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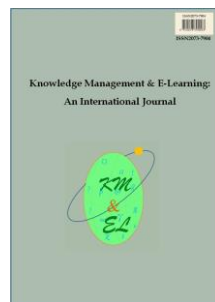
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Knowledge hiding behaviors as moderator between machiavellianism, professional envy and research productivity: Empirical evidence from emerging economy

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Abstract: Working in a toxic environment makes it harder to be productive. This study examines the direct impact of Machiavellianism and professional envy on research productivity (individual and group) with the moderating role of knowledge-hiding behaviors. For this purpose, through convenience sampling, an online survey through Google Docs was conducted, and 221 permanent faculty members from private sector higher education institutions participated. The impact of moderating variables between predictors and criterion variables was tested through PROCESS-macro. The findings of this study revealed that Machiavellianism and professional envy have a significant negative influence on individuals and as well group-based research productivity. In contrast, knowledge hiding behaviors of faculty members moderate the

relationships between Machiavellianism, professional envy, and individual and group-based research productivity.

Keywords: Machiavellianism (Mach); Professional envy (PE); Knowledge hiding behaviors (KHBs); Research productivity (RP); Social comparison theory (SCT)

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1. Introduction

Higher educational institutions (HEIs) are the major contributor to the society of emerging economies, which not only shape the society but also contribute to the economy of the state by producing highly educated individuals. The start of the 21st century transformed the regime of the economy from industrialization to a knowledge-based economy which is not only highly globalized but also based on fast information, which ultimately changes the working, engagement, knowledge, and learning level of individuals at the workplace (Khan et al., 2022). Current globalization not only becomes challengeable for organizations, but these circumstances become opportunistic if the organizations can utilize their existing knowledge with the generation and approachability of new knowledge (Ullah et al., 2019). Moreover, in these circumstances, the HEIs are recognized as a hub of research, change, and excellence of knowledge which enhances the skills of the individuals of society with the acquisition, generation, and transfer of knowledge (Zeeshan Mubarak et al., 2012). Rapid changes in globalized circumstances pressure HEIs to encourage research productivity (RP) (Muscio et al., 2013) with quality research. In the current era, the RP of faculty members of HEIs has become an imperative tool of university management, and this tool also works as the backbone for the sustainability and good reputation of HEIs (Sandström & Van den Besselaar, 2018). Also, the policymakers and communities of scientific research enlighten the importance of RP for HEIs and society (Ocampo et al., 2022). These circumstances force the researchers to determine the factors that influence the research productivity of faculty members of HEIs (Lee, 2021).

Humans are the backbone of every organization and are considered a major capital of organizations with no alternative (Chughtai & Rizvi, 2020). It is pointed out that human behaviors, attitudes, actions, and attitudes at the workplace are influenced/shaped by different factors, and the personality of individuals is one of them (Malesky et al., 2022). Human personality is “the set of psychological traits and mechanisms within the individual that are organized and relatively enduring and that influence his or her interactions with, and adaptations to, the intrapsychic, physical, and social environments” (Larsen et al., 2005, p. 4). It has also been observed that humans are dishonest, selfish, and sometimes act evil (Locke, 1967); therefore, their values influence their behaviors (Tang & Li, 2021). Human traits can be assumed of a person’s organized cognitive frameworks or structural frames of personal characteristics (Serenko & Choo, 2020).

From several aversive personality characteristics (Kowalski, 2001), dark personalities represent by a dark triad with three sub-dimensions, i.e., narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002). Persons with a higher score in these dark natures tend to show uncivil behaviors (Chughtai et al., 2020; Chughtai & Ali Shah, 2020) at the workplace with a lack of responsiveness (Jonason & Krause, 2013), devalue supportive benefits (Jonason et al., 2015), commit fraud (Modic et al., 2018), show vengefulness (Giammarco & Vernon, 2014) and manipulate others (Webster & Smith, 2019) for their self-interest. Machiavellianism (Mach), a subclinical of dark personalities, are those persons involved in the activities of personal gain by manipulating others for their self-interest (Wilson et al., 1996). In addition, these Machiavellian personalities are hungry for the power through which they control others (Kessler et al., 2010) with unethical and exploitative behaviors (Bereczkei et al., 2015). Moreover, these individuals are generally uncooperative and disregard social values and collective interests (Bereczkei & Czibor, 2014; Greenbaum et al., 2017).

Associations with fellow employees, bosses, or subordinates are supported by empathic control and employees' emotional responses that directly influence professional careers (Zurriaga et al., 2020). Envy has been defined as negative feelings that individuals generate when someone compares their benefits with other's benefits (Smith & Kim, 2007). Moreover, Cohen-Charash (2007) explains that when individuals compare themselves with others at the workplace through a cognitive process, it leads to professional envy (PE). In contrast, PE usually occurs when people compare upward (comparing with the superiors) from different perspectives, i.e., abilities, achievements, and skills (Braun et al., 2018; Navarro-Carrillo et al., 2018; Ogunfowora et al., 2021). It has also been observed that high workplace competition among employees may also cause PE (Li et al., 2021). Earlier studies reported that PE at the workplace negatively influences the individual's outcomes, i.e., reduces job satisfaction and engagement (Lee et al., 2018; Sterling & Labianca, 2015), increases workplace incivility, turnover intentions, moral disengagement and social undermining (Ferris et al., 2008; Li et al., 2021).

Human knowledge is the backbone for achieving all organization's goals and objectives (Opele, 2022). In contrast, sharing knowledge by humans at the workplace is a crucial tool for organizational success and becomes a primary power source for individuals (Connelly et al., 2019; Connelly et al., 2012; Shateri & Hayat, 2020). Organizations encourage and motivate their workforce by providing an attractive environment where they share their knowledge with their seniors, peers, and subordinates for higher organizational and individuals' performance, innovation, and creativity (Asbari et al., 2021; Connelly et al., 2019; Singh et al., 2021; Ye et al., 2022). Behaviors through which individuals conceal knowledge with intention from others who request are known as knowledge-hiding behaviors (KHBs) (Connelly et al., 2012), and these behaviors harm the interpersonal relationship through distrust and decrease the productivity of individuals and team members (Connelly et al., 2012). Earlier studies reported that KHBs increase the adverse outcomes in the organizations, i.e., distrust among team members (Hernaus et al., 2019), decreased individual creative and innovative activities (Bogilović et al., 2017; Černe et al., 2017), reduce extra-role behaviors and increase emotional exhaustion (Ain et al., 2022), increase turnover intentions and decrease OCB (De Clercq et al., 2018; Tourigny et al., 2013).

1.1. Need for this study

HEIs of developing nations are usually facing the problem of RP with higher quality. Due to the rapid transfer of information globally, the HEIs of every country, especially from developing countries, are under pressure on how to produce higher-quality RP. Therefore, this study tries to find out the antecedents that affect the RP (individual and group-based) of faculty members of HEIs from the personality perspective and answer the call of Li et al. (2021) and use KHBs as moderating between PE and RP (individual and group-based), as they suggested that there is need to investigate moderating variables between envy and its outcomes. Baloch et al. (2021) in their study indicated that there is a need to impact of individual, leadership, and institutional factors which influence the RP (individual and group-based) of faculty members of HEIs, to overcome this empirical gap; this study uses Mach and PE as an essential unique factor which may negatively influence the RP (individual and group-based). Further, this study also responds to the call of Baloch et al. (2021) by using KSBs as a moderator between the relationships of Mach, PE, and RP (individual and group-based). Moreover, this study also uses PE as an antecedent of RP (individual and group-based), as suggested by earlier researchers (Lee et al., 2018).

Findings of a most recent systematic review on KSBs by He et al. (2021) indicated that there is a need to pay attention to exploring the consequences of KSBs for organizations, individuals, and teams as well; therefore, this study uses KSBs as moderating variable between the relationship of Mach and PE and RP (individual and group-based) (See Fig. 1). Methodologically, this study overcame the methodological research gap of Maharjan et al. (2022), where they suggested a need to measure the RP with the balanced sampling frame of faculty members of HEIs (i.e., professors, associate professors, assistant professors).

2. Literature review

2.1. Theoretical underpinning

This study is based on the theoretical lens of social comparison theory (SCT), through which researchers further explain the proposed model. According to SCT (Festinger, 1954), individuals often analyze their expertise, perspectives, and efficiency by comparing themselves with others they recognize to be equivalent or better in some qualities (Kilduff, 1990; Kruglanski & Mayseless, 1990; Wood, 1996). Festinger (1954) explained social comparison as a process of information that individuals gather for self-evaluation, through which they determine their self-ranking or group standards (Wood, 1996). It has been observed that people make a comparison of themselves with two approaches, i.e., upward and downward; where upward comparison of people is linked with adverse effects on their personalities, and they feel inferior to others; while the downward comparison of people connected with positive outcomes and they feel superior to others (Buunk & Gibbons, 2007; Meier & Schäfer, 2018). The upward side of social comparison is relevant to this study, as Machiavellian people compare themselves with others to get benefits through manipulation and seek control over others for their higher status (Dahling et al., 2009). People belong to this personality due to social comparison try to get economic opportunities, and due to upward social comparison, these people usually are less cooperative and engage in uncivil, unethical, and counterproductive activities (Chughtai et al., 2020; Chughtai & Ali Shah, 2020; O'Boyle et al., 2012). When these individuals see their position low in the workplace or society, they show careless, undisciplined, and impulsive behaviors (Miller et al., 2017). Moreover, upward social comparison forces individuals to show envy in society or at the workplace; on the other side, envy occurs when someone wants or lacks something which they don't have but others (Cohen-Charash & Mueller, 2007; Parrott & Smith, 1993; Tussing et al., 2022). Moreover, comparison also cognitively influences people, which enables them to demonstrate envy at the workplace; ultimately envied person shows uncooperative, discouraging attitudes and behaviors (Braun et al., 2018; Cohen-Charash & Mueller, 2007). People compare themselves with the higher performers, and when they feel inferior, these feelings activate envy and hostility towards the higher performers (Cohen-Charash & Mueller, 2007). In contrast, this social comparison of individuals also leads to envy that enforces to engage themselves in harmful and antisocial activities (Cohen-Charash & Mueller, 2007; Liu et al., 2019) at the workplace, i.e., KHBs (Weng et al., 2020) from others which further disturb the group and individual working. KHBs are associated with the intentional concealment of information requested by other persons (Connelly et al., 2012), and these behaviors harm teamwork, resulting in low performance and distrust (Connelly et al., 2012). Organizations, individuals, and teams suffer several losses due to KHBs of individuals at the workplace, i.e., repetitions of

mistakes, wastage of time, distrust, higher moral disengagement, and psychological safety (Arain et al., 2021; Serenko & Choo, 2020).

2.2. Machiavellianism, professional envy, knowledge hiding in HEIs

HEIs are considered knowledge organizations where knowledge is created and disseminated (Karim, 2020). Higher quality productivity of HEIs depends upon the higher level of knowledge sharing in these institutions, but the hiding of knowledge is also common in academics of HEIs (Karim, 2020; Karim & Majid, 2019; Yang & Ribiere, 2020). Moreover, faculty members of HEIs are the major contributor to the generation and sharing of knowledge with society through their energetic participation in different academic activities, i.e., research, teaching, innovation, consultation, and publication (Al-Kurdi et al., 2018; Jolaei et al., 2014). Members of HEIs usually hide knowledge from peers due to their professional interpersonal relationships and personality traits (Yang & Ribiere, 2020). The study of Pan et al. (2018) revealed that the link between personality traits and KSBs is in the early stage of research, and there is a need for further work on it, as personal characteristics of humans are the main driver of their behaviors (Maran et al., 2022). It has been observed in recent studies that Mach personalities who are famous due to their undesirable and unethical attitudes and behaviors at the workplace (Abukhait et al., 2022; Lata & Chaudhary, 2020) are the main actors involved in counterproductive activities, such as the hiding of knowledge especially in HEIs (Karim, 2020, 2022; Karim & Majid, 2019). An unpleasant emotional state which occurs due to social comparison in humans is called envy (Reyna, 2021). Moreover, HEIs provide a fertile platform for PE because the atmosphere of these institutions demands higher level quality productivity competition of research (in the form of publication) which is related to the promotional opportunities of faculty members and some secret plans of control and power over others (Cleary et al., 2016). Therefore, in HEIs, PE badly impacts the interpersonal relationships and communication between the faculty members, which affects individual well-being and team-level productivity (Reyna, 2021). In contrast, a higher level of PE among the faculty members due to higher competition affects individuals' motivation and confidence level, which results in higher stress and a decrease in research productivity (Tai et al., 2012). Based on the above discussion, it is argued that Mach and PE negatively influence the research productivity of the faculty members of HEIs at individual and group levels; in contrast, in the highly competitive environment of the academia KSBs of individuals also severely affect the RPI and RPG.

2.3. Machiavellianism and research productivity

Mach is a personality characteristic that usually shows people's negative qualities, i.e., distrust, engaging in immoral manipulation with others to control them, or showing their status over others (Dahling et al., 2009; Greenbaum et al., 2017). It has been observed that people with higher level qualities of Machiavellianism create troubles due to their unethical and counterproductive work behaviors at the workplace for effective and smooth organizational functioning (Harrison et al., 2018; Kessler et al., 2010; O'Boyle et al., 2012). Moreover, people with this trait have a higher tendency to use others to achieve their personal goals (Bereczkei & Czibor, 2014; Jones & Paulhus, 2014; Paulhus & Williams, 2002). In contrast, it has also been observed that Machiavellian traits are greed for supremacy through which they manipulate others (Kessler et al., 2010), with immoral and manipulative activities (Bereczkei et al., 2015). Furthermore, these persons are mostly unhelpful and disrespect social ethics and communal benefits (Bereczkei & Czibor, 2014; Greenbaum et al., 2017). On the other side, unethical behaviors of

Machiavellian personalities harm the working atmosphere, which results in aggressiveness and social harm to peers and subordinates (Greenbaum et al., 2017; Muris et al., 2017), which may alternatively negatively affect the individuals and group level productivity. Due to authoritative thinking, Machiavellian people usually think they can't achieve higher status with honesty and believe that knowledge hiding is power (Rehman & Shahnawaz, 2018; Serenko & Choo, 2020). Therefore, these personalities intentionally hide their knowledge from their peers and subordinates, as they think their peers and subordinates are misleading them (Serenko & Choo, 2020; Wisse & Sleebos, 2016). Another picture of these personalities is that they show themselves as caring personality. However, in fact, they feel jealousy/envy of the success of others (Serenko & Choo, 2020), which leads not only to less productivity at the individual level but also affects the group level performance. Based on the above debate in the literature, it is argued that the Machiavellian personality trait may negatively affect individual and group-level research productivity. Therefore, it is hypothesized that:

H1a: There is a negative association between Machiavellianism and Individual Research Productivity.

H1b: There is a negative association between Machiavellianism and Group Research Productivity.

2.4. Professional envy and research productivity

Interactions of humans with each other take place with different titles, i.e., peers, subordinates, and supervisors, and these relations are escorted by emotional care, which further affects the individuals' professional, personal and organizational life (Zurriaga et al., 2020). Envy is considered a form of negative emotions, thoughts, and behaviors by individuals, which occurs when they lose self-confidence by seeing others achieve success or achievement which they wish (Vecchio, 2000). Envy in humans is universal and common in the organizational context, which is related to the unpleasant emotions of individuals (Tai et al., 2012; Tussing et al., 2022). In other words, envy happens when an employee lacks and wishes more than others, which they have (Cohen-Charash & Mueller, 2007; Parrott & Smith, 1993). Jealousy in humans arises due to comparison with others socially, i.e., upward and downward social comparison through different features of the workplace situation (González-Navarro et al., 2018; Navarro-Carrillo et al., 2018). An upward social comparison refers to an upward comparison with persons who are higher performers or achievers (Greenberg et al., 2007); in contrast, a downward social comparison refers to a comparison with people who are less or worse performers (Xue et al., 2020). Moreover, earlier studies have also observed that a higher competitive workplace environment may also become the cause of envy among professionals (Koopman et al., 2020; Li et al., 2021; Thiel et al., 2021). A recent meta-analytic study by Li et al. (2021) explained that PE not only harms the positive behaviors and activities of the employees at the workplace, i.e., reduction in OCBs and engagement, learning and helping behaviors, and satisfaction. In contrast, individuals with a higher level of PE demonstrate negative behaviors and activities, i.e., CWBs, incivility, ostracism, social undermining, higher turnover intentions, and moral disengagement (Li et al., 2021; Thiel et al., 2021). Based on the above discussion, PE is proposed to influence individual and group-level research productivity negatively. Therefore, it is hypothesized that:

H2a: There is a negative association between Professional Envy and Individual Research Productivity.

H2b: There is a negative association between Professional Envy and Group Research Productivity.

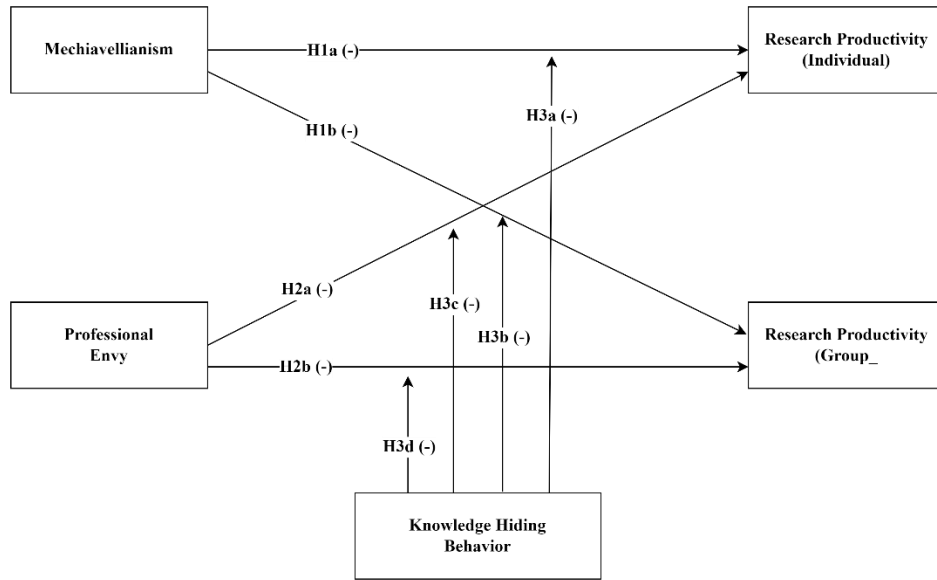


Fig. 1. Proposed Research Model

2.5. Moderating role of knowledge-hiding behaviors

Human knowledge is imperative, and management of this tool positively affects organizational and individual performance (He et al., 2021; Lee & Yew, 2022), which leads to higher efficiency and competitiveness (Chetty et al., 2021). Sharing of knowledge is not only beneficial for individuals in the form of enhancement of skills, expertise, and learning (Shateri & Hayat, 2020; Ye et al., 2022). In contrast, individuals’ intentional behaviors about hiding and concealing knowledge from others who requested the knowledge are called KHBs (Connelly et al., 2019; Connelly et al., 2012). Therefore, KHBs in organizations not only disturb the flow of knowledge; but also encourage a negative culture which resultantly creates an adverse impact on organizational and individual output (Jahanzeb et al., 2019). It has also been observed that KSBs are linked with personality traits (Pan et al., 2018), which may influence individual and organizational productivity. KHBs are usually simulated from three different actions of the individuals, i.e., rationalized hiding, playing dumb, and evasive hiding (Connelly et al., 2019; Connelly et al., 2012; Pan et al., 2018). In rationalized KHBs, individuals provide clarification to others that why they are incapable of tendering the obligatory knowledge; in playing dumb KHBs, individuals provide unrelated information to the requested person, or they promise to provide relevant information in the future, whereas, in evasive KHBs, individuals pretend themselves to disregard the request of the knowledge (Connelly et al., 2019; Connelly et al., 2012; Pan et al., 2018). It has been observed in earlier studies that KHBs adversely affect different individual and organizational outcomes (Karim, 2020), i.e., individual and team-level creativity (Bari et al., 2019; Bogilović et al., 2017; Malik et al., 2019), team learning and performance (Zhang & Min, 2019), OCB, task performance and IWBs (Arain et al., 2021; Burmeister et al., 2019; Černe et al., 2017). Based on the above discussion, it is important to investigate the moderating role of KHBs of faculty members of HEIs on their individual and group-level research productivity with a personality trait and PE. Therefore, it is hypothesized that:

H3a: Knowledge Hiding Behavior would moderate the relationship between Machiavellianism and Individual Research Productivity.

H3b: Knowledge Hiding Behavior would moderate the relationship between Machiavellianism and Group Research Productivity.

H3c: Knowledge Hiding Behavior would moderate the relationship between Professional Envy and Individual Research Productivity.

H3d: Knowledge Hiding Behavior would moderate the relationship between Professional Envy and Group Research Productivity.

3. Research design

3.1. Sample and procedure

The sample of this study was permanent faculty members (professor, associate professor, assistant professors, and lecturers) of private sector higher education institutions situated in major cities of Punjab, Pakistan. The present study used a survey technique to collect data by adopting the quantitative research strategy and deductive paradigm. For that purpose, close-ended questionnaires were utilized through the self-administered questionnaires from the faculty members of private sector higher education institutions. Data was collected by adopting the convenience sampling technique, a non-probability technique of data collection, as this technique is easy and low-cost oriented, and in the pandemic circumstances, this sampling technique is suitable for the researchers. The researchers first contact the human resource departments of the respective private sector higher education institutions to collect the official e-mail addresses of the faculty members. After getting the information, the researchers forwarded the Google Docs link of the questionnaire to the respective faculty members to get their opinions about the questions in the survey form. Online data collection/web-based surveys (Ramsey et al., 2016) through Google Docs facilitates the researchers, especially during the pandemic circumstances, and is widely used in all disciplines and types of research (Opara et al., 2021; Saeed & Al Qunayeer, 2022). The purpose and objective of the study were briefed to all-faculty members in their e-mails; it also gave assurance regarding the confidentiality of the data.

To overcome the respondents' biases, the data for the current study was collected in two phases; we sent two data collection links to the participants with one month interval. The interval between the data collection process enables the researchers to minimize the biases of the respondents, as this method is recommended by Podsakoff et al. (2003). By following these recommendations, the researchers collected data in the first phase for the first predictor (Mach) and first criterion (RPI) variables; in the second phase, the data was collected for the second predictor (OE), second criterion (RPG) and moderator (KHBs) variables. We forwarded both Google Docs (first and second phase) links to 300 respondents with an interval of one month; and at the end of the second phase, we pared the responses of the first and second phases and found 221 responses valid for further analysis and the response rate was 73.67%. For the detection of common method bias (CMB), the Harman single factor analysis was conducted, and the results revealed that there was 35.8% cumulative variance which is less than the 50% cumulative variance threshold suggested by Harman (1967).

3.2. Measures

All measurement scales used in this study were adopted from the earlier reputed published studies; the scales ranged from 1 (strongly disagree) to 5 (strongly agree).

3.2.1. Machiavellianism

Nine items were adopted to measure the Machiavellian personality through the SD3 (short dark triad), which was developed by Jones and Paulhus (2014) was adopted for this study; but three items of the scale were removed whose factor loadings cannot meet the threshold limit (.500) as per suggestions of Hair et al. (2019) during confirmatory factor analysis process. The sample items of this scale were “I like to use clever manipulation to get my way” and “You should wait for the right time to get back at people.”

3.2.2. Professional envy

The level of individuals was assessed using a 10-item scale developed by Kwiatkowska et al. (2022), but items of the scale were removed whose factor loadings cannot meet the threshold limit (.500) as per suggestions of Hair et al. (2019) during confirmatory factor analysis process. The sample items of this scale were “If other people have something that I want for myself, I wish to take it away from them” and “If someone has superior qualities, achievements, or possessions, I try to attain them for myself.”

3.2.3. Knowledge-hiding behaviors

KHBs were measured using 11 items scale developed by Connelly et al. (2012). This scale has three dimensions, i.e., evasive hiding (4-items), a sample item of this dimension is “old him/her that I would help him/her out but stalled as much as possible”; playing dumb (4-items), a sample item of this dimension is “said I didn’t know even though I did”; and rationalized hiding (3-items), a sample item of this dimension is “explained that I would like to tell him/her but was not supposed to.” One item from each dimension was removed whose factor loadings cannot meet the threshold limit (.500), as suggested by Hair et al. (2019) during the confirmatory factor analysis process.

3.2.4. Research productivity

RP of the individuals and groups was assessed through a 5-item scale for individual research productivity and a 4-item scale for the research productivity of the group; this scale was developed by Baloch et al. (2021). Sample items of the scale for individual-level research productivity were “Number of book chapters written nationally/internationally” and “Number of papers presented at a scholarly conference in the country”; and sample items of the scale for group-level research productivity were “Number of research projects/ works carried out with international colleagues” and “Number of scholarly papers published with international colleagues.”

4. Results

4.1. Statistical analysis strategy

Data for this study was analyzed using SPSS; this software is widely used in social sciences research studies and can test small and complex models (Jakobsen & Mehmetoglu, 2022). Hayes PROCESS-macro was used for moderation analysis as this software can centralize variables before moderation analysis to overcome the biases of responses, as suggested by Igartua and Hayes (2021).

All the participants were from educational psychology classes, with 50 at undergraduate level and 43 at graduate level. The upper-level undergraduate course was hybrid class (80% online) with only three face-to-face meeting times, while the graduate class was 95% online with only one class meeting. Both the undergraduate and graduate classes had semester-long projects which require extensive coursework. However, students in all four classes had the opportunities of meeting with the instructors and fellow students face-to-face and/or online to discuss and collaborate on the projects. Further, clear instructions, guidelines, rubrics, and sample products for the projects were provided to help students accomplish the assignments with sufficient guidance and minimal confusion.

4.2. Demographics

Given below Table 1 demonstrate the details of respondents who participate in this study.

Table 1
Participant's details

	Category	Representation	%
Gender	Male	165	74.7%
	Female	56	25.3%
Age	25-35 Years	200	90.5%
	36-45 Years	21	9.5%
Qualification	M.Phil.	142	64.3%
	PhD	79	35.7%
Designation	Lecturer	70	31.7%
	Assistant Professor	63	28.5%
	Associate Professor	47	21.3%
Experience	Professor	41	18.6%
	1-5 Years	103	46.6%
	6-10 Years	93	42.1%
	More than 10 Years	25	11.3%

Note. *** $p < .001$, ** $p < .01$, * $p < .05$ (2-tailed)

4.3. Confirmatory factor analysis

Table 2 of this study shows factor loadings, validity, and reliability statistics of this study; where CR values of all study variables meet the minimum acceptable range (0.70) as recommended by Hair et al. (2019); whereas values of AVE also found above then the acceptable range (0.500) according to the recommendation of Hair et al. (2019); the researchers also test the factor loadings of each item of the all study variables and found

that all values were between 0.500-0.900 as per the suggestion of Hair et al. (2019) and Sarstedt et al. (2014); these findings evidence for the validity. Additionally, the values of Cronbach’s alpha for all study variables are above the threshold (0.700), as suggested by Fornell and Larcker (1981).

Table 2
Factor loading, validity, and reliability

Variables	Item	Loading	CR	AVE	Alpha
Machiavellism	1	0.65	0.88	0.56	0.88
	2	0.66			
	3	0.67			
	4	0.77			
	5	0.90			
	6	0.87			
Professional Envy	1	0.66	0.93	0.63	0.93
	2	0.70			
	3	0.96			
	4	0.86			
	5	0.80			
	6	0.79			
	7	0.83			
	8	0.74			
Knowledge Hiding Behavior	1	0.60	0.92	0.59	0.91
	2	0.97			
	3	0.73			
	4	0.95			
	5	0.75			
	6	0.60			
	7	0.68			
	8	0.77			
Research Productivity (Individual)	1	0.66	0.90	0.64	0.90
	2	0.90			
	3	0.81			
	4	0.83			
	5	0.77			
Research Productivity (Group)	1	0.76	0.85	0.58	0.84
	2	0.73			
	3	0.77			
	4	0.77			

4.4. Descriptive statistics and correlations

A one-way analysis of variance test was performed to test the influence of demographic variables on all study variables. Results shown in Table 3 indicate that only the association of gender was found significant with all study variables.

Table 4 of this study demonstrates the values of mean, SD, and correlations; it has been found that all study variables significantly correlated. Moreover, Mach significantly positively correlated with PE ($r = .25, p < .01$) and with KHBs ($r = .46, p < .01$); in contrast, Mach positively significantly correlated with RPI ($r = .38, p < .01$) and with

RPG ($r = -.18, p < .01$). PE positively significantly correlated with KHBs ($r = .41, p < .01$), and positively significantly correlated with RPI ($r = .37, p < .01$) and with RPG ($r = -.15, p < .05$). KHBs significantly positively correlated with RPI ($r = -.43, p < .01$) and RPG ($r = -.19, p < .01$).

Table 3
ANOVA

Variables	Mach	Envy	KH	RPI	RPG
Gender	12.602***	11.170***	39.083***	16.538***	7.421**
Age	.892	2.575	.172	8.330**	2.589
Qualification	1.344	34.954***	12.650***	23.730***	2.053
Designation	4.705*	1.339	.030	.007	4.898*
Organization Type	2.583	.311	.005	3.900*	.323
Experience	3.251*	.420	2.287	.415	7.715***

Note. Mach: Machiavellism, PE: Professional envy, KHBs: Knowledge hiding behavior, RPI: Research productivity (individual), RPG: Research productivity (group), *** $p < .001$, ** $p < .01$, * $p < .05$

Table 4
Descriptive statistics and correlations

Variables	Mean	SD	1	2	3	4	5
1 Mach	2.69	.9637					
2 PE	3.01	1.0239		.25**			
3 KHBs	2.95	.8304			.46**		
4 RPI	1.75	.9951				.38**	
5 RPG	3.45	.8588					.37**

Note. Mach: Machiavellism, PE: Professional envy, KHBs: Knowledge hiding behavior, RPI: Research productivity (individual), RPG: Research productivity (group), * $p < .01$, ** $p < .05$

4.5. Direct effects

The regression analysis calculated the direct effects of predicting variables on criterion variables. Values in Table 5 reveal that Mach negatively significantly influences the RPI ($b = -.39***, SE = .06, t = -6.13, p < .001$), PE significantly negatively influences the RPI ($b = -.36***, SE = .06, t = -5.89, p < .001$), Mach have a significant negative impact on RPG ($b = -.16**, SE = .06, t = -2.72, p < .01$) and PE also have a significant negative effect on RPG ($b = -.13*, SE = .05, t = -2.26, p < .05$); thus, these results prove H1a, H1b, H2a and H2b of the present study.

Table 5
Regression analysis

Direct Paths	<i>b</i>	<i>SE</i>	<i>t</i> -value	<i>p</i> -value	<i>R</i> ² / <i>R</i> ² Change
Mach → RPI	-.39***	.06	-6.13	.000	.146 / .142
PE → RPI	-.36***	.06	-5.89	.000	.137 / .133
Mach → RPG	-.16**	.06	-2.72	.007	.033 / .028
PE → RPG	-.13*	.05	-2.26	.025	.023 / .018

Note. Mach: Machiavellism, PE: Professional Envy, KHBs: Knowledge hiding behavior, RPI: Research productivity (individual), RPG: Research productivity (group), *** $p < .001$, ** $p < .01$, * $p < .05$

4.6. Interactive effects

The researcher tested the moderation effect of KHBs by following the method of PROCESS-macro suggested by Igarua and Hayes (2021) with bootstrapping sample of 5000. The first part of Table 6 shows the moderating effect of KHBs between the relationship of Mach and RPI, where interaction (Mach x KHBs) has a negative impact on RPI ($b = -.15, SE = .06, t = -3.90, p < .001, LL/UL-Cis = -.06/-.17$); thus, these results support H3a of this study. The second part of Table 6 shows the moderating effect of KHBs between the relationship of PE and RPI, where interaction (PE x KHBs) has a negative impact on RPI ($b = -.27, SE = .08, t = -3.48, p < .001, LL/UL-Cis = -.12/-.42$); thus, these results support H3c of this study.

Table 6
Moderation analysis

Interaction Term	B	SE	t-value	p-value	LL/UL-CIs
Mach → RPI	-.25	.07	-3.54	.00	-.11/-.38
KHBs → RPI	-.38	.08	-4.59	.00	-.21/-.54
Mach x KHBs → RPI	-.15	.06	-3.90	.00	-.06/-.17
PE → RPI	-.11	.08	-1.34	.18	-.27/.05
KHBs → RPI	-.58	.11	-5.19	.00	-.36/-.80
Envy x KHBs → RPI	-.27	.08	-3.48	.00	-.12/-.42

Note. Mach: Machiavellism; PE: Professional Envy; KHBs: Knowledge hiding behavior; RPI: Research productivity (individual); RPG: Research productivity (group); LL-UL CIs: Lower and upper level of class intervals

The researchers drew an interaction graph to clarify further moderation (Mach x KHBs) effects on RPI. Fig. 2 shows that when the Mach qualities of individuals were at a higher level, and their KHBs were higher, their RPIs were lower and also higher, it decreased their RPI.

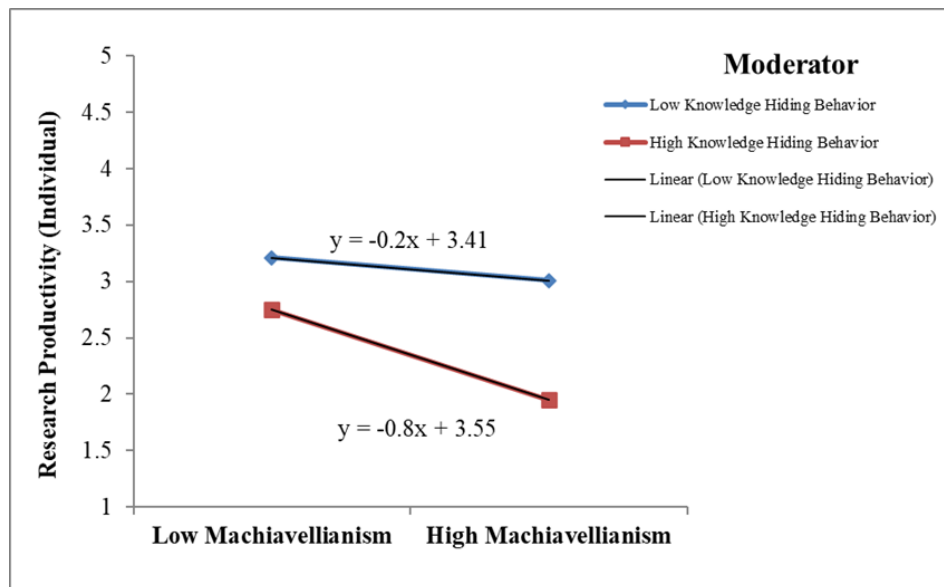


Fig. 2. Moderation slope

Additionally, researchers explain the moderation (PE x KHBs) effects on RPI; for that purpose, an interaction graph was drawn; Fig. 3 shows that a higher level of PE of individuals with higher KHBs becomes the cause of a decrease in their RPI.

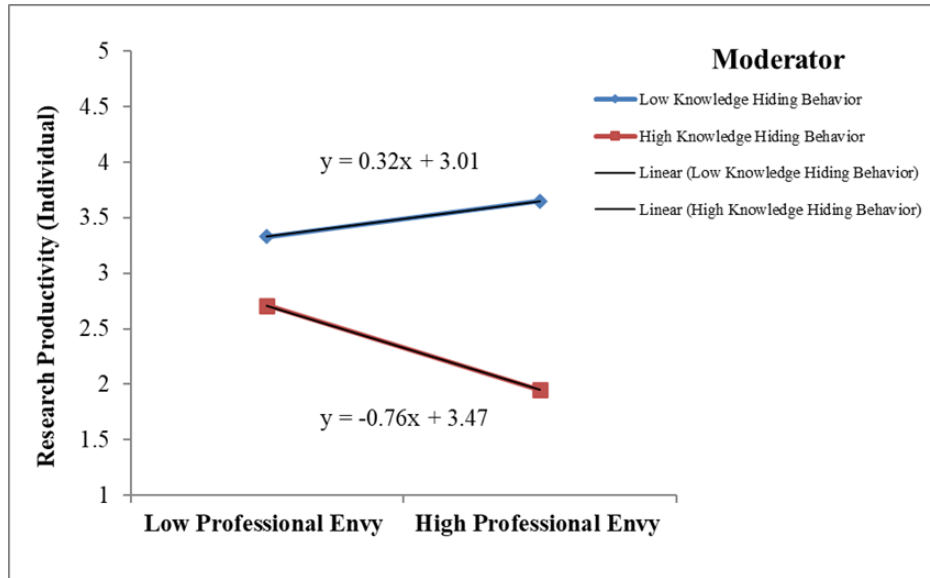


Fig. 3. Moderation slope

The researcher tested the moderation effect of KHBs by following the method of PROCESS-macro suggested by Igartua and Hayes (2021) with bootstrapping sample of 5000. The first portion of Table 7 shows the moderating effect of KHBs between the relationship of Mach and RPG, where interaction (Mach x KHBs) has a negative impact on RPG ($b = -.19, SE = .06, t = -3.49, p < .001, LL/UL-Cis = -.03/- .20$); thus, these results support H3b of this study. The second portion of Table 7 shows the moderating effect of KHBs between the relationship of PE and RPG, where interaction (PE x KHBs) has a negative impact on RPG ($b = -.25, SE = .07, t = -3.44, p < .001, LL/UL-Cis = -.11/- .39$); thus, these results support H3d of this study.

Table 7
Moderation analysis

Interaction Term	B	SE	t-value	p-value	LL / UL-CIs
Mach → RPG	-.11	.07	-1.72	.09	-.02/.25
KHBs → RPG	-.12	.08	-3.55	.00	-.03/-.28
Mach x KHBs → RPG	-.19	.06	-3.49	.00	-.03/-.20
PE → RPG	-.13	.08	-3.41	.00	-.12/-.18
KHBs → RPG	-.12	.05	-3.23	.00	-.18/-.23
Envy x KHBs → RPG	-.25	.07	-3.44	.00	-.11/-.39

Note. Mach: Machiavellism; PE: Professional envy; KHBs: Knowledge hiding behavior; RPI: Research productivity (individual); RPG: Research productivity (group); LL-UL CIs: Lower and upper level of class intervals

A moderation graph has been drawn for further clarification of moderation (Mach x KHBs) effects on RPG; Fig. 4 shows that higher level Mach qualities of individuals with higher KHBs decrease their RPG.

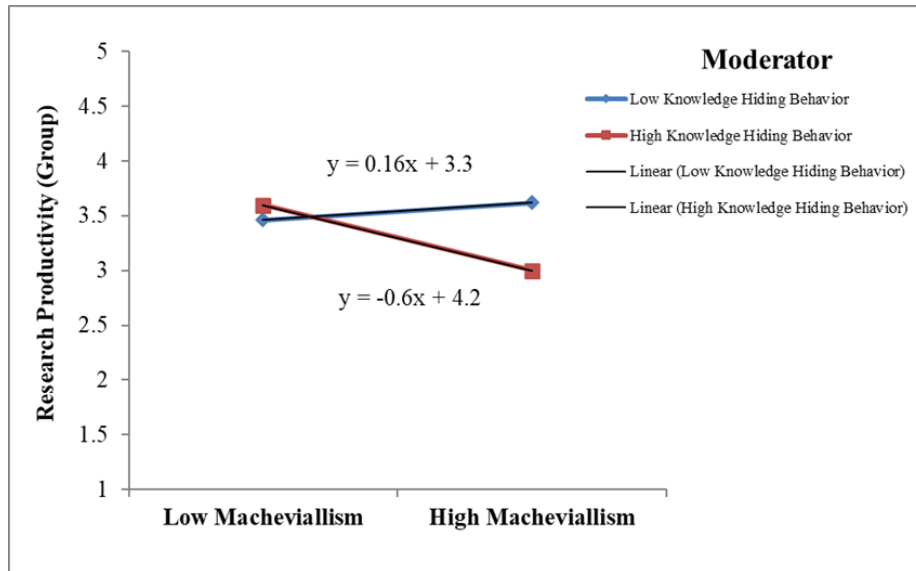


Fig. 4. Moderation slope

The researchers also explained the effects of moderation (PE x KHBs) on RPG by drawing the interaction graph; Fig. 5 shows that higher-level PE of individuals with higher-level KHBs decreases their RPG.

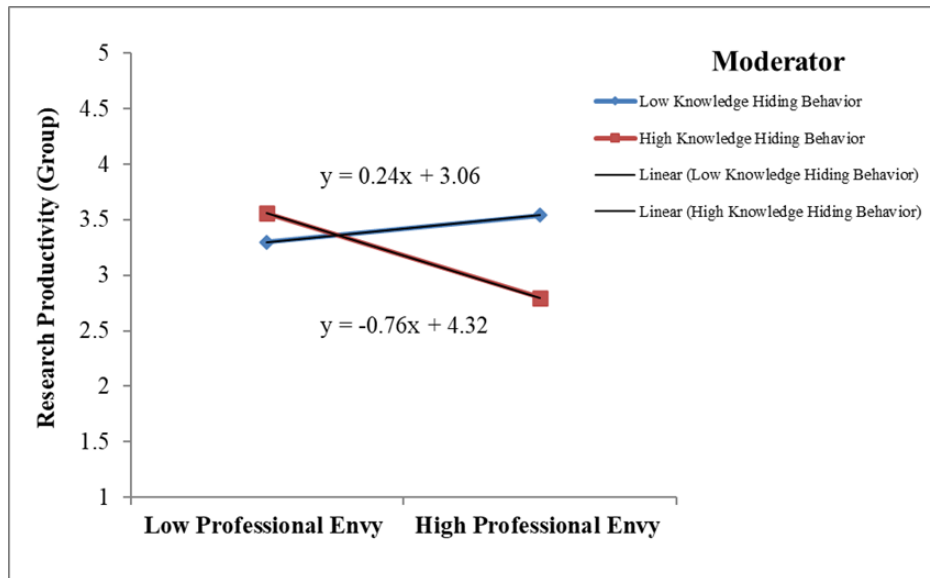


Fig. 5. Moderation slope

5. Discussion and conclusion

The purpose of the present study was twice-fold: to understand the impact of Mach personality trait and PE on RPI and RPG of faculty members of HEIs; to investigate the

effects of KHBs between these relationships. The first (H1a and H1b) hypothesis of this study proposed that there is a negative impact of Mach on RPI and RPG; the findings of this study evidenced the acceptance of this hypothesis. Earlier studies also support this hypothesis and explain that Machiavellian people, due to their nature, demonstrate negative behaviors and attitudes in the workplace (Chughtai & Ali Shah, 2020; Jonason & Krause, 2013; Modic et al., 2018; Webster & Smith, 2019). Our findings further elaborate that, in the context of HEIs, these personalities' negative behaviors affect individual and group-level research activities. The second (H2a and H2b) hypothesis of this study proposed that PE negatively influences the RPI and RPG, and the findings of this study are evidence for the acceptance of this hypothesis. Earlier studies also provide support to this hypothesis by explaining that envy is much fertile in academia and this emotional state negatively affects individual, organizational, and group-level outcomes (Li et al., 2021; Thiel et al., 2021; Tussing et al., 2022; Zurriaga et al., 2020). Further, the findings of this study describe that in HEIs, the PE of faculty members, especially with their peers, is harmful to their personal growth and development and effective teamwork. Also, a person who suffers from PE faces a decrease in motivation and self-confidence that ultimately affect their cognitive level for creative and innovative thinking, which is the backbone for the research activities in HEIs. The third hypothesis of this study (H3a, H3b, H3c, and H3d) proposed that KHBs moderate the relationship between Mach, PE, RPI, and RPG; the results of this study provide support for the acceptance of this hypothesis. Earlier studies also evidenced that KHBs of individuals negatively influence the individual, team, and organizational output (Bari et al., 2019; Burmeister et al., 2019; Černe et al., 2017; Karim, 2020; Karim & Majid, 2019). Our findings further explain that KHBs of individuals are natural in academia because HEIs are considered knowledge-intensive institutions. The level of competition between the faculty members is much high in academia due to the race of research publication (Karim, 2020). These publications provide opportunities for promotion, power, and control to the faculty members; therefore, they intentionally hide knowledge from their peers. Negative personality trait and envy also helps individuals to demonstrate their KHBs, as this emotional state forces people to get control over other by manipulating them with unethical and uncooperative behaviors.

5.1. Theoretical and empirical implications

The present study has some theoretical and empirical implications; theoretically, this study extends the body of knowledge in management, organizational behavior, and psychology by explaining the impact of negative personality traits and envy on research productivity (individual and group). The findings of this study also extend social comparison theory (Festinger, 1954) by explaining that social comparison of individuals forces them to demonstrate negative behaviors and attitudes at the workplace. Especially in HEIs where faculty members belong to negative traits and compare their achievements with their peers in upward social comparison (Buunk et al., 2020; Buunk & Gibbons, 2007; Meier & Schäfer, 2018) then they suffer from this negative emotional state (i.e., professional envy). This study also explains the moderating role of KHBs within the context of HEIs, which are considered knowledge-intensive institutions, but unfortunately, HEIs are much more fertile where faculty members hide knowledge from each other. Faculty members, due to race of research activities in the form of publication, compare the achievements (i.e., number of publications, funding, and higher positions) with others, and they feel they have less than the expectations. These feelings of self-evaluation force them to hide knowledge so that they can use this knowledge as power to control others.

Empirically, first, organizations biannually or annually should help the faculty members psychologically so that they can re-evaluate their personality traits and knowledge behaviors with their colleagues. This act by the HEIs provides a platform for the faculty members to cooperate regarding knowledge behaviors and align themselves with the organization's reality (as HEIs are knowledge-concentrated institutions). Second, the management of the HEIs also calls meetings to find out how many incidents of KHBs occur and what the causes are, take measures and make policies to promote knowledge sharing in the HEIs. Third, management of the HEIs for better educational and research activities and quality research productivity take steps during the faculty hiring process. Management also makes a recruitment policy in which personality assessment must be taken during and after hiring, i.e., in probation and in-service employees, to minimize harmful activities by the dark traits.

5.2. Limitations and future directions

Despite its potential contribution, this study has numerous limitations and future directions. First, the present study uses a self-reported scale of Machiavellians and professional envy; it might be possible that due to social desirability, participants of this study reported a lower level of their personality traits and emotional state. Secondly, this study collected data from the HEIs of the private sector for the generalizability of the findings of this study; future researchers replicate this model with other sectors, i.e., public sector institutions and manufacturing and service sector organizations. In the present study, researchers use Mach and PE as predictor variables; it is recommended for future studies to find out the antecedent so this trait and emotional state (Li et al., 2021; Zurriaga et al., 2020). Thirdly, in the present study, we use KHBs as moderator; it is recommended for future research to test other moderators (occupational self-efficacy and learning behaviors) and mediators (i.e., moral disengagement, work engagement) between these relationships and with different outcomes (i.e., OCBs, and turnover intentions) (Li et al., 2021; Zurriaga et al., 2020). Finally, in the present study, we use the envy scale as an aggregate construct; it is suggested that future researchers may use the dimension of the envy construct (i.e., dispositional envy, episodic envy, and general envy) for a better understanding of this phenomenon (Li et al., 2021; Zurriaga et al., 2020).

Author Statement

The authors declare that there is no conflict of interest.

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