

An Analysis of the Research Status about Conscientiousness Based on CiteSpace

Manhui Huang¹, Jiali Fu², Changxian Li^{3,*}, Ye Zhu⁴

¹huangmanhui@126.com, ²2225439904@qq.com, ³*Corresponding author: l_changxian@163.com, ⁴1320970300@qq.com

Information Science School, Guangdong University of Finance and Economics Guangzhou, China

Abstract— To analyze the research status of conscientiousness in management field, this paper uses related literature records from 1985 to 2020 in the core collection of Web of Science database as the sample, and uses CiteSpace software to conduct the analyses of keyword co-occurrence, keyword mutation, scientific cooperation network, etc. The results show that in most research conscientiousness refers to one kind of personality of the big-five personality, and such research focuses on the outcome of conscientiousness including behavior and performance, the antecedents which show how to change one's personality, and the method used to conduct the research. While in some other research, conscientiousness may refer to one kind of organizational citizenship behavior (OCB), and such research focuses on the antecedents such as individual personality and organizational justice, and the effect of conscientiousness on job performance.

Keywords-conscientiousness; OCB; personality; job performance; CiteSpace

1 INTRODUCTION

"Conscientiousness" may refer to personality or behavior in the human resource management field. As behavior, usually it is one of the dimensions of organizational citizenship behavior (OCB). In 1988, Organ initially defined OCB as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization"^[1]. According to Organ^[1], organizational citizenship behavior composed of five dimensions including altruism, conscientiousness, sportsmanship, courtesy and civic virtue^[1]. Organ defined conscientiousness as "a pattern of going well beyond minimally required levels of attendance, punctuality, housekeeping, conserving resources, and related matters of internal maintenance"^[1]. In comparison, as personality, conscientiousness is one of the big 5 personality traits, and is defined as: "orderly, responsible, and dependable"^[2].

To explore the research status of conscientiousness, the current study uses the bibliometric software CiteSpace to conduct the analyses of keyword co-occurrence, research cooperation network, etc., based on the relevant literature records in the core collection of the Web of Science database.

2 RESEARCH STATUS OF CONSCIENTIOUSNESS PERSONALITY

2.1 Number of Publications

To analyze the status and trends of conscientiousness personality research, we used the advanced search function of Web of Science database. To retrieve articles concerning conscientiousness personality, we retrieved with the search formula "TS (title subject) =conscientiousness AND AB (abstract) = personality", aiming at retrieving articles with the subject of conscientiousness and its abstract containing the term "personality". The literature type is limited as "Article", and the time range is set from 1985 to 2020. Finally, 5264 literatures were retrieved, and the citation report from Web of Science was output. The number of articles about conscientiousness personality is shown in Figure 1. It shows that conscientiousness personality began to be paid lots of attention to in 2002, and the number of publications increased every year, which implied that conscientiousness personality has been an important research field in the recent years.

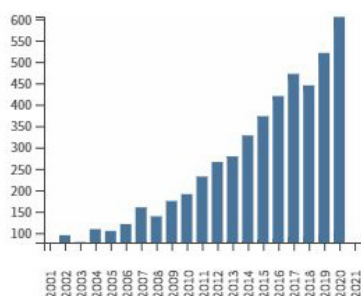


Figure 1. Chronological distribution of the number of papers

2.2 Research hotspots and trends

1) *Reference co-citation cluster analysis*. In the CiteSpace software, the "Node types" was set as "Reference", the Pathfinder algorithm was used to simplify the generated co-citation network, and the results are shown in Figure 2.

Figure 2 shows that totally the reference co-citation network of conscientiousness personality research generated 456 nodes ($N=456$) and 903 connections ($E=903$). Modularity is an index of cluster and its value is represented by the letter Q . If $Q>0.3$, the obtained cluster is considered to be reasonable. The Silhouette value is an index used to measure the homogeneity of the cluster. If the Silhouette is higher than 0.7, the cluster will be reliable^[3]. Figure 2 shows $Q=0.33$ (>0.3) and $S=0.935$ (>0.7), indicating that the cluster is reasonable and reliable. Totally there are 8 clusters. The cluster labels are #0 cohort studies, #1 five-factor personality trait, #2 emotional stability, #3 contextual performance, #4 volitional personality change, #5 childhood personality, #6 college performance, #7 schizophrenic patient respectively. These clusters can be further divided into categories including attribute, research method, consequence, and antecedent of conscientiousness personality.

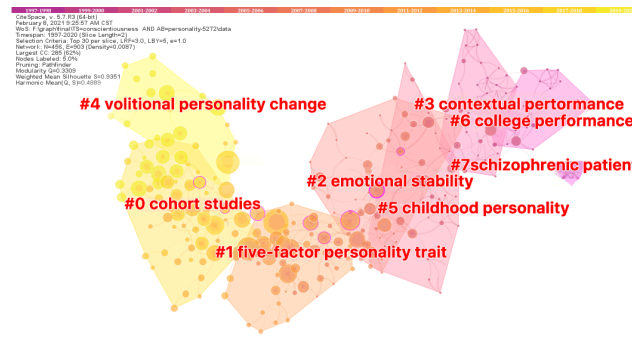


Figure 2. Co-citation cluster map

Cluster #1 “five-factor personality trait”, Cluster #5 “childhood personality”, and Cluster #2 “emotional stability” indicate that conscientiousness may be treated as one kind of personality in the five-trait model, which reflects the attribute of conscientiousness. The five traits are openness, conscientiousness, extraversion, agreeableness and neuroticism [4].

Cluster #0 “cohort studies” indicates a common method used in conscientiousness personality research. The main steps of the cohort study are as follows. First, divide the research subjects into different groups according to whether they are exposed to a risk factor to be studied or according to their different exposure levels. Second, observe the subjects for a period of time, check and register the occurrence rate of the expected outcome of each group. Third, compare the outcome of each group, and evaluate and test the relationship between the risk factor and outcome[5].

Cluster #3 “contextual performance” and #6 “college performance” indicate the consequences of conscientiousness personality. Many studies have shown that conscientiousness personality is a strong predictor of performance[6-12]. Some studies have shown that conscientiousness personality is closely associated with health, behavior, and interpersonal relationships [13-21].

Cluster #8 “volitional personality change” indicates the antecedent research of conscientiousness personality. It has been pointed out that “In recent years, research on volitional personality change has received more attention, which shows that many individuals want to change personality for the better, especially the characteristics that they lack in social needs” [22]. The antecedents of conscientiousness personality may include training, intervention, age, gender, heredity, and environment [23-26].

Additionally, Cluster #7 “schizophrenic patient” indicates that conscientiousness personality has been paid lots of attention to in the psychological field and the health field.

2) *Keywords co-occurrence analysis.* Word frequency analysis method is to extract keywords that can express the core content of the literature and calculate the frequency of keywords from the literature information to analyze the development trends and research hotspots of the field[3].

In the CiteSpace software, we changed "node types" to "keyword", set the time slice to 2 years, and used the pathfinder algorithm to simplify the co-occurrence network to obtain a keyword co-occurrence map. The top 20 keywords with the highest co-occurrence frequency are shown

in Table 1. Figure 3 is a keyword co-occurrence network map with the main keyword nodes and the main links among the nodes. As Table 1 shown, “conscientiousness” appeared 1014 times in the 5264 literatures, ranking No.3 in frequency. Figure 3 shows that conscientiousness has close connections with many other nodes. The keywords with the highest co-occurrence times are "personality" and "big 5", which appeared 3417 times and 2167 times respectively, as shown in Table 1. This implies that conscientiousness, as a personality trait in the "big five personality", has been paid lots of attention to.

Table 1 shows that the keywords "performance" and "job performance" have a high frequency of occurrence in the literatures, ranking 6th and 9th respectively. The occurrence times are 565 and 488 respectively. Accordingly, Figure 3 shows that conscientiousness has significant relationship with "performance" and "job performance". This implies that conscientiousness has an important effect on performance. Additionally, Table 1 shows that "behavior" is ranking 5th with a high frequency of 629, and Figure 3 shows that conscientiousness is significantly related with behavior. Based on the above discussion, it can be concluded that the outcome of conscientiousness personality is a hotspot in management research.

TABLE 1. TOP20 KEYWORDS IN PERSONALITY RESEARCH

Key Words	Relevant information		
	<i>id</i>	<i>Frequenc y</i>	<i>Centralit y</i>
personality	1	3417	0.02
big 5	2	2167	0.03
conscientiousness	3	1014	0.02
model	4	650	0.03
behavior	5	629	0.04
performance	6	565	0.03
meta-analysis	7	564	0.05
neuroticism	8	541	0.18
job performance	9	488	0.02
predictor	10	462	0.03
dimension	11	419	0.16
health	12	407	0.04
validity	13	407	0.04
depression	14	344	0.2
individual difference	15	321	0.05
validation	16	291	0.18
stress	17	250	0.02
motivation	18	228	0
intelligence	19	227	0.01
disorder	20	220	0.01



Figure 3. Keyword Cooperation Network map

3) *Keyword Burst*: Burst words refer to the words that appear frequently during a period of time^[27], from which we may see the change of the research focuses^[28]. The top 25 keywords with the highest burst strength in the conscientiousness personality research are shown in Figure 4.

Figure 4 shows the burst keywords from 1998 to 2020, which implies that lots of research on conscientiousness personality in different topics had been conducted.

From 1998 to 2010, the burst strength of "work performance" is the highest, indicating that the impact of conscientiousness personality on job performance was a research hotspot during that period. Some other keywords with high burst strength include "dimension", "rating", "construct", "validity", and "scale", which indicates that how to measure conscientiousness is another research hotspot during that time. The keywords including social desirability, adulthood, optimism, and so on, indicated that the antecedents of conscientiousness personality were also a hotspot at that time. The burst keyword "personnel selection" indicates that conscientiousness personality has been paid lots of attention to in the human resource management.

From 2010 to 2015, the keywords with high burst strength include organizational citizenship behavior, mechanism, and meta-analysis, which indicates the relationship between conscientiousness personality and OCB was a hotspot during 2010 to 2015.

From 2015 to 2020, the keywords include "internet addiction", "social media", "engagement", "big 5 personality", "medical student", "consumption", and so on. These keywords change indicated that in recent years, the research still focused on the influences of conscientiousness personality on behaviors, but the research context had been extended to some other contexts such as online behaviors, consumption behavior, and medical field.

Top 25 Keywords with the Strongest Citation Bursts

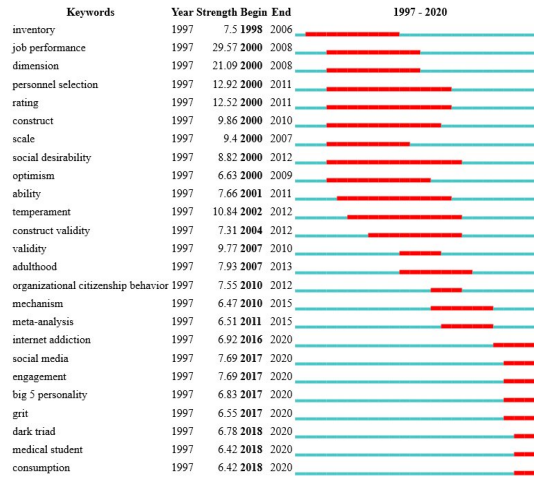


Figure 4. Burst keywords in conscientiousness personality research

3 CONSCIENTIOUSNESS AS BEHAVIOR

As stated above, conscientiousness may also be treated as one type of OCB. To further explore the research status of conscientiousness behavior, we retrieve the literature records with both conscientiousness and OCB as keywords using the CiteSpace software. Finally 201 literature records were obtained. Keyword co-occurrence analysis was performed on these 201 records. The top 20 keywords was shown in Table 2.

The results showed that "organizational citizenship behavior" appears 138 times in the 201 references, ranking No.1 of the appearance frequency. Therefore, as behavior, conscientiousness was usually treated as one of the dimensions of OCB in the existing research. The top keywords include "job performance", "performance", and "task performance", indicating that as a dimension of OCB, the consequence of conscientiousness is a hotspot in the existing research, and conscientiousness behavior may predict performance. The top keywords include "job satisfaction", "work commitment", "justice", "personality", and "trait", indicating that antecedents of conscientiousness behavior is another hotspot, and the antecedents of conscientiousness behavior may include individual factors such as job satisfaction and organizational factors such as organizational justice.

TABLE 2. TOP20 KEYWORDS IN BEHAVIOR RESEARCH

Key Words	Relevant information		
	<i>id</i>	<i>Frequen cy</i>	<i>Centrality</i>
organizational citizenship behavior	1	138	0.02
job performance	2	79	0.1
personality	3	77	0.05

performance	4	58	0.09
conscientiousness	5	50	0.06
5 factor model	6	43	0.11
job satisfaction	7	39	0.1
meta-analysis	8	39	0.07
predictor	9	37	0.03
model	10	31	0.06
work	11	30	0.05
commitment	12	30	0.07
dimension	13	24	0.1
satisfaction	14	20	0.03
counterproductive work behavior	15	19	0.06
task performance	16	18	0.01
justice	17	15	0.05
trait	18	15	0.08
workplace deviance	19	15	0.07
impact	20	15	0.07

4 CONCLUSIONS

The current research used the literature records retrieved from the Web of Science database as a sample to conduct a quantitative analysis of the research status and trends of conscientiousness by CiteSpace software. In the existing research, conscientiousness may be treated as one of the big-5 personality or one of the dimensions of OCB. As personality, the research focused on how to measure conscientiousness, the antecedents of conscientiousness personality, and the effect of conscientiousness on work behavior or work performance. In recent years, the research has been extended to some other context such as the online behavior, consumption behavior, and the medical field. In comparison, as work behavior, conscientiousness was usually treated as one kind of OCB. The research on conscientiousness behavior focused on the antecedent analysis including individual factors such as work commitment and organizational factors such as organizational justice, and the effect of conscientiousness behavior on work performance. Comparing with the abundance of personality research, the research of conscientiousness behavior is still limited. Future research may extend the behavior research to some other contexts such as the IT context.

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