

# The influence of users' dark triad on knowledge contribution behaviour on social Q&A sites

Lin Wang, Yajing Liu, Wenjun Han and Junping Qiu

## Abstract

**Introduction.** *The users' knowledge contribution behaviour is the driving force for the sustainable development of the social Q&A sites. This kind of user behaviour is affected by various factors, among which users' personality traits are the prominent ones. The dark triad is a theory on the dark side of personality. This article explores the influence and mechanism of users' dark triad on their knowledge contribution in social Q&A sites.*

**Method.** *A questionnaire survey and statistical methods such as hierarchical regression and Bootstrap analysis were adopted in this study.*

**Analysis Information** *about 301 users with experience in Chinese social Q&A sites were collected through the questionnaire survey. The quantitative analysis of survey data employed the statistical package SPSS 26.0.*

**Results.** *The dark triad significantly affects knowledge contribution on social Q & A sites. Online self-disclosure plays a completely mediating role in the relationship between the dark triad and knowledge contribution. The relational psychological contract has a moderating role between online self-disclosure and knowledge contribution.*

**Conclusions.** *This study argues that the dark triad has a positive effect on knowledge contribution behaviour in socialized Q&A communities by constructing a model of mediated effects that are moderated. The dark triad shows its altruistic side in the context of social Q&A sites. The role of the dark triad in different knowledge-intensive contexts should be viewed dialectically in future research. Based on these findings, we put forward some suggestions for encouraging users' knowledge contribution behaviour in the social media context.*

**Keywords:** *dark triad; knowledge contribution; online self-disclosure; relational psychological contract; social Q&A sites*

## **Introduction**

The popularity of Web 2.0 has driven the boom of social Q&A sites (SQA). Social Q&A sites, represented by Quora in the west and Zhihu in China, have become the main channels for the public to acquire knowledge. User-centered and user-generated content are the main characteristics of social Q&A sites (Wang, 2018). As the content producers of social Q&A sites, users are the key to the sustainable development of these platforms. Their contributions to quality knowledge are the core value of social Q&A sites (Tang, 2018). Exploring the influencing factors of users' knowledge contribution behaviour can help social Q&A sites design mechanisms and rules in a targeted manner to motivate users to produce and share high-quality knowledge.

User knowledge contribution behaviour is an important field of information behaviour research. Its dominant research paradigm is the classical cognitive-psychological paradigm, in which personality traits in psychology are among the strongest predictors of knowledge contribution behaviour and sharing attitude (Schmitt, et al., 2007; Matzler, et al., 2011). Studies have found that the Big Five Personality, i.e., conscientiousness, agreeableness, extraversion and openness are positively correlated with knowledge contribution (Zhao, 2013; Esmaelinezhad and Afrazeh, 2018). In recent years, the dark triad has emerged as a new personality trait in the information behaviour field, which is about the *dark* side of the sub-clinical personality. It compensates for the deficiencies of non-clinical personality research represented by the Big Five personality (Qing and Xu, 2013). In knowledge management studies, it has been shown that dark triad directly or through mediating variables affects counterproductive knowledge behaviours (Pan, et al., 2018). Other exploratory research has demonstrated that the dark triad also has positive effects on individual behaviour. However, it is unclear in what context the dark triad can play a positive role (He, et al., 2017). To date, the dark triad has not been empirically investigated in the context of social Q&A sites. Relevant research in knowledge management is mainly carried out in the corporate environment. In such an environment, a competitive relationship usually exists between the subjects, which is significantly different from the atmosphere of sharing and mutual assistance in the social Q&A sites. It is interesting to explore whether dark personalities can play a positive role in social Q&A sites, changing the usual stereotype on it. This paper examines the relationship between users' dark triad and their knowledge contribution behaviour in the social Q&A sites. It introduced online self-disclosure and relational psychological contract variables and constructed a moderated mediation model to investigate the influence and mechanism of the dark triad on knowledge contribution behaviour in a social Q&A site. Then, it put forward corresponding countermeasures and suggestions to motivate online Q&A community users to actively contribute knowledge.

## **Literature review and research hypothesis**

### **Dark triad and knowledge contribution behaviour**

The dark triad is a personality trait cluster composed of three independent and intertwined personality traits: Machiavellianism, narcissism, and psychopathy (Qi, et al., 2018). All three exhibit the characteristics of being manipulative, callous, and selfish (Jones and Figueredo, 2013). The essence of Machiavellianism is a knack for manipulating others to achieve one's own goals, focusing on results, and ignoring morality; narcissism is characterized by two major characteristics: conceit and pomposity. High narcissists have low empathy, see others as tools to achieve goals, and seek attention and praise. Psychopathy exhibits persistent behavioural deviance in interpersonal and emotional aspects, with three distinctive features: disinhibition, boldness, and meanness (Zhang and Zhang, 2014).

Knowledge contribution refers to the transfer of knowledge from one individual to other individuals through some specific ways (Kumar and Thondikulam, 2006). Knowledge contribution in social Q&A sites can be defined as users expressing or sharing various types of knowledge through the platforms of social Q&A sites, thus realizing knowledge exchange and interaction. Other users absorb the contributed knowledge to realize knowledge transformation and re-creation, and finally accumulate the knowledge asset of social Q&A sites (Deng and Zhao, 2013). Existing research on knowledge

contribution focuses on its influencing factors. Altruism, trust, and self-efficacy influence users' knowledge contribution (Chang and Chuang, 2011; Chen and Hung, 2010; Lin, et al., 2009). However, no research has analyzed knowledge contribution behaviour from users' dark personality traits. Users are the main knowledge contributors on social Q&A websites, and their personality traits will inevitably affect their knowledge behaviour. Therefore, we focus on the influence mechanism of users' dark personality traits on their knowledge contribution behaviours.

It is found that the dark triad has a positive influence on individual knowledge hoarding behaviour in corporate and higher education environments (Karim, 2020; Pan, 2018; Hutter, et al., 2015). Individuals with strong dark personality traits do not trust others and are more reluctant to contribute their constructive knowledge. When we reconsider this topic, it can be identified that the dark triad leads to knowledge hoarding because individuals compete with others in knowledge teams in companies and universities. Contributing or sharing knowledge means reducing one's uniqueness and irreplaceability in the knowledge network, ultimately putting one at a competitive disadvantage. On the contrary, in the contexts of social Q&A sites, the more active knowledge contribution, the more public attention and praise the individual receives. The more active knowledge contribution, the more likely he/she will have a more substantial influence and higher social status in the community. It can attract goal-oriented, appreciation-eager individuals with dark triad to contribute knowledge on social Q&A websites. Based on this, this study proposes the following hypothesis.

H1: Users' dark triad significantly influences their knowledge contribution behaviours on the social Q&A sites.

### **The mediating role of online self-disclosure**

Online self-disclosure refers to disclosing personal information to others through the Internet, which extends the self-disclosure concept. Self-disclosure is the basis for users to establish intimate relationships and communicate effectively on social networks (Xie, et al., 2013). Studies reported that the dark triad is positively related to online self-disclosure (Ledbetter et al., 2011). The dark triad is even a determinant of online self-disclosure (Savci, 2019). Abell and Brewer (2014) argued that online self-disclosure strategies differ across personality traits, and Machiavellianism is positively associated with online self-disclosure. In addition, online self-disclosure of Machiavellianism people may be more tactic and calculating, albeit less frequent, but more active (O'Connor and Simms, 1990). Psychopaths and narcissists also tend to self-disclosure, but due to the impulsive or apathetic qualities, they are less likely to purposefully shape their image on social networking sites by controlling the degree and rhythm of self-disclosure as Machiavellians do. Research has demonstrated that psychopaths and narcissists engage in impulsive and unintentional self-disclosure in online communication, such as frequent status updates on Facebook (Garcia, et al., 2014). Narcissists tend to overly aggressively self-promotion online (Pan, 2018). These results suggest that individuals with a high level of the dark triad prefer to utilize online self-disclosure to manipulate their self-image shaping in social interactions with others. Individuals with a high level of online self-disclosure may be more willing to update information and post developments on social Q&A sites to contribute the knowledge. Therefore, it is hypothesized that dark triad influences knowledge contribution behaviour in Q&A sites through online self-disclosure. The following hypothesis is proposed:

H2: In the context of social Q&A sites, users' online self-disclosure level plays a mediating role between dark triad and knowledge contribution behaviour.

### **The moderating role of relational psychological contracts**

The psychological contract is one of the critical theories of organizational behaviour and is defined as a set of unwritten expectations between each organizational member and its organization (Schein, 2009). The psychological contract moderates the relationship between the organizational situation and performance (Li, et al., 2018). It can be classified into two types: transactional and relational psychological contracts. The transactional psychological contract focuses on external needs and short-term economic satisfaction. It is based on the courtesy demands reciprocity principle of economic

exchange. The members with such contracts usually have low social-emotional involvement in the organization. The relational psychological contract focuses on intrinsic needs and long-term socio-emotional satisfaction. The boundaries of members' responsibilities are blurred. The relational psychological contract goes beyond the exchange of economic benefits, reflecting that members often have high socio-emotional involvement in the organization and emphasize loyalty, trust, job security, growth, and development (Rousseau, 2001). Psychological contract theory is mostly applied in corporate contexts. Since the relational psychological contract describes the level of users' emotional involvement with a specific organization, and such an involvement, growth and development are closely related to users' social and knowledge behaviours in social Q&A sites (Zheng, et al., 2021), we introduce this concept into the study. A solid relational psychological contract between users and social Q&A sites implies that users believe that the community values their contributions and facilitate their development. Even if their online self-disclosure levels are low, they will have intentions to reciprocate, invest more efforts and contribute more knowledge in social Q&A sites. It has been noted that in communities, users with the relational psychological contract can gain a sense of accomplishment, belonging and actively provide support and help to others (Coyle-Shapiro & Kessler, 2000). This emotional connection between users and online communities may reduce the effect of online self-disclosure on users' knowledge contribution behaviour. Therefore, this study hypothesized that:

H3: Relational psychological contract negatively moderates the relationship between users' online self-disclosure and knowledge contribution behaviours on social Q&A sites The hypothetical model of this paper is shown in Figure 1.

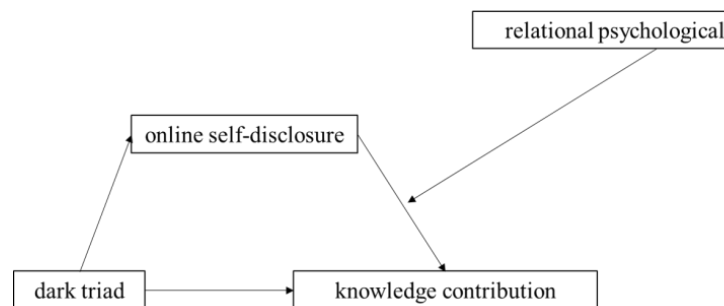


Figure 1: Model of factors influencing the knowledge contribution

## Questionnaire design and data collection

### Questionnaire design

For the Dark Triad Inventory design, we used the Dirty Dozen (DD) translated and revised by Geng, et al. (2015). This scale is mature. It has been widely used and tested to have good reliability and validity. It should be noted that human behaviour is complex, and the real nature of human motivation is mulch-faceted. Self-report inventories like the Dirty Dozen (DD) have some limitations to provide a comprehensive picture of human psychology. However, self-report inventories are one of the most common methods to test personality in psychology until now. Scientific personality testing began in the late 19th century with F. Galton's research on personality measurement. Influenced by the trait-factor theory, researchers believed that subjects themselves knew their personality traits best and that scoring scales were better suited to quantitative research needs. Structured measures, represented by the self-report inventory, are widely used in personality tests (Sarason, 2019). Early self-report inventories were developed using surface validity, but this method's scientific validity and appropriateness were questionable. In the early 1940s, the Minnesota Multiphasic Personality Inventory (MMPI) was developed using empirical criterion keying, marking a significant methodological advancement in self-report inventory; factor analysis is another mainstream method for developing self-report inventory (Pervin and John, 1999). With the popularity of multi-factor analysis and the use of computers, many self-report inventories were devised using factor analysis,

such as the Cattell's 16 Personality Factor(16PF) (Cattell and Mead, 2008), the Eysenck Personality Inventory (Eysenck and Eysenck, 1975), and the Big Five Personality Inventory (Costa and McCrae, 1992). Nowadays, the self-report inventory has become a standard, accepted, and widely used way of personality test. Therefore, the Dirty Dozen (DD), a self-report inventory, was used to measure personality in this study.

The scale has 12 questions, such as *'I tend to manipulate others to achieve my own goals'*, *'I am cold and insensitive'*, *'I expect special treatment from others'*. The Likert 7 scale was used to score, with 1 indicating a complete lack of conformity and 7 indicating complete conformity. The higher the score, the higher the level of the dark triad. Scale scores are used to describe the extent of a person's dark personality traits and do not indicate that the person is a psychopath in the clinical sense.

For the online self-disclosure scale design, we adopted the online interaction-online self-disclosure scale (Ping, et al., 2012), which is also a mature scale with good reliability and validity. The question items in the scale were modified in the context of social Q&A sites. Six questions are formed, for example, *'I show my interests and hobbies to users in Q&A sites'*, *'I disclose my personality traits in Q&A sites'* and *'I am a good self-disclosure person in Q&A sites'*. The Likert 7 scale was used to score, with 1 indicating complete disagreement and 5 indicating complete agreement. The higher the score, the higher the level of online self-disclosure.

For the relational psychological contract scale design, this paper integrated the relational psychological contract scale (Li and Sun, 2006; Hui, et al., 2004). We made appropriate modifications to the question items in the scale to adapt to the context of social Q&A sites. The revised scale consists of 11 questions, like: *'My Q&A community has harmonious interpersonal relationships and smooth communication'*, *'I feel that the Q&A community has rewarded me for my contributions'* and *'I feel a sense of belonging in the Q & A community'*.

In the knowledge contribution scale design, this paper employed the knowledge contribution scale (Li, 2019; Cheng and Wu, 2017) and modified the items in the scale appropriately. The revised scale consists of six questions, such as *'I answer questions asked by others in the Q&A community'*, *'I point out the errors in the posts of others in the Q&A community and correct them'*, *'I discuss an issue with other members of the Q&A community'*. The higher the score, the more positive the knowledge contribution.

### **Questionnaire distribution and data collection**

This study collected data by issuing questionnaires to users through the Questionnaire Star platform. Users with experience in using social Q&A sites such as Zhihu and Baidu Zhidao were selected for questionnaire surveys from July 13, 2020, to August 13, 2020. Zhihu and Baidu Zhidao are the two dominant social Q&A sites in China. Subjects of this study were mostly users of these two social Q&A sites. Six hundred forty-three questionnaires were issued, and 301 valid questionnaires were taken back, with a 47% questionnaire response rate. As shown in Table 1, 159 of them were male, accounting for 52.8% of the sample, and 142 were female, accounting for 47.2%. The age of the subjects was concentrated between 21-30 years old, and the results of previous studies showed that the age of users of social Q&A sites usually ranges between 21-30 (Deng, et al., 2017). This indicates that the sample of this study reflects the overall characteristics of users in terms of age.

Table 1: Demographic variables

Demographic	Category	Number of people	Percentage
Gender	Male	159	52.8%
	Female	142	47.2%
Age	Under 20 years old	87	28.9%
	21-30 years old	181	60.1%
	Over 30 years old	33	11.0%

We applied Cronbach's  $\alpha$  reliability coefficient to assess reliability. The alpha coefficient for the Dark Triad Inventory was 0.898; for the Online Self-disclosure Inventory, it was 0.899; for the Relational Psychological Contract Inventory, it was 0.928; and for the Knowledge Contribution Inventory, 0.897. The overall Cronbach's alpha value for the scale was 0.902, meaning that the scale's reliability was very satisfactory. Validity refers to the degree to which a measurement instrument or tool can accurately measure the thing to be measured. In this study, a pre-test questionnaire was distributed. Eight experts in information science and psychology were invited to give their opinions. Then we made modifications according to their advice. On this basis, the scale has good content validity.

## Data analysis

### Descriptive statistics and correlation analysis

As the descriptive statistics in Table 2 show, social Q&A sites users have high scores in the online self-disclosure, relational psychological contract, and knowledge contribution. The correlation analysis illustrated that the dark triad was significantly and positively correlated with online self-disclosure and knowledge contribution ( $p < 0.01$ ). It had no significant correlation with the relational psychological contract. Online self-disclosure significantly and positively correlated with relational psychological contract ( $p < 0.01$ ) and knowledge contribution ( $p < 0.01$ ). Relational psychological contract was significantly and positively correlated with knowledge contribution ( $p < 0.01$ ).

Table 2: Descriptive statistics and correlations

	Average	Standard deviation	Dark Triad	Self-disclosure	relational psychological contract	knowledge contribution
Dark triad	36.69	13.38	1	0.16***	0.02	0.15***
Self-disclosure	19.39	5.59	0.16***	1	0.70***	0.50***
Relational psychological contract	38.65	8.56	0.02	0.70***	1	0.60***
Knowledge contribution	21.11	5.28	0.15***	0.50***	0.60***	1

Note: \*\* $p < 0.05$ , \*\*\* $p < 0.01$

## Difference test

Independent sample t-tests on the dark triad and each of its internal dimensions were conducted separately on gender. It is shown in Table 3. Male users of social Q&A sites scored higher than female users on the dark triad, Machiavellianism, narcissism, and psychopathy, and the differences were statistically significant. Previous studies have recognized that men are more prone to Machiavellian and psychopathic than women that masculinity is positively correlated with narcissism. Generally speaking, males tend to have higher levels of dark triad than females (Jonason and Davis, 2018). This is consistent with what the present study found.

Table 3: Gender differences in various variables

	Female ( N=142 )	Male ( N=159 )	T
Dark Triad	33.7±10.1	39.4±15.3	-3.81***
Machiavellianism	8.9±4.3	10.9±6.7	-3.23***
Narcissism	17.3±5.6	18.6±5.8	-2.01**
Psychopathy	7.6±3.6	9.8±5.9	-4.02***

## Model verification analysis

We applied SPSS 26.0 to test the hypotheses through multiple linear regression. To avoid the problem of collinearity, we centered independent variables and then obtained the value of the interaction effect by calculating the product of the online self-disclosure and relational psychological contract. The regression results of the hypothesis test are shown in Table 4.

Table 4: Multiple linear regression results

		online self-disclosure		knowledge contribution				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables	Gender	0.437***	0.401***	0.266***	0.229***	0.016	-0.01	0.003
Independent variables	Dark Triad		0.144**		0.147**	0.071	0.116*	0.100*
Intermediate variables	Online self-disclosure ( O )					0.531***	0.145*	0.136
Adjustment variables and interaction terms	Relational psychological contract ( R )						0.516***	0.542***
	R <sup>2</sup>	0.238***	0.257**	0.094***	0.114**	0.324***	0.437***	0.446*
	ΔR <sup>2</sup>		0.020		0.021	0.210	0.113	0.009
	F	46.47***	34.30***	15.39***	6.88**	91.85***	45.77***	39.40***

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

We test the mediating effect of online self-disclosure according to Baron and Kenny(1986) and Wen, Zhang and Hou(2004) : (1) Examining the effect of the dark triad on knowledge contribution. Model 3

took control variables as independent variables and knowledge contribution as dependent variables; Model 4 added dark triad as an independent variable on the basis of Model 3, and the regression results showed a significant positive effect of the dark triad on knowledge contribution ( $\beta=0.147$ ,  $p<0.01$ ). Hypothesis 1 was supported. (2) Model 1 used control variables as independent variables and online self-disclosure as dependent variables. Model 2 added the dark triad as an independent variable based on Model 1. The regression results indicated that the dark triad significantly affected online self-disclosure ( $\beta=0.144$ ,  $p<0.01$ ). (3) Model 5 added the mediating variable of online self-disclosure to model 4. Comparing the regression results of model 4 and model 5, the coefficient between dark triad and knowledge contribution changed from  $\beta=0.147$  ( $p<0.01$ ) to  $\beta=0.071$  ( $p>0.05$ ), and the coefficient between online self-disclosure and knowledge contribution was  $\beta=0.531$  ( $p<0.001$ ) after the introduction of the mediating variable of online self-disclosure. These results suggest that online self-disclosure positively affects knowledge contribution and plays a fully mediating role between dark triad and knowledge contribution. Hypothesis 2 was supported. To further test the mediating effect, a Bootstrap test was conducted using the Process plug-in. The results displayed that the indirect effect value was 0.076 with a 95% confidence interval of (0.016, 0.144), implying online self-disclosure played a significant mediating role between dark triad and knowledge contribution. Hypothesis 2 was further supported.

Model 6 added relational psychological contract as the moderating variable (R) to model 5. Model 7 added the interaction term between relational psychological contract and online self-disclosure (RO) to model 6. The regression coefficient was  $\beta=-0.102$  ( $p<0.05$ ), indicating that the relational psychological contract negatively moderated the relationship between online self-disclosure and knowledge contribution. Hypothesis 3 was supported.

Table 5: The intermediary effect under the conditions of different relational psychological contracts

Relational psychological contract	Effect Value	Boot Standard Errors	Boot CI Lower Limits	Boot CI Upper limits
Low relational psychological contract (M-SD)	0.033	0.021	0.0006	0.802
Middle relational psychological contract (M)	0.220	0.016	-0.005	0.055
High-relational psychological contract (M+SD)	0.006	0.015	-0.024	0.040

Note: \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$

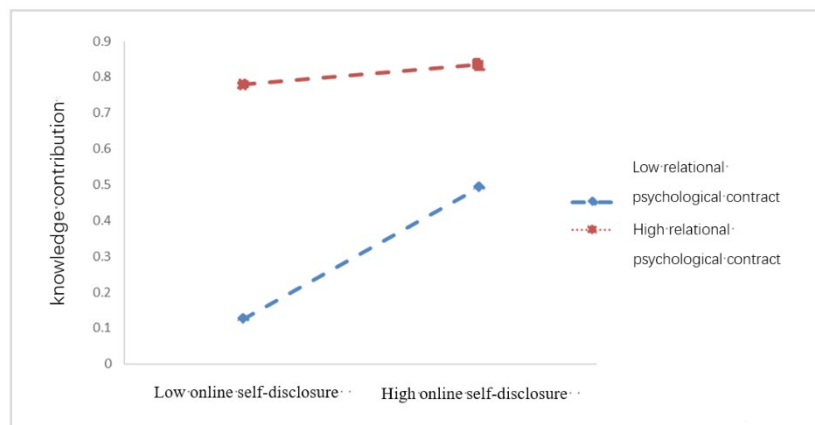


Figure 2: The moderating effect of relational psychological contract



In order to more clearly demonstrate the nature of the interactive effect of online self-disclosure and the relational psychological contract, we used the Bootstrap program of the Process plug-in for testing, and the number of Bootstrap was 5000. The mediating effects of different relational psychological contract conditions are shown in Table 5. The effect size of online self-disclosure on knowledge contribution was calculated when the value of the relational psychological contract was one standard deviation higher or lower than the mean. Simple slope analysis was plotted based on the regression equation (Back, et al., 2010). It can be seen from Table 5 and Figure 2 that the indirect effect was significant (simple slope=0.229,  $t=2.83$ ,  $p<0.01$ ) at the low level of relational psychological contract (M-SD). At the middle level of relational psychological contract (M), the indirect effect was not significant (simple slope=0.136,  $t=1.92$ ,  $p>0.05$ ). The same to the high level of relational psychological contract (M+SD)(simple slope=0.044,  $t=0.51$ ,  $p>0.05$ ). These results suggest that as the level of relational psychological contract increases, the positive predictive effect of online self-disclosure on knowledge contribution gradually decreases until it is not significant. The path coefficient of the model is shown in Figure 3.

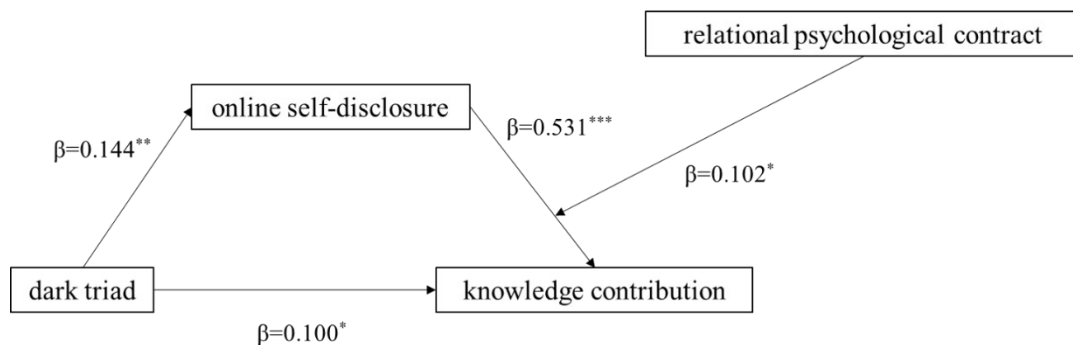


Figure 3: Modified model

## Discussion

ocial Q&A sites are a product of combining traditional knowledge exchange networks and Web 2.0 technology. Any user on the social Q&A sites can ask or answer questions and is both a knowledge producer and knowledge consumer (Deng et al., 2019). Social Q&A sites build network platforms for users to spontaneously contribute and exchange knowledge. The experience and knowledge contributed by users are the core values of social Q&A communities. Users' psychological characteristics and behaviour are unique and different from those on other kinds of websites (Shen and Shi 2019). Previous studies have reported that the features of social Q&A platforms, such as perceived usefulness, easiness of use, interactive degree, and playfulness, influence users' knowledge contribution behaviour or knowledge-sharing continuance (Kang, 2018; Song, Shuai, and Li, 2019). Several studies have also indicated that the classical personality, like the Big Five personality, impacts users' knowledge contribution behaviour (Esmaeelinezhad and Afrazeh, 2018). However, the dark side of the personality, i.e., the dark triad, has not been empirically investigated in the context of social Q&A sites. In this study, we explored the influence and mechanism of users' dark triad on their knowledge contribution in social Q&A sites.

The results showed that the dark triad significantly affected knowledge contribution behaviour on social Q&A sites. The term dark describes this personality trait negatively, but our results suggest that there are positive aspects of the dark personality. To administer their charisma and gain attention (Back et al., 2010), online users with a high level of the dark triad will present and contribute knowledge to the community, which satisfies their desire for fame and praise, meanwhile benefiting the Q&A community and its positive development. We argue that whether the dark triad can drive altruistic behaviours depends on the organizational context and incentive mechanism. A dark triad can promote knowledge hoarding and destructive behaviours in a robust competitive environment such as enterprises, which is detrimental to organizational development. In contrast, in a stable reciprocal

context like social Q&A sites, the dark triad can generate positive and altruistic knowledge contribution behaviours. The results of this study reveal the dialectical role of the dark triad.

Machiavellianism has been found to be positively related to strategic self-disclosure in the social media context. Machiavellians selectively disclose information that is beneficial to them in exchange for social capital (Abell and Brewer, 2014). Psychopaths and Narcissists, due to their highly impulsive nature, extemporize and unintentionally self-disclose themselves in online communication, including frequent updates on social media status (Garcia, et al., 2014). This study reconfirmed the positive effect of the dark triad on online self-disclosure. We further approved that the dark triad positively influences knowledge contribution behaviour through online self-disclosure. In other words, individuals with a high level of the dark triad have a stronger tendency to online self-disclosure, leading to actively sharing information and contributing more knowledge in online Q&A communities. Users with a high level of the dark triad usually engage in online self-disclosure due to their impulsive characteristics and desire for social capital and appreciation. Self-disclosure is an information-sharing behaviour, which refers to individuals sharing their thoughts, opinions, experiences, and feelings with others. This type of user thus generates more knowledge contributions in the community, including answering other users' questions, participating in discussions, and providing needed information and experience. Such knowledge contribution behaviours are also altruistic (Khang and Jeong, 2016; Song, et al., 2016). This rather intriguing finding demonstrated the positive side of the dark triad in online Q&A community growth.

This study found that the relational psychological contract moderated the mediating effect of online self-disclosure between the dark triad and knowledge contribution. This mediating effect was significant in the low-level relational psychological contract user group but insignificant in the high-level relational psychological contract user group. These results help us understand that the influence of online self-disclosure on users' knowledge contributions also varies depending on their emotional involvement in the community. Users with high relational psychological contracts have high emotional involvement and identity in the Q&A community and are willing to provide support and help to others actively. This positive image of the social Q&A sites and emotional connection drive users to contribute knowledge in the community, regardless of their levels of online self-disclosure. Therefore, the mediating role of online self-disclosure is not significant in the high-relational psychological contract condition. However, users have a weak emotional connection with the community in the low-relational psychological contract condition. They lack the emotional motivation to contribute knowledge to the community. Their knowledge contribution behaviour mainly depends on personality traits. At this point, the level of online self-disclosure significantly affects knowledge contribution behaviour. The relational psychological contract is a set of unwritten expectations between users and the community, which is an extrinsic factor affecting users' knowledge contribution behaviours. This external factor buffers the influence of the hard-to-change internal factor such as self-disclosure.

## **Conclusions and recommendations**

Previous research has shown that the dark triad is associated with many negative behaviours. Machiavellianism, Narcissism, and Psychopathy in knowledge-based teams are all predictors of knowledge destruction (Serenko and Choo, 2020), which stems from the fact that Narcissists, Machiavellians, and Psychopaths disregard traditional social norms of exchange when interacting with others (Pan, 2018). This study argues that the dark triad has a positive effect on knowledge contribution behaviour in socialized Q&A communities by constructing a model of mediated effects that are moderated. The dark triad shows its altruistic side in the context of social Q&A sites. The role of the dark triad in different knowledge-intensive contexts should be viewed dialectically in future research.

This study has several implications. First, for users with a high level of the dark triad, the motivation for knowledge contribution in social Q&A sites is to gain the attention and admiration of others, a sense of accomplishment, and accumulate social capital. Community builders should satisfy these users' needs by designing intrinsic incentive mechanisms, such as setting up website functions of

comments, likes, and forwarding recommendations. They should also recognize users' knowledge contributions by setting up ranking mechanisms and virtual medal rewards. Second, individual online self-disclosure is relatively stable due to gender, age, and social culture (Savci, 2019; Ledbetter, et al., 2011; Xie, et al., 2013), and generally does not change with environmental changes. So it is difficult for social Q&A site managers to influence it to motivate knowledge contribution behaviour. However, when users have higher relational psychological contracts, they engage in more positive knowledge contributions. Therefore, users can be encouraged to make knowledge contributions by increasing the relational psychological contracts of the community. There are two suggestions regarding establishing a good relational psychological contract between social Q&A sites and users: First, the platform atmosphere should be optimized. Users with inappropriate speech, malicious comments, and online *troll* behaviour should be warned or banned. Social Q&A sites should create a friendly and harmonious interaction culture. Secondly, efforts should be made to develop the social functions of the online Q&A community, like setting up interest groups for cultivating a good community atmosphere and enhancing emotional exchanges between users. In addition, it should be noted that users with dark triad may make exaggerated information disclosure due to their eagerness for quick success and instant benefit. Social Q&A sites platforms can adopt real-name verification for knowledge contributors with great influence. They should also improve disciplinary measures for false knowledge disclosure to reduce the negative impact on the community knowledge ecology.

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### **About the authors**

**Lin Wang** is a distinguished professor of information science and associate dean at the Academy of Chinese Science and Education Evaluation, Hangzhou Dianzi University, China. He received a Young Information Scientist award from the China Society for Science and Technology Information and his Ph.D. in information science from Peking University. His research interests include the foundations of information science and information behaviour. He has published more than eighty academic papers in international LIS journals and leading peer-reviewed information science journals in China. He can be contacted at: wanglinpku@163.com

**Yajing Liu** is a postgraduate student at School of Management, Tianjin Normal University, China. Her research area is information behaviour. She can be contacted at: xue6fei@sina.com

**Wenjun Han** is a postgraduate student at School of Management, Tianjin Normal University, China. Her research areas are information needs and information behaviour. She can be contacted at: hwj\_youngon@163.com

**Junping Qiu** is a distinguished professor and dean at the Chinese Academy of Science and Education Evaluation, Hangzhou Dianzi University, China. Before joining the faculty of HDU, he was a professor at Wuhan University. His research directions include bibliometrics, informetrics, webometrics, and evaluation science. He can be contacted at: jpqiu@whu.edu.cn

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