Tian et al. 2018). Further, to ensure the quality of the articles, the citation index was set as "SSCI" or "SCI," the literature type was set as "article" or "review," and the search was conducted according to "theme." A comprehensive reading of the literature indicated that the search should involve keywords including "psychological distance," "psychic distance," and "construal level." Finally, a total of 1371 studies were retrieved.

This study used Bibexcel and Citespace software. Bibexcel software was developed by Olle Persso and is a bibliometric tool that can be used for most bibliometric analyses. The data can be easily transferred to other software. The main functions of the software include bibliometric analysis, citation analysis, co-citation, and cluster analysis. Therefore, this study used Bibexcel software to extract and analyze literature related to the research of psychological distance.

This study used Citespace software to conduct a quantitative analysis on the literature collection relating to specific academic fields, to explore the critical path and turning point of the evolution of the research categories. The software can explore the potential dynamic evolutionary mechanisms and the frontiers of subject development. The Citespace software shows the citation frequency in each period by the size of the node. The key nodes in the network (intermediate centrality ≥0.1) are highlighted with circles. Citespace software was used to draw a map of the research category of psychological distance to understand the status of the research category of psychological distance in each of the examined years.

Results

Publication Status of Psychological Distance

The number of published studies, journals, and countries that researched psychological distance were analyzed in detail, to clearly present the basic status of psychological distance research. Figure 2 shows the annual number of published studies, the cumulative number of published studies, and the growth rate of research related to psychological distance over the years.

Figure 2 shows that the earliest retrieved article was from 1939. Seven studies were published in the 30-year period of 1939–1969, which we defined as the infancy period of psychological distance development. In the 35 years from 1970 to 2005, the number of published studies was below ten studies per year, and the total number of published studies was less than 100, as observed during the slow development stage. We defined this period as the exploratory period of psychological distance development. From 2006 to 2012, the annual number of published studies began to exceed 20, and the number of publications increased but remained below 500. This period was defined as the growth period of psychological distance development. From 2013, the annual number of published studies exceeded 100 and showed a sharp growth trend, and the total number of studies published in 2016 exceeded 1000. This period is defined as the outbreak period of psychological distance. In the past decade (2009–2018), the number of published studies increased by 483% and showed an explosive growth trend. In the past five years (2014–2018), the number of published studies increased by 95%, showing a rapid growth trend.

A further analysis of the national distribution revealed that 65 countries conducted research on psychological distance. The USA published 640 research studies, the highest number

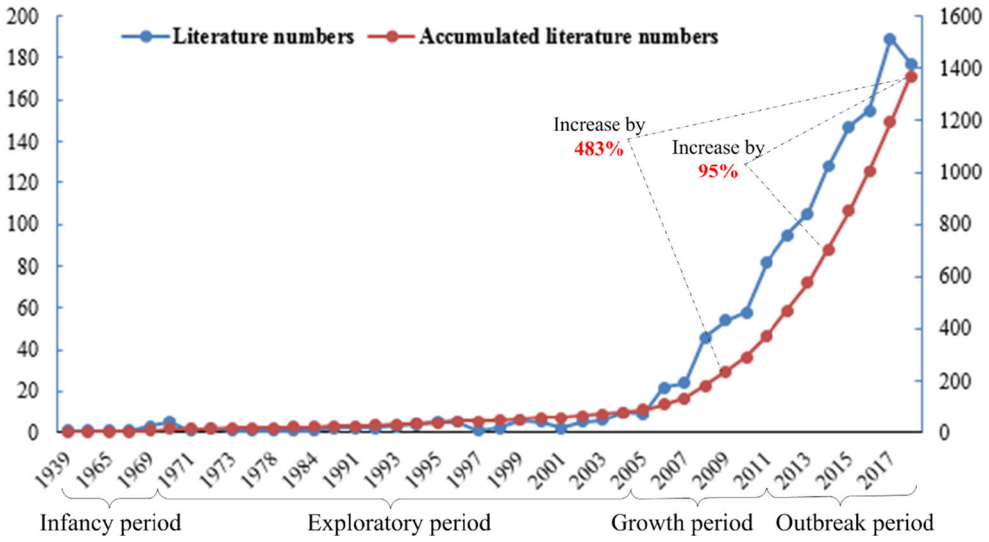

Fig. 2 The number and growth rate of psychological distance related literature

of publications, representing 46.68% of the total amount. China ranked second, having published 121 studies, accounting for 8.83%, followed by England, Canada, and the Netherlands. The top 20 countries are shown in Table 1.

The top 20 journals that published literature on psychological distance were selected on the basis of the number of studies published (Table 2). The relevant research studies were published in psychology, social psychology, business economics, marketing, and organizational behavior journals, as well as other related journals. The Journal of Experimental Social Psychology published the highest number of studies ($n = 69$), followed by the Journal of Consumer Research ($n = 40$), the Journal of Personality and Social Psychology ($n = 38$), and the Personality and Social Psychology Bulletin ($n = 36$). These findings indicate abundant research studies on social psychology.

Research Categories of Psychological Distance

We analyzed the evolution of psychological distance at different periods from a macroscopic perspective. The evolutionary map of psychological distance was produced in Citespace software ($n \geq 20$). Figure 3 shows the time of the node, which represents the year in which the domain first appeared, and the node size indicates the number of studies in the field (see Fig. 3).

The results showed that research studies on psychological distance were mainly in the fields of psychology (658), economics (523), business (361), social psychology (282), management (178), and other domains. From a chronological perspective, research on psychological distance first appeared in the fields of psychology and the behavioral sciences, and then gradually expanded into the research fields of social psychology, economics, and business. In recent years, research studies on psychological distance have begun to emerge within the fields of the social sciences, neuroscience, and environmental sciences.

To further evaluate the developmental process of the different research categories, we selected the five research categories with the largest distribution. The results are shown in Fig. 4. Although the various research categories indicated that psychological distance was first applied in each category at different time periods, the publication of relevant studies within these research categories expanded rapidly around 2007.

High-Frequency Keywords of Psychological Distance

A total of 2971 original keywords were extracted from 1371 studies with Bibexcel software. However, the software was not able to accurately identify the word case, abbreviations, and singular versus plural words, among other issues. Therefore, three graduate students with an extensive background in management and psychological research and understanding of the concept of psychological distance were invited to artificially combine the words. Before their work, we explained the content, purpose, and precautions of this study to ensure that they had a deep understanding of the work. For example, "construal level," "CLT," "construal-level theory," and "construal levels" were merged as "construal level." "SMEs," "small and medium-sized enterprises," "SME," "small-and-medium-sized enterprises," and "industrial SMEs" were merged into "SMEs." In addition, some keywords had the same meaning but were expressed differently. Two management professors were invited to integrate the keywords. For example, "prosocial behavior," "pro-social behavior," and "consumers' pro-social behavior" were integrated to produce "prosocial behavior." "Morality" and "ethics" were integrated to produce "morality." Following this integration process, 2056 keywords remained. The top 70 keywords with a frequency > 10 were selected for further analysis. Table 3 shows the top 20 high-frequency keywords.

The 70×70 co-occurrence matrix generated by Bibexcel was imported into Ucinet to generate a file. Netdraw was used to read the file to draw the social network map of highly cited keywords within the field of psychological distance research (Fig. 5).

The nodes in Fig. 5 refer to the aspects analyzed. Each high-frequency keyword is a node. The connection between two nodes represents the relationship between the two nodes and provides a visual representation of the input data and the co-occurrence relationship between them. The sizes of the nodes in the figure indicate degree centrality. The larger the node size, the greater the extent of connection between the

Table 1 Countries/regions distribution of psychological distance articles (top 20)

Country	N	P	Country	N	P	Country	N	P
USA	640	46.68%	Australia	78	5.69%	Austria	25	1.82%
China	121	8.83%	Spain	42	3.06%	Switzerland	23	1.68%
England	116	8.46%	France	38	2.77%	Belgium	23	1.68%
Canada	106	7.73%	South Korea	36	2.63%	Singapore	22	1.60%
Netherlands	105	7.66%	Sweden	33	2.41%	Japan	19	1.39%
Germany	91	6.64%	Italy	31	2.26%	Scotland	17	1.24%
Israel	85	6.20%	Taiwan	30	2.19%			

Table 2 Top 20 scientific journals where psychological distance research articles have appeared

Journal	N	Journal	N
Journal of experimental social psychology	69	Social psychological and personality science	21
Journal of consumer research	40	Journal of international business studies	21
Journal of personality and social psychology	38	Journal of business research	20
Personality and social psychology bulletin	36	Journal of international marketing	20
Journal of consumer psychology	34	European journal of social psychology	19
International business review	32	Journal of marketing research	19
Journal of experimental psychology general	29	International marketing review	17
Psychological science	24	Social cognition	16
PLOS ONE	24	Organizational behavior and human decision processes	16
Frontiers in psychology	22	Social behavior and personality	16

keyword and other keywords; there were many co-occurrence relations with other keywords.

By performing additional analysis of high-frequency keywords, we identified keywords focusing on the individual psychological level, individual behavioral level, and social development level. Therefore, the high-frequency keywords were classified according to these three levels. Owing to the limited number of research studies published during the infancy and exploration periods ($n < 100$), these two periods were integrated into one period for analysis. Because "psychological distance" and "construal level" were identified as search keywords, they are not shown in Fig. 5. The frequency of "psychological distance" and "construal level" for the three periods was 8, 82, and 185, and 0, 108, 233, respectively.

Figure 6 shows that research on psychological distance was first carried out at the individual psychological level, then expanded to the level of social development during the growth period, and appeared at the level of individual behavior during the outbreak period. The relevant research was characterized by the coordinated development of individual psychology, individual behavior, and social development. (1) The related research on individual psychology has long been a research hotspot, and the number of published research studies showed

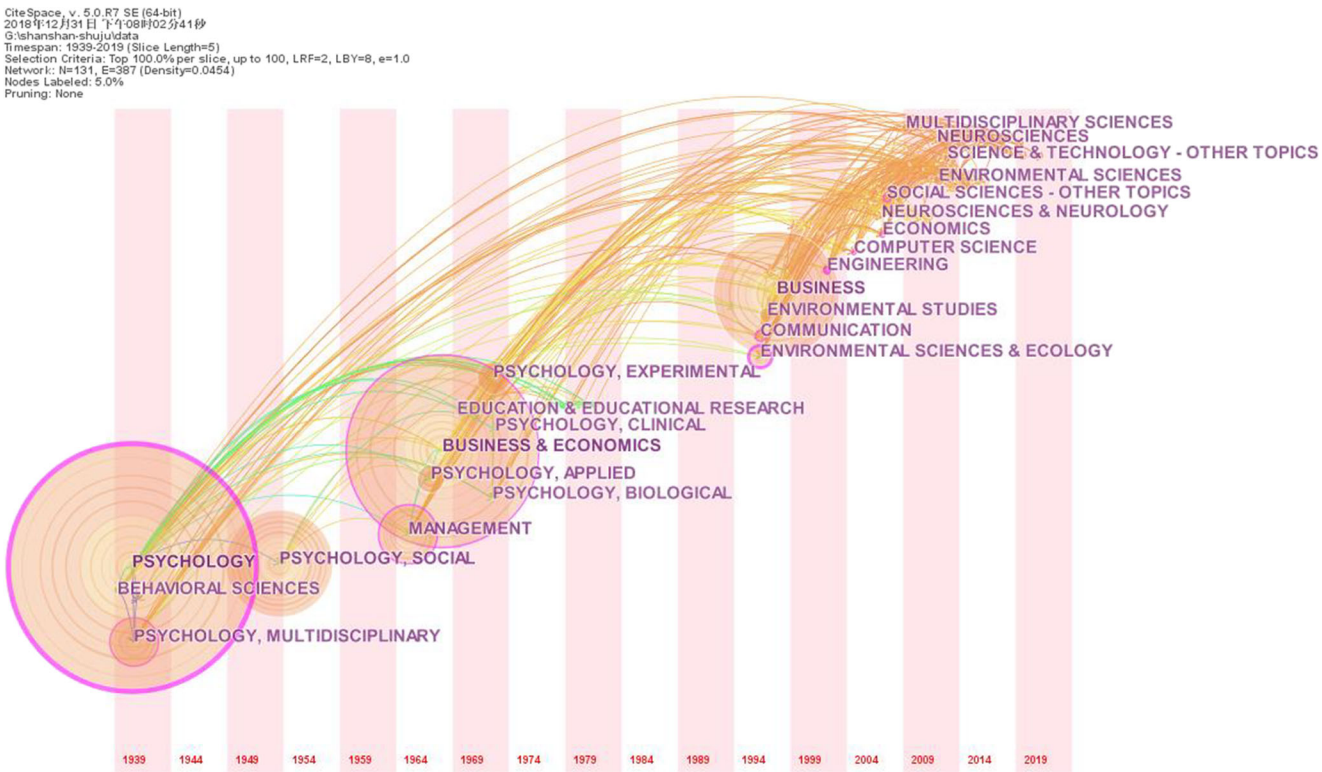

Fig. 3 The distribution map of psychological distance research under time clues

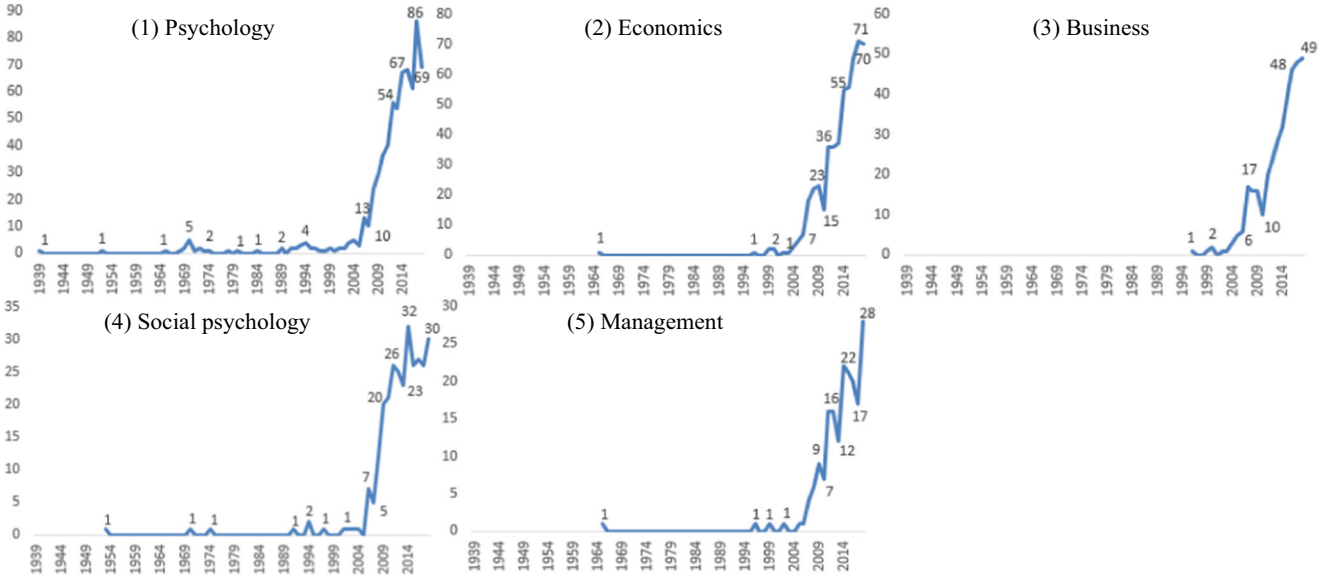

Fig. 4 Research track of Top 5 category of psychological distance

an increasing trend. The research mainly focused on interpersonal relationships and aimed to evaluate the relationships between individuals (e.g., parents and children, teachers and students, or leaders and subordinates) during the infancy and the exploratory periods. In the growth period, the research began to place a greater emphasis on analyzing the psychological construction process and explaining the internal mechanisms of psychological distance, to theoretically evaluate psychological distance. (2) The research on psychological distance expanded from the micro level to the macro level, and from the individual psychological level to the social developmental level. The research content mainly focused on the field of international trade, and the keywords "internationalization," "exporting," and "marketing" began to emerge. (3) In the past five years, research on psychological distance has continued to expand at the social developmental level. In the field of the environment, related keywords such as "climate change," "communication," "close relationships," "environment," and "sustainability" began to emerge. Notably, research on psychological distance has been applied at the individual behavioral level, and has mainly focused on consumer choice behavior. In general, the research on psychological distance showed a diverse trend, with a wider range and a larger number of applications during the outbreak period.

Cluster Analysis of High-Frequency Keywords

Hierarchical clustering was adopted in this study to cluster high-frequency keywords. The principle is to start with all the data points themselves as clusters, then find the two nearest clusters and combine them into one, repeating the above steps until the preset number of clusters is reached (Corpet 1988). In terms of specific algorithms, Agglomerative clustering is a kind of the hierarchical clustering method from the bottom, it can calculate the distance

Table 3 Top 20 high-frequency keywords of psychological distance

Rank	Keywords	Frequency	Rank	Keywords	Frequency
1	Construal level	341	11	Cultural distance	34
2	Psychological distance	275	12	Communication	32
3	Temporal distance	91	13	Environment	29
4	Decision making	73	14	Attitude	27
5	Internationalization	59	15	Social distance	27
6	Marketing	43	16	Judgment	27
7	Climate change	39	17	Choice	27
8	Exporting	37	18	Preference	26
9	Close relationships	36	19	Processing styles	26
10	Social cognition	34	20	Identity	26

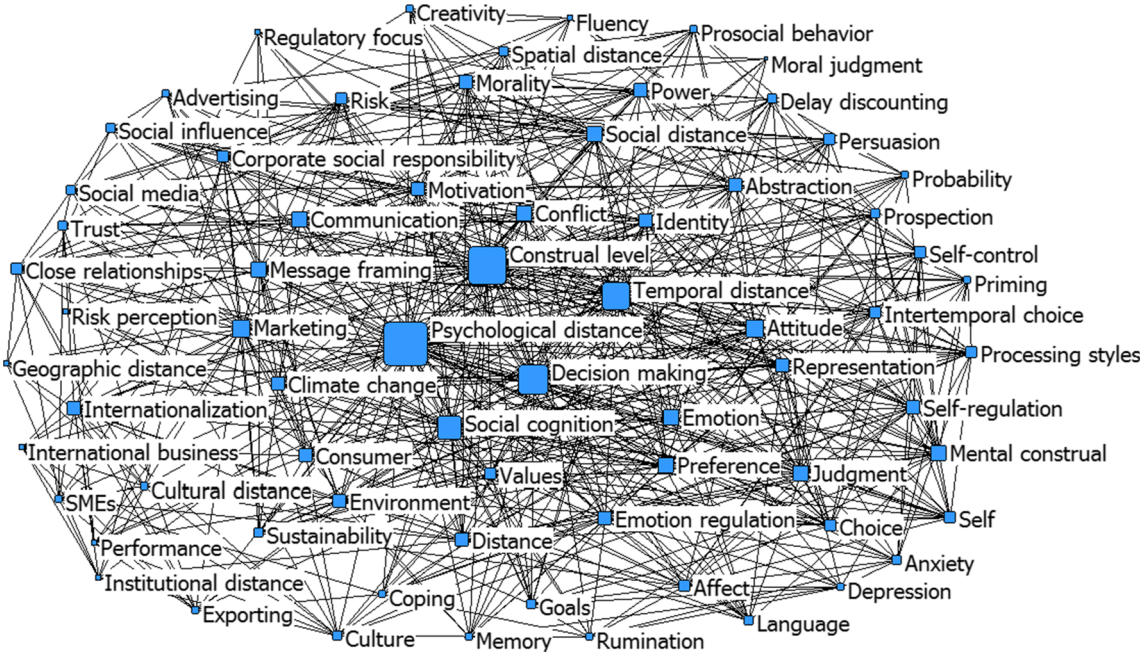

Fig. 5 Social network diagram of high-frequency keywords of psychological distance
Note: The sizes of the nodes in the figure indicate degree centrality. The larger the node size, the greater the extent of connection between the keyword and other keywords.

between classes based on the specified similarity. Specifically, each element was first classed individually, and then repeated (each round merging the specified least distant class) until all elements were classed as the same. The distance between clusters can be calculated by the shortest distance method, the longest distance method, the middle-distance method, the cluster average method. Among them, the method of class average is often used the most commonly and best. On the one hand, it has good monotonicity. On the other hand, its degree of spatial expansion/concentration is moderate (Alberto and Sergio 2019). Therefore, this study uses the cluster average method. Secondly, the advantages of ward's cluster method we adopted are as follows: the ward used agglomerative clustering objects to square and minimize the differences across all

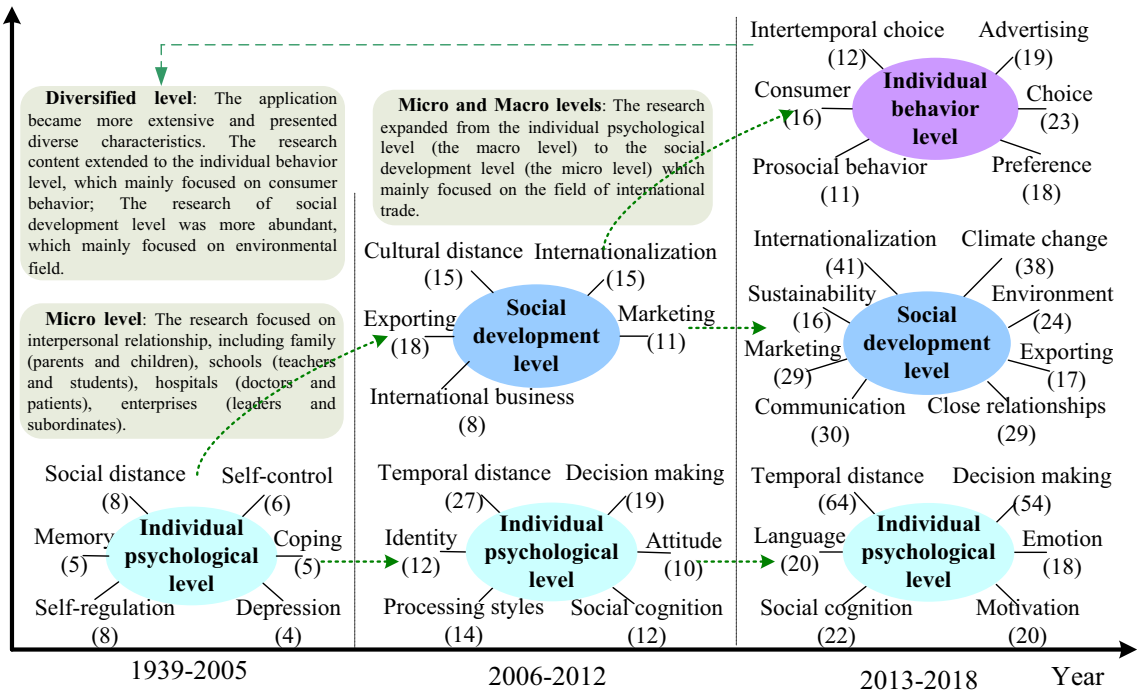

Fig. 6 Evolution trend of research hotspots of psychological distance

clusters. This study finally obtained the results of six clusters. Because of the many high-frequency keywords, this study did not use dendrogram for presentation but chose the representation in Fig. 7.

According to the characteristics of the keywords in the same cluster, we termed the six clusters "psychological construction process" (C1), "individual emotions and reactions" (C2), "social cognition and decisions" (C3), "marketing and consumer behavior" (C4), "international trade" (C5), and "environmental protection and social responsibility" (C6). The C1 cluster mainly represents the psychological distance from the process of psychological construction. The C2 cluster applies the concept of psychological distance to explain the generation and regulation of emotions and reactions. The C3 cluster is primarily focused on individual cognition and decision-making in relation to others or objects. The C4 cluster is primarily focused on consumer perception, attitude, and behavior research. The C5 cluster is mainly used to discuss the obstacles that affect international trade. The C6 cluster mainly represents the psychological distance in the fields of environmental protection and social responsibility. From a horizontal development perspective, the research on psychological distance experienced theory generation, theory driving, and theory diffusion. The psychological construction process represents the theoretical foundation of psychological distance. All studies of psychological distance are based on the internal psychological construction process. The C2 and C3 clusters construct the process of theoretical development of psychological distance. Related topics extended to individual emotions, cognition, and decisions. The C4, C5 and C6 clusters represent the theoretical application of psychological distance. During the actual research process, psychological distance was first applied in marketing and international trade as well as other fields. From a vertical development perspective, the research encompassed three levels: the individual psychological level, individual behavioral level, and the social developmental level. The location of each cluster in Fig. 7 represents the developmental level.

Discussion

The Evolutionary Trends during the Time Periods

The literature on psychological distance has increased, especially in the past 10 years. According to the life cycle, events unfold through a process that begins with gestation and evolves toward death, with each stage having different characteristics (Koval et al. 2017). Similarly, the research on psychological distance is expected to undergo a process of transitioning from less to more, from a rise to a fall. This study explored the life cycle of psychological distance research. According to the number of studies and the developmental trends, we identified four periods: an infancy period, exploration period, growth period, and outbreak period. Although the life cycle period of psychological distance in the future cannot be predicted precisely, research on psychological distance remains a major topic and, from a developmental trend perspective, it offers substantial future value, given its broad potential for application.

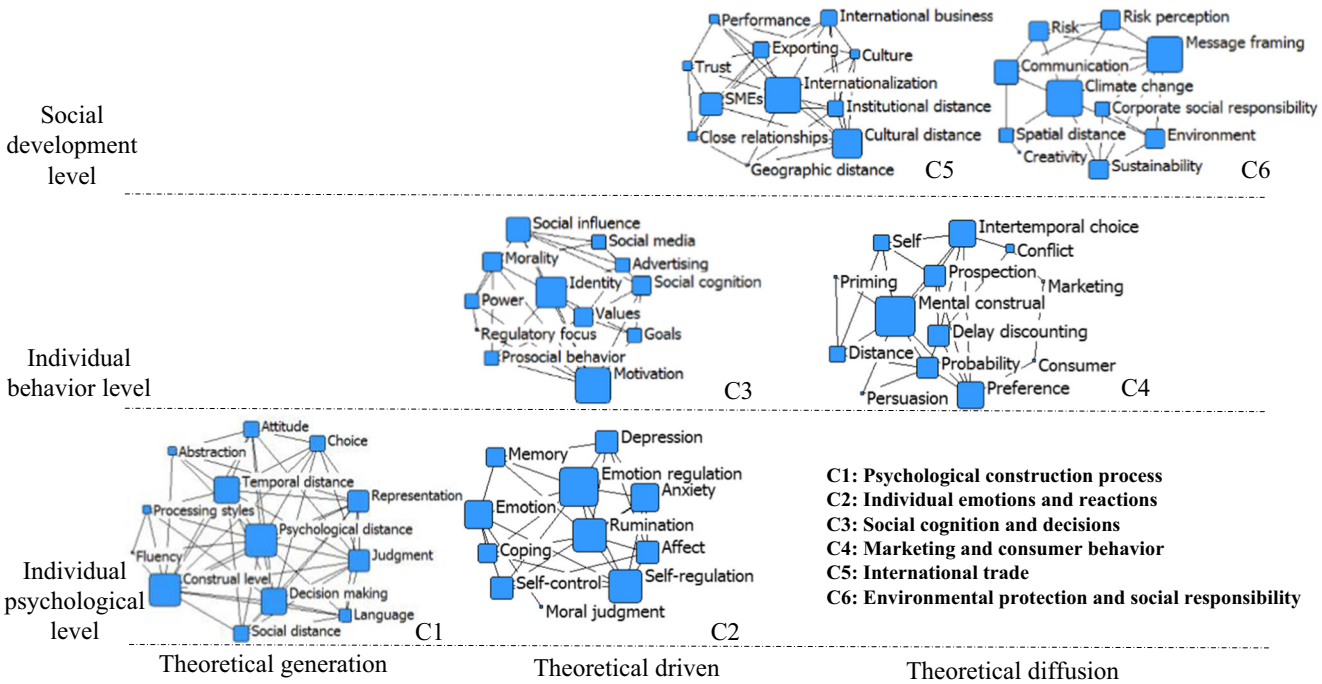

Fig. 7 Cluster analysis of high-frequency keywords of psychological distance

During the infancy period, theoretical research on this topic was in early stages, and seven published studies were produced. However, this period lasted 30 years. The related research mainly focused on the study of teaching relationships, which involved evaluating the psychological distance between excellent and disadvantaged children (Tolor and Orange 1969). Owing to limitations within the research field and theoretical development, researchers did not strongly focus on psychological distance.

After the infancy period, research on psychological distance experienced an exploratory period, with a slow rate of development. The application of psychological distance further expanded into the field of interpersonal relationships, and some progress in the test methods was made (Salzmann and Grasha 1991). Psychological distance was applied to evaluate the relationship among families (parents and children), schools (teachers and students), hospitals (doctors and patients), and enterprises (leaders and subordinates). Over the course of the theory's development, psychological distance was viewed as a "pure cognitive orientation" that attracted attention and was expounded upon by scholars who considered the concept from the perspective of time interpretation theory (Liberman and Trope 1998). On the basis of these studies, the theory of psychological distance developed to a certain extent, although a more comprehensive theory failed to emerge. During this period, psychological distance was used to explore obstacles encountered in the process of international trade, which laid a foundation for future research. A total of 82 studies were published during this period.

During the growth period, the research focus of scholars gradually expanded from time distance to other distance dimensions. Liberman et al. (2007) have proposed the term "psychological distance" to uniformly define these "distance" factors affecting the construal level and consequently the various cognitive judgments and decisions of individuals. The authors explained the relationship between the construal level and psychological distance. Many scholars discussed and studied psychological distance, thus leading to notable developments within psychological distance theory. Research on psychological distance extended to the macro level of social development, which was applied to the field of international trade to guide and solve practical problems.

During the outbreak period, research on psychological distance developed further. Scholars from various fields applied psychological distance theory to determine the internal mechanism and essence of the development of various processes. In this period, research on psychological distance showed diverse development trends. At the individual psychological level, given the complexity of human nature, the related research focused on the psychological construction process. At the individual behavioral level, owing to the rapid development of social productive forces, the marketing concepts used by enterprises were continuously redeveloped, and value was placed on consumer purchasing behavior. At the social development level, and because of the threat of environmental pollution and climate change, research on psychological distance began to emerge within the field of environmental science, aiming to clarify the failure of public environmental protection, to better promote public's environmental behavior. More than 100 studies were published during this period.

Analysis of the Research Themes

C1 Psychological construction process. The cluster mainly represents the psychological distance from the process of psychological construction and aims to explore the internal mechanism of psychological distance. On the basis of CLT, psychological distance emphasizes the importance of an individual's perception and understanding of the environment. One central idea is that individuals' responses to social events depend on their mental representation of the events (Nussbaum et al. 2003). Mental representations are characterized by a hierarchy, which can be simplified as high-level construal and low-level construal (Nussbaum et al. 2003; Trope and Liberman 2003). The CLT clarifies that people's reactions to social events depend on their mental representations of the events. Research examining the psychological construction process has provided an institutional and integrated theoretical framework for multidisciplinary and interdisciplinary research on psychological distance.

C2 Individual emotions and reactions. Research examining individual emotions and reactions applies the concept of psychological distance to explain the generation and regulation of emotions and reactions. At present, this theory has mainly been applied in two respects. First, it explains the process of emotional regulation. According to CLT, activating a high-level construal motivates people to experience situations that help them achieve long-term goals. Mei et al. (2018) have discussed whether emotional intensity moderates the influence of emotional valence on psychological distance. Second, this theory interprets the effects of trade-off difficulty on negative emotions and coping behavior. By understanding the conditions that elicit these effects, individuals can be helped to overcome trade-offs. Alexander and Ashley (2018) have investigated the influence of abstract and concrete mindsets on the decision-making process of consumers faced with difficult tradeoffs. They have found that an abstract mindset decreases the intensity of negative emotions experienced by consumers as well as the need to participate in coping behaviors. The application of psychological distance within the field of individual emotions and reactions provides a scientific interpretative tool that can be used to uncover the processes involved in the generation, control, and regulation of individual emotions and reactions.

C3 Social cognition and decisions. In research examining social cognition and decisions, the focus has primarily

been placed on individual cognition and decision-making in relation to others or objects. This research has been carried out primarily to investigate the following. First, this work has explained how individuals form impressions of others. Rim et al. (2009) have shown that subjects with high-level construal tend to form more abstract representations of events and are more likely to infer other people's personality traits to accelerate the formation of their impression of others. Second, the differences involved in individual preferences for others have been clarified. Because individuals with a high-level construal mindset pay greater attention to abstract self-concepts, they show a preference for people or things similar to their self-concept (including personality traits or life goals) (Freitas et al. 2008). Third, this work has interpreted changes in social cognition and decisions induced by a sense of power differences. Individuals with a high sense of power tend to perceive a greater social distance between themselves and others, thus suggesting that a high sense of power is associated with a high-level construal mindset (Lammers et al. 2012). The application of psychological distance in the field of social cognition and decision-making provides a theoretical explanation for individual cognition and decision-making in society.

C4 Marketing and consumer behavior. Related research has been conducted to examine the following. First, psychological distance was applied to study consumer perceptions. The related research has indicated that construal level influences consumers' perceptions of information attributes. Information about "loss" is more effective in influencing consumers with a low-level construal mindset, whereas information about "gain" is more effective in influencing consumers with a high-level construal mindset (White et al. 2011). Second, psychological distance has been applied to research consumer attitudes and evaluations, and has mainly focused on explaining differences in consumer product preferences based on product attributes (Henderson 2013). Third, psychological distance has been applied to study customer choice, as mainly reflected in consumers' choice of extended products (White et al. 2011). The application of psychological distance in the field of marketing and consumer behavior has provided an important perspective that can be used to clarify consumers internal perceptions of products/brands, to determine the fit and mechanism of consumer choice behavior.

C5 International trade. In research examining international trade, psychological distance has mainly been used to discuss the obstacles affecting international trade. Håkanson (2014) has defined psychological distance as the cost and difficulty affecting international trade transfer. Export research is an important facet of the field of international marketing (Chabowski et al. 2018). Bodlaj and Vida (2018) have explored how export managers experience and perceive transnational differences. In addition, cultural distance has been identified as a key factor in international trade. From the perspective of familiarity, in the initial stage of foreign market selection, a manager's familiarity with the country directly affects the manager's psychological distance to the overseas market, which in turn influences the decision-making process and the outcome (Clark et al. 2017). The application of psychological distance in the field of international trade highlights the obstacles and formation mechanisms in international trade, and offers a framework for better international trade.

C6 Environmental protection and social responsibility. Scholars have introduced psychological distance into the research fields of environmental protection and pro-social behavior. Ryoo et al. (2017) have used psychological distance to explain the failures of the public to adopt behaviors that promote environmental protection. The authors have demonstrated that emphasizing economic benefits (for example, saving money) decreases consumer interest in sustainable products when individuals' thinking patterns are more abstract than concrete. In terms of theoretical application, scholars have explored the relationship between the decrease in psychological distance in relation to climate change and loyalty to green products from the perspective of environmental sustainability (Yu et al. 2017). Furthermore, some researchers have conducted further studies using a combination of other theories. The application of psychological distance in the field of environmental protection and social responsibility has provided new ideas and theoretical methods to solve current environmental behavior problems.

Conclusions and Future Trends

Conclusions

We drew the following conclusions from the analysis of 1371 psychological distance research studies. In terms of the number of published studies, psychological distance research has experienced four periods: an infancy period, an exploration period, a growth period, and an outbreak period. After 2006, the number of published research studies showed a rapid growth trend. Psychological distance is currently experiencing an outbreak period, thus indicating that research on psychological distance offers broad potential. In terms of the national distribution, research on psychological distance is mainly concentrated in the United States (46.68%), followed by China (8.83%), England, Canada, and the Netherlands. With respect to journal distribution, the research is mainly published in psychology, social psychology, business economics, marketing, and organizational behavior journals, and other related research journals.

The results of the research category analysis showed that psychological distance is mainly disseminated in the fields of "psychology," "economics," "business," "social psychology," and "management." In recent years, the research has begun to expand into research categories such as the social sciences, neuroscience, and environmental sciences.

On the basis of the analysis of the co-occurrence of keywords, we drew the following conclusions. The following keywords represent the central hotspots of psychological distance research: "temporal distance," "decision making," "internationalization," "marketing," and "climate change." Research on psychological distance was first carried out at the individual psychological level, and it then expanded to the social developmental level during the growth period and appeared at the individual behavioral level in the outbreak period. The related research is characterized by the coordinated development of individual psychology, and individual behavioral and social development. Research at the individual psychology level has become a hotspot, and the number of research studies has shown an increasing trend. In the outbreak period, psychological distance research expanded to the level of social development and was mainly concentrated in the field of international trade. In the past 5 years, psychological distance research has been carried out at the individual behavioral level and focused on the study of consumer choice behavior. Research at the social development level has continued to expand, and the research has focused on the field of environmental science.

Cluster analysis of high-frequency keywords revealed six clusters: "psychological construction process," "individual emotions and reactions," "social cognition and decisions," "marketing and consumer behavior," "international trade," and "environmental protection and social responsibility." Further integration of the six clusters can be divided into three process: theory generation, theory driving, and theory diffusion.

Future Trends

In the past decade, scholars have placed great importance on psychological distance, a social psychology theory of "pure cognitive orientation," and notable progress has been made in various fields. Research on psychological distance shows substantial potential. This study analyzed the future trends in psychological distance research from the viewpoint of the direction of research and research category (Fig. 8), while performing subclassification from the perspective of psychosocial distance and construal level. The specific analysis is as follows.

Dimension At present, research on psychological distance has identified four major dimensions: spatial distance, temporal distance, social distance, and hypotheticality (Trope and Liberman 2010). The dimensions of psychological distance interact with one another; i.e., a change in one of the distance dimensions affects the perception of other distance dimensions. However, previous studies have generally investigated psychological distance by referring to a single distance dimension but have rarely examined multiple distance dimensions. How do the distance dimensions interact and cause changes in psychological distance? The existing research has not comprehensively demonstrated the process of dynamic change in psychological distance, which could be examined by increasing the number of distance dimensions, and which requires further study.

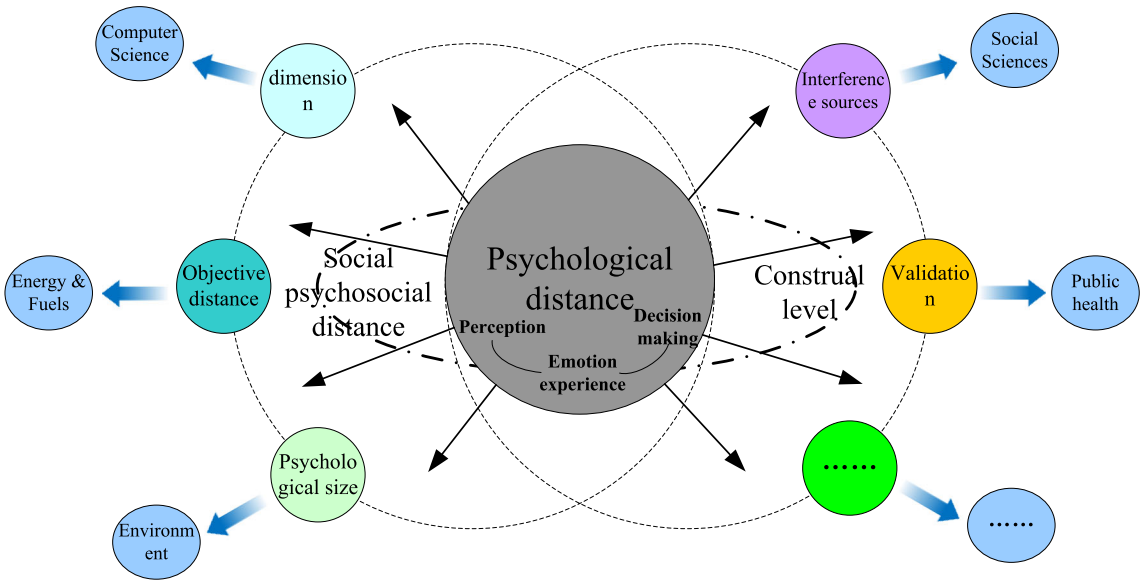

Fig. 8 Future trends model of psychological distance

Objective Distance Psychological distance is the perception of objective distance, a gradual process from near to far. Whether changes in objective distance affect the dynamic changes in psychological distance remains unclear. In general, when the distance is close, the change in objective distance causes a change in psychological distance. However, with an increase in objective distance, the change in psychological distance becomes smaller. According to Weber-Fechner law, the change in psychological distance, caused by a change in objective distance, follows a logarithmic function rather than a linear function. Zauberman et al. (2009) have confirmed that this logarithmic relationship is also applicable to the subjective judgment of the time distance of future events. These studies have shown that an initial change in objective distance causes a large change in psychological distance, and the effects of subsequent changes in psychological distance decrease rapidly. However, the above research does not fully describe the specific process of change in psychological distance with changes in objective distance, a topic that must be further explored.

Psychological Size Psychological size is the perceived state of one person relative to another. The psychological size difference is directly related to psychological distance, such that individual psychological size includes the size of the self and the size of the other. Existing research has been confined to manager-subordinate relationships (Salzmann and Grasha 1991), teachers, and learners (Vaughn and Baker 2010). Psychological size is defined as the size of oneself (or another person), and psychological distance is the distance between each circle. However, the specific relationship between psychological size and psychological distance remains unknown and requires further discussion.

Interference Sources CLT is a social cognitive theory that emphasizes the importance of an individual's perception and understanding of the environment (Nussbaum et al. 2003). Therefore, research examining the influence of the external environment (interference source) on individual perceptions of psychological distance offer practical value. At present, most research on the source of interference has used an information framework to analyze the influence of individual behavior and implement thorough and effective countermeasures by matching the information intervention and psychological distance (Chang et al. 2015). It is critical to explore the interference factors that affect psychological distance, to decrease the psychological distance between the perceived subject and the perceived object and thereby improve social efficiency. Therefore, research on the source of psychological distance interference is a direction for future research.

Validation Psychological distance is a subjective perception that requires objective equipment to further verify its accuracy and scientific validity. Future studies may use electroencephalograms, eye trackers, and other instruments to verify the psychological distance between the perceived subject and object by evaluating electroencephalograms, eye movements, heart rate variations, emotions, electromyography, and skin peripheral circulation methods. At present, no researchers have verified the actual psychological distance perception of individuals, and this problem remains to be explored.

Research Category The analysis of the categories of psychological distance research indicated that psychological distance has been widely used in the fields of environmental science, social sciences, computer sciences, public health, neuroscience, meteorology, energy and fuels, and other domains. This is inseparable from the real-world context, in which the global environment and health problems are increasingly prominent, and computers are widely used. Therefore, psychological distance complies with the historical development trends. Scholars introduced the concept of psychological distance to solve these practical problems while also considering the development needs of the field. These fields will continue to represent future hotspots of research. The application of psychological distance in these fields can be further expanded in both breadth and depth.

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Compliance with Ethical Standards

Conflict of Interest The authors declared no conflicts of interest with respect to the authorship or the publication of this article.

Ethical Approval Not applicable.

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References

Agnew, C. R., Loving, T. J., Le, B., & Goodfriend, W. (2004). Thinking close: Measuring relational closeness as perceived self-other inclusion. In D. J. Mashek & A. P. Aron (Eds.), *Handbook of closeness and intimacy* (pp. 103–115). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Alberto, F., & Sergio, G. (2019). Versatile linkage: A family of space-conserving strategies for agglomerative hierarchical clustering. *Journal of Classification, 3*, 1–14. https://doi.org/10.1007/s00357-019-09339-z.

Alexander, D. L., & Ashley, S. B. (2018). Besting the status quo: The effect of abstract versus concrete mindsets on emotional trade-off difficulty and avoidant coping behavior. *Marketing Letters, 29*(3), 351–362. https://doi.org/10.1007/s11002-018-9463-8.

Alter, A. L., & Oppenheimer, D. M. (2008). Effects of fluency on psychological distance and mental construal (or why New York is a large City, but New York is a civilized jungle). *Psychological Science, 19*(2), 161–167. https://doi.org/10.1111/j.1467-9280.2008.02062.x.

Apriliyanti, I. D., & Alon, I. (2017). Bibliometric analysis of absorptive capacity. *International Business Review, 26*(5), 896–907. https://doi.org/10.1016/j.ibusrev.2017.02.007.

Bodlaj, M., & Vida, I. (2018). Factors underlying cultural and psychic distance in cross-national activities of export managers: Qualitative insights from a CEE country. *Journal for East European Management Studies, 23*(3), 351–376. https://doi.org/10.5771/0949-6181-2018-3-351.

Boyle, F., & Sherman, D. (2006). Scopus: The product and its development. *The Serials Librarian, 49*(3), 147–153. https://doi.org/10.1300/J123v49n03_12.

Bullough, E. (1912). "psychical distance" as a factor in art and an aesthetic principle. *British Journal of Psychology, 5*(2), 87–118. https://doi.org/10.1111/j.2044-8295.1912.tb00057.x.

Chabowski, B., Kekec, P., Morgan, N. A., Hult, G. T. M., Walkowiak, T., & Runnalls, B. (2018). An assessment of the exporting literature: Using theory and data to identify future research directions. *Journal of International Marketing, 26*(1), 118–143. https://doi.org/10.1509/jim.16.0129.

Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising, 34*(1), 158–176. https://doi.org/10.1080/02650487.2014.994731.

Chen, H., & Li, S. (2018). Measuring the psychological distance between an organization and its members—The construction and validation of a new scale. *Frontiers in Psychology, 8*, 2296. https://doi.org/10.3389/fpsyg.2017.02296.

H, Chen, Y, Feng, S. S, Li, Y. U, Zheng, & X. X, Yang (2019). Bibliometric analysis of theme evolution and future research trends of the type a personality. *Personality and Individual Differences*, 150, 109507. doi.org/10.1016/j.paid.2019.109507.

Clark, D. R., Li, D., & Shepherd, D. A. (2017). Country familiarity in the initial stage of foreign market selection. *Journal of International Business Studies, 49*(4), 442–472. https://doi.org/10.1057/s41267-017-0099-3.

Corpet, F. (1988). Multiple sequence alignment with hierarchical clustering. Nucleic acids research, 16(22), 10881-10890. Doi:Org/https://doi.org/10.1093/nar/16.22.10881.

R, Duan, B, Takahashi, & A, Zwickle (2019). Abstract or concrete? The effect of climate change images on people's estimation of egocentric psychological distance. *Public Understanding of Science*, 1-17. doi: https://doi.org/10.1177/0963662519865982.

Everitt, B. (1980). Cluster analysis. *Quality & Quantity, 14*(1), 75–100. https://doi.org/10.1007/BF00154794.

Freitas, A. L., Langsam, K. L., Clark, S., & Moeller, S. J. (2008). Seeing oneself in one's choices: Construal level and self-pertinence of electoral and consumer decisions. *Journal of Experimental Social Psychology, 44*(4), 1174–1179. https://doi.org/10.1016/j.jesp.2008.02.011.

Genschow, O., Hansen, J., Wänke, M., & Trope, Y. (2019). Psychological distance modulates goal-based versus movement-based imitation. *Journal of Experimental Psychology: Human Perception and Performance, 45*(8), 1031–1048. https://doi.org/10.1037/xhp0000654.

Guo, D., Chen, H., Long, R., Lu, H., & Long, Q. (2017). A co-word analysis of organizational constraints for maintaining sustainability. *Sustainability, 9*(10), 1928. https://doi.org/10.3390/su9101928.

Håkanson, L. (2014). The role of psychic distance in international trade: A longitudinal analysis. *International Marketing Review, 31*(3), 210–236. https://doi.org/10.1108/imr-04-2013-0079.

Henderson, M. D. (2013). When seeing the forest reduces the need for trees: The role of construal level in attraction to choice. *Journal of Experimental Social Psychology, 49*(4), 676–683. https://doi.org/10.1016/j.jesp.2013.03.001.

Huang, Y. N. (2015). Research of psychological distance in interpersonal relationship. *Journal of Chifeng College: Natural Science Edition, 31*(6), 114–116. https://doi.org/10.3969/j.issn.1673-260X.2015.12.044.

Koval, V., Prymush, Y., & Popova, V. (2017). The influence of the enterprise life cycle on the efficiency of investment. *Baltic. Journal of Economic Studies, 3*(5), 183–187. https://doi.org/10.30525/2256-0742/2017-3-5-183-187.

Lammers, J., Galinsky, A. D., Gordijn, E. H., & Otten, S. (2012). Power increases social distance. *Social Psychological and Personality Science, 3*(3), 282–290. https://doi.org/10.1177/1948550611418679.

Levinson, S. C., & Brown, P. (1987). *Politeness: Some universals in language usage*. Cambridge, England: Cambridge university press.

S, Li, & H, Chen (2019). Closeness or distance? An investigation of employee–organization relationships: From a psychological distance perspective. *Frontiers in Psychology*. 2019, 9, 2765. doi: org/https://doi.org/10.3389/fpsyg.2018.02765

Li, S., Chen, H., Huang, X., Hou, C., & Chen, F. (2019). Chinese public response to occupational safety and health problems—A study based on psychological distance. *International Journal of Environmental Research and Public Health, 16*(11), 1944. https://doi.org/10.3390/ijerph16111944.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology, 75*(1), 5–18. https://doi.org/10.1037/0022-3514.75.1.5.

Liberman, N., Sagristano, M. D., & Trope, Y. (2002). The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology, 38*(6), 523–534. https://doi.org/10.1016/s0022-1031(02)00535-8.

Liberman, N., Trope, Y., & Wakslak, C. (2007). Construal level theory and consumer behavior. *Journal of Consumer Psychology, 17*(2), 113–117. https://doi.org/10.1016/s1057-7408(07)70017-7.

Liu, B., Chen, H., & Huang, X. (2018). Map changes and theme evolution in work hours: A co-word analysis. *International Journal of Environmental Research and Public Health, 15*(5), 1039. https://doi.org/10.3390/ijerph15051039.

Mei, D., Li, L. M. W., & Wang, Y. (2018). Influence of emotional valence on perceived psychological distance depends on emotional intensity. *European Journal of Social Psychology, 48*(5), 687–700. https://doi.org/10.1002/ejsp.2361.

Moore, W. C., Meyers, D. A., Wenzel, S. E., Teague, W. G., Li, H., Li, X., D'Agostino R Jr, Castro, M., Curran-Everett, D., Fitzpatrick, A. M., Gaston, B., Jarjour, N. N., Sorkness, R., Calhoun, W. J., Chung, K. F., Comhair, S. A., Dweik, R. A., Israel, E., Peters, S. P., Busse, W.

W., Erzurum, S. C., Bleecker, E. R., & National Heart, Lung, and Blood Institute's Severe Asthma Research Program. (2010). Identification of asthma phenotypes using cluster analysis in the severe asthma research program. *American Journal of Respiratory and Critical Care Medicine, 181*(4), 315–323. https://doi.org/10.1164/rccm.200906-0896OC.

Nussbaum, S., Trope, Y., & Liberman, N. (2003). Creeping dispositionism: The temporal dynamics of behavior prediction. *Journal of Personality and Social Psychology, 84*(3), 485–497. https://doi.org/10.1037/0022-3514.84.3.485.

Pluye, P., Hong, Q. N., Bush, P. L., & Vedel, I. (2016). Opening-up the definition of systematic literature review: The plurality of worldviews, methodologies and methods for reviews and syntheses. *Journal of Clinical Epidemiology, 73*, 2–5. https://doi.org/10.1016/j.jclinepi.2015.08.033.

Rim, S., Uleman, J. S., & Trope, Y. (2009). Spontaneous trait inference and construal level theory: Psychological distance increases nonconscious trait thinking. *Journal of Experimental Social Psychology, 45*(5), 1088–1097. https://doi.org/10.1016/j.jesp.2009.06.015.

Rogers, M. L., Hom, M. A., Stanley, I. H., & Joiner, T. E. (2018). Brief measures of physical and psychological distance to suicide methods as correlates and predictors of suicide risk: A multi-study prospective investigation. *Behaviour Research and Therapy, 120*, 103330. https://doi.org/10.1016/j.brat.2018.11.001.

Ronda-Pupo, G. A., & Guerras-Martin, L. Á. (2011). Dynamics of the evolution of the strategy concept 1962-2008: A co-word analysis. *Strategic Management Journal, 33*(2), 162–188. https://doi.org/10.1002/smj.948.

Roose, G., Vermeir, I., Geuens, M., & Van Kerckhove, A. (2019). A match made in heaven or down under? *The effectiveness of matching visual and verbal horizons in advertising. Journal of Consumer Psychology. In Press. doi*. https://doi.org/10.1002/jcpy.1088.

Ryoo, Y., Hyun, N. K., & Sung, Y. (2017). The effect of descriptive norms and construal level on consumers' sustainable behaviors. *Journal of Advertising, 46*(4), 536–549. https://doi.org/10.1080/00913367.2017.1396514.

Salzmann, J., & Grasha, A. F. (1991). Psychological size and psychological distance in manager-subordinate relationships. *The Journal of Social Psychology, 131*(5), 629–646. https://doi.org/10.1080/00224545.1991.9924647.

Seuring, S., Müller, M., Westhaus, M., & Morana, R. (2005). Conducting a literature review —The example of sustainability in supply chains. *Research Methodologies in Supply Chain Management*, 91–106. https://doi.org/10.1007/3-7908-1636-1_7.

Shapira, O., Liberman, L., Trope, Y., & Rim, S. (2012). Levels of mental construal. In *The SAGE handbook of social cognition* (pp. 229–250). Los Angeles: Sage.

Small, H. (1988). Mapping the dynamics of science and technology. *Scientometrics, 14*(1–2), 165–168. https://doi.org/10.1007/bf02020250.

Spence, A., Poortinga, W., & Pidgeon, N. (2012). The psychological distance of climate change. *Risk Analysis, 32*(6), 957–972. https://doi.org/10.1111/j.1539-6924.2011.01695.x.

Stephan, E., Liberman, N., & Trope, Y. (2010). Politeness and psychological distance: A construal level perspective. *Journal of Personality and Social Psychology, 98*(2), 268–280. https://doi.org/10.1037/a0016960.

Suzuki, S. (2019). Effects of psychological distance on attraction effect. *The Journal of Social Psychology, 159*(5), 561–574. https://doi.org/10.1080/00224545.2018.1526772.

Theodorakis, I. G., & Painesis, G. (2018). The impact of psychological distance and construal level on consumers' responses to taboos in advertising. *Journal of Advertising, 47*(2), 161–181. https://doi.org/10.1080/00913367.2018.1452654.

Tian, X., Geng, Y., Sarkis, J., & Zhong, S. (2018). Trends and features of embodied flows associated with international trade based on bibliometric analysis. *Resources, Conservation and Recycling, 131*, 148–157. https://doi.org/10.1016/j.resconrec.2018.01.002.

Tolor, A., & Orange, S. (1969). An attempt to measure psychological distance in advantaged and disadvantaged children. *Child Development, 40*(2), 407–420. https://doi.org/10.2307/1127411.

Trautmann, S. T., & Kuilen, G. V. D. (2012). Prospect theory or construal level theory: Diminishing sensitivity vs. psychological distance in risky decisions. *Acta Psychologica, 139*(1), 254–260. https://doi.org/10.1016/j.actpsy.2011.08.006.

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review, 110*(3), 403–421. https://doi.org/10.1037/0033-295X.110.3.403.

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440–463. https://doi.org/10.1037/a0018963.

Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior. *Journal of Consumer Psychology, 17*(2), 83–95. https://doi.org/10.1016/s1057-7408(07)70013-x.

A, Vanderstukken, B, Schreurs, F, Germeys, A, Van den Broeck, & K, Proost (2019). Should supervisors communicate goals or visions? The moderating role of subordinates' psychological distance. *Journal of Applied Social Psychology*, 1-13. doi: https://doi.org/10.1111/jasp.12626.

Vaughn, L. M., & Baker, R. C. (2010). Psychological size and distance: Emphasising the interpersonal relationship as a pathway to optimal teaching and learning conditions. *Medical Education, 38*(10), 1053–1060. https://doi.org/10.1111/j.1365-2929.2004.01952.x.

Wade, S., & Ghahramani, Z. (2018). Bayesian cluster analysis: Point estimation and credible balls (with discussion). *Bayesian Analysis, 13*(2), 559–626. https://doi.org/10.1214/17-ba1073.

White, K., MacDonnell, R., & Dahl, D. W. (2011). It's the mind-set that matters: The role of construal level and message framing in influencing consumer efficacy and conservation behaviors. *Journal of Marketing Research, 48*(3), 472–485. https://doi.org/10.1509/jmkr.48.3.472.

Yu, T. Y., Yu, T. K., & Chao, C. M. (2017). Understanding Taiwanese undergraduate students' pro-environmental behavioral intention towards green products in the fight against climate change. *Journal of Cleaner Production, 161*, 390–402. https://doi.org/10.1016/j.jclepro.2017.05.115.

Zauberman, G., Kim, B. K., Malkoc, S. A., & Bettman, J. R. (2009). Discounting time and time discounting: Subjective time perception and intertemporal preferences. *Journal of Marketing Research, 46*(4), 543–556. https://doi.org/10.1509/jmkr.46.4.543.

Zhong, W. J., & Li, J. (2008). The research of co-word analysis (1) — The process and methods of co-word analysis. *Journal of Information, 27*(5), 70–72. https://doi.org/10.3969/j.issn.1002-1965.2008.05.022.