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Modelling the factors that affect medical students' occupational identity in long COVID: an integrated perspective of motivation, opportunity and ability

Jun Yan [1], Manli Wu[1✉], Yuhan Liao[2] & Yaxin Huang[1]

The medical workforce plays a critical role in building resilience in the medical system and society to respond to long COVID. The threat of career pressure and the proliferation of social media disinformation have combined to reduce medical workers' occupational identity, triggering a wave of medical staff resignations all over the world. There is an urgent need to investigate the development of medical students' occupational identity. Based on characteristics of medical students, this study builds on the Motivation-Opportunity-Ability (MOA) framework and develops a comprehensive theoretical model to illustrate the predictors of medical students' occupational identity to find ways to stabilize the subsequent medical workforce pool. The results show that medical students' occupational identity is affected by motivation, opportunity and ability factors. The results call for improving motivation cultivation and practice environment. The newly discovered role of media exposure not only provides a new way to enhance occupational identity, but also contributes to the follow-up exploration of the relationship between media environment and occupational identity.

[1] School of Journalism and Information Communication, Huazhong University of Science and Technology, Wuhan, China. [2] Yangtze Estuary Waterway Administration Bureau, Ministry of Transport of the P. R. China, Shanghai, China. ✉email: mlwu@hust.edu.cn

Introduction

The Coronavirus disease 2019 (COVID-19) pandemic outbreak and the prolonged existence of long COVID have brought great impacts and continuous threats to social order stability and structural balance worldwide (Mansouri and Sefidgarbaei, 2021). It is notable that medical workers, who are the main force in the fight against pandemics, are faced with health risks (Xiang et al., 2020; Vizheh et al., 2020). Recent statistics suggest that nearly one in five medical workers in the United States resigned during the COVID-19 pandemic (Monique, 2021). Several hospitals in Spain, Canada, Brazil, and the United Kingdom also declared crises due to shortages of medical workers, and the World Health Organization predicts that there will be a global shortage of more than14 million health workers by 2030.

At least 65 million people worldwide are estimated to have long COVID (Davis et al., 2023), which places high demands on medical workers. Medical students are future medical workers. They are in the formation and transformation stages of occupational identity, and they are younger and more easily molded than experienced medical workers. Occupational identity thus plays an important role in driving their career cognition and choices (Monrouxe, 2010). To some extent, medical students' career cognition and choices determine the security of global health, particularly during public health emergencies. However, few prior studies have examined the development of medical students' occupational identity when long COVID lasts where medical workers play critical roles.

In addition, prior studies tended to either describe the influencing factors of occupational identity without providing enough theoretical explanations for each factor (Wong and Trollope-Kumar, 2014; Wu et al., 2020) or adopt a specific theoretical lens to examine unidimensional antecedents of occupational identity (Heidari et al., 2020; Zhang et al., 2021). The present study aims to develop a comprehensive theoretical model to uncover the antecedents of medical students' occupational identity. Thus, this study hopes to advance theoretical understanding of medical students' belonging and career choice intention and provide actionable strategies to improve their occupational identity.

Based on the motivation-opportunity-ability (MOA) model, this study investigates how medical students' occupational motivation, media information, and occupational ability shape their occupational identity. The results show that occupational motivation and occupational ability have significant impacts on occupational identity. In addition, the role of media environment as an opportunity factor in the formation of occupational identity is highlighted.

Literature review and hypotheses development

Occupational identity. Occupational identity is defined as the structure of a self-concept related to an individual's perceived future occupational role (Erikson, 1968; Meijers, 1998). Occupational identity is important in the education of medical students. On the one hand, owing to the high professionalism requirements for medical workers, occupational identity guarantees medical students invest great efforts in their learning. On the other hand, as future medical workers, occupational identity influences their occupation choice. Considering the impacts of COVID-19 as well as its high demands on medical workers, it is essential to explore the factors that influence their occupational identity development.

The existing research has attempted to examine antecedents of occupational identity, but many studies utilized descriptive analysis rather than providing sufficient theoretical explanations (Wong and Trollope-Kumar, 2014; Wu et al., 2020). In recent years, some empirical studies have begun to build on specific theories, such as social construction theory and social presence theory, to investigate the antecedents of occupational identity (Ding and Wang, 2019; Heidari et al., 2020). These studies tend to examine the role of either internal or external factors in driving occupational identity without simultaneously considering multiple drivers. As medical students' occupational identity can be affected by various factors, an integrated theoretical model should be built in order to develop a good understanding of occupational identity.

Occupational identity is regarded as a complex structure (Meijers, 1998). Individuals tend to construct their occupational identity based on feelings and behaviors (Ashforth and Schinoff, 2016). Both belonging and career choice intention are important indicators of occupational identity (Ding and Wang, 2019; Yue and Zhao, 2021). Belonging describes the feeling of being a member of a group, and it measures how medical students feel about being a member of the medical occupation. Career choice intention is conceptualized as medical students' willingness to engage in a medical occupation in the future (Ashforth and Schinoff, 2016; Barbour and Lammers, 2015).

Feeling a sense of belonging can influence career choice intention. Empirical studies have found a positive correlation between belonging and behavioral intention (Amani, 2022; Lin, 2007). Individuals with higher belonging tend to put more time and effort into their occupations (Roberts, 1998). Career choice intention is determined by individual psychographic factors (Dyer, 1995), and it has been shown that enhancing belonging during medical workers' hospital practice has an important impact on their career choices (Brandford et al., 2022). The following hypothesis is proposed:

H1: Medical students' belonging positively correlates with their career choice intention.

MOA model. Composed of motivation, opportunity and ability (MacInnis and Jaworski, 1989), the MOA model provides an integrated perspective to explain individual behavior. The MOA model claims that an individual's behavior is mainly shaped by individual characteristics (e.g., motivation or ability) and the external environment (e.g., opportunity) (Lai et al., 2018). Motivation refers to willingness, interest and desire, and it is commonly viewed as a force that directs individuals toward specific behaviors (MacInnis et al., 1991); opportunity refers to situational factors that can either enhance or impede behavior (Leung and Bai, 2013); and ability refers to knowledge or skills that individuals possess in order to perform specific behaviors (Hallahan, 2000). MOA provides a theoretical framework to understand the formation of individuals' behavior without identifying specific variables, which makes it adaptable to various situations.

Motivation, opportunity and ability factors can play important roles in medical students' development of occupational identity (Meijers, 1998). First, motivation affects choice of major and learning effort, thus impacting their professional learning and occupational choices (Pagnin et al., 2013; Sobral, 2004). Second, medical students' ability is based on medical knowledge and practical experience, which may further affect their occupational identity (Pitkala and Mantyranta, 2003). Third, opportunities to gain information about medical workers may affect medical students' perception of the occupation (Citra and Syakurah, 2022). During the COVID-19 pandemic, individuals increasingly relied on the media to obtain real-time news about the pandemic (Gupta et al., 2021). Notably, online media not only provided medical-related information (Krawczyk et al., 2021), but also

posted news reports regarding medical workers (Bagnasco et al., 2020). The online news exposure thus provided opportunities for medical students to learn the responsibilities and challenges of medical workers (Bagnasco et al., 2020), which may further affect their occupational identity. Hence, this study regards news exposure as the opportunity source for medical students to develop their occupational identity. In sum, the MOA model provides a good lens to understand the development of medical students' occupational identity. This framework is based on the notion that medical students are more likely to develop a sense of occupational identity if they are motivated to choose their major (motivation), have the necessary medical knowledge (ability) and develop a cognition of medical workers through the media environment (opportunity).

This study employs the MOA framework for the following reasons. First, the MOA model interprets occupational identity from different perspectives, thus providing a more comprehensive framework for understanding its development. Second, by exploring the factors in different dimensions, we can develop a nuanced understanding regarding the cultivation of occupational identity. Based on MOA, this study examines how motivation factors, opportunity factors and ability factors affect medical students' belonging and career choice intention.

The effects of motivation. Identity construction processes are guided by identity motives that push individuals toward certain identity states, especially during adolescence (Vignoles, 2011). According to the self-determination theory, motivation can be divided into intrinsic motivation and extrinsic motivation (Deci and Ryan, 1985). Intrinsic motivation is defined as doing an activity for its own sake, because it is interesting and enjoyable in itself (Gagné et al., 2015). In contrast, extrinsic motivation refers to engaging in the activity for instrumental reasons, such as receiving rewards and approval, avoiding punishment or criticism, boosting one's self-esteem, or reaching a personally valued goal (Gagné et al., 2015). Medical students' motivation in choosing their majors may be based on intrinsic motivation, such as their own interests and self-efficacy, and extrinsic motivation, such as occupational employment prospects, suggestions from important others and salary expectations (Wu et al., 2018). Both intrinsic motivation and extrinsic motivation are critical drivers of individuals' cognition and behaviors toward their future occupations.

Intrinsic motivation can influence medical students' occupational identity, as reflected by belonging and career choice intention. First, intrinsic motivations for selecting a major are positively associated with students' belonging. Students usually feel a high sense of belonging and satisfaction when they choose their majors for their own sake (Soria and Stebleton, 2013). Second, intrinsic motivation is positively correlated with career choice (Harms and Knobloch, 2005; Ng et al., 2017). Intrinsic motivations such as altruism and the desire to help others are found to be important drivers of career choice (Harms and Knobloch, 2005). Therefore, the following hypotheses are proposed:

H2a: Intrinsic motivation positively correlates with belonging.
H2b: Intrinsic motivation positively correlates with career choice intention.

Extrinsic motivation also plays an important part in occupational identity. Belonging can be driven by extrinsic motivation. For instance, choosing a major because of prestige has a positive predictive effect on students' belonging (Soria and Stebleton, 2013). The influence of extrinsic motivation on occupational identity is prominent in one's career choice. Occupations with higher salaries and better benefits are more likely to be chosen (Hejazi and Bazrafshan, 2013). Therefore, the following hypotheses are proposed:

H3a: Extrinsic motivation positively correlates with belonging.
H3b: Extrinsic motivation positively correlates with career choice intention.

The effects of opportunity. Since the outbreak of COVID-19, a large amount of pandemic information has circulated on media platforms (Apuke and Omar, 2020; Cinelli et al., 2020). Good news articles share praise and rewards for medical workers; sad news details challenges and sacrifices of medical workers during the pandemic. Since medical students relied on online media to gain pandemic-related news (Gupta et al., 2021), media was medical students' opportunity source to learn about COVID-19 and the working conditions of medical workers, which affected their cognition and behaviors toward medical occupations. However, existing studies ignore the role of online media news exposure in their identity construction.

Online news can present external interpretations about a group, and it may affect medical students' occupational identity via their reflection on medical occupations (Dutton and Dukerich, 1991). Previous research has found that good news brings positive feelings (McIntyre and Gibson, 2016). When medical students read news showing public appreciation of medical workers, they tend to be proud and are likely to regard themselves as members of this group, thus enhancing their sense of belonging (Kjærgaard et al., 2011). Good news about medical groups can also promote students' confidence in choosing a career. It has been shown that positive reports in the media about specific practitioners can affect individuals' career choice directions (Konon and Kritikos, 2017). Hence, the following hypotheses are proposed:

H4a: Good news exposure positively correlates with belonging.
H4b: Good news exposure positively correlates with career choice intention.

Although sad news has been reported to result in negative outcomes in previous research (McIntyre and Gibson, 2016), it can engender positive effects in some specific contexts. Sad news will achieve emotional resonance through emotional embedding, which may transform negative emotions into positive feelings and even positive actions (Giorgi, 2017). For medical students, sad news involving workers' sacrifices and the tough conditions in fighting against the disease can enhance their sense of responsibility (Vivekananda-Schmid et al., 2015). In this sense, sad news may motivate students to take responsibility and choose their career. Therefore, the following hypotheses are proposed:

H5a: Sad news exposure positively correlates with belonging.
H5b: Sad news exposure positively correlates with career choice intention.

The effects of ability. Both knowledge and practice play important roles in medical students' ability development (Monrouxe, 2010) and affect their perceptions of the occupation. This study thus treats knowledge and experience as ability dimensions and examines how they affect occupational identity. Knowledge refers to the professional knowledge needed by medical students for occupational practice, and experience refers to the practical experience gained from real contact with the occupational environment, especially a clinical work environment (Tan et al., 2017).

Medical students' knowledge can exert a positive impact on their belonging. On the one hand, knowledge helps them develop their own self-efficacy (Lang and Lee, 2005). On the other hand, knowledge allows them to categorize themselves as members of the medical occupation, which increases their group belonging (Gao and Riley, 2010). Moreover, knowledge can exert a positive impact on their career choice. Students tend to choose a career that matches their mastered knowledge (Yusoff et al., 2011). Thus, we propose the following hypotheses:
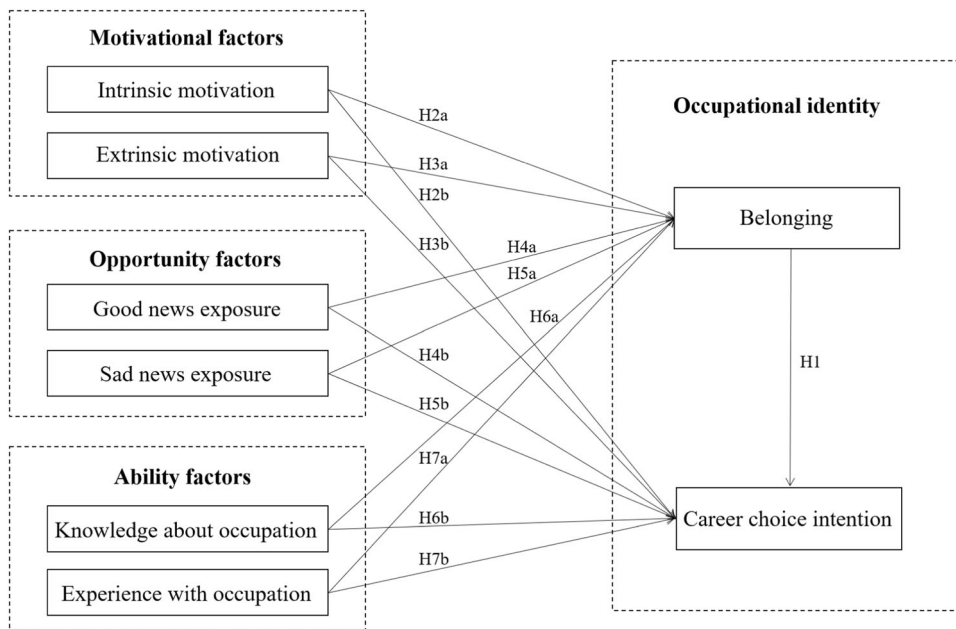
Fig. 1 Relationships between MOA factors and occupational identity.

H6a: Knowledge about occupation positively correlates with belonging.

H6b: Knowledge about occupation positively correlates with career choice intention.

In addition, practical experience can increase medical students' awareness of the occupation, which further fosters their sense of belonging (Filstad et al., 2019). Practical experience can also affect medical students' career choice (Mortimer et al., 2002). It has been shown that medical students' expectations to be medical workers increase after they come into contact with patients (Pitkala and Mantyranta, 2003), work with mentors or role models and engage in other practical experiences during their internship (Querido et al., 2018). Therefore, the following hypotheses are proposed:

H7a: Experience with occupation positively correlates with belonging.

H7b: Experience with occupation positively correlates with career choice intention.

Figure 1 shows the proposed research model.

Research method

Samples and data collection. To test the proposed research model, we conducted a survey among medical students in Wuhan, China. Specifically, medical students majoring in Basic Medicine in a medical school participated in this survey in May 2022. The Basic Medicine major trains medical students in public health, preventive medicine, and epidemiology, as well as clinical skills, hence they are an important component of the medical profession. A pilot test was conducted, and the wordings and measurements were modified according to the feedback. In the formal survey, pilot test participants were not allowed to complete the questionnaire. The paper questionnaire included participants' demographic information, occupational identity, and factors related to motivation, opportunity, and ability. A total of 337 valid questionnaires were collected, and the effective rate of the sample was 86.9%. Respondents' demographic characteristics can be found in Table 1.

Measurement instrument. To ensure the validity of instrument, measurement items were adapted from prior studies and

Table 1 Respondents' demographic characteristics (n = 337).

Characteristics		Frequency	Percent
Gender	Male	162	48.1
	Female	175	51.9
Age	18–22	228	67.6
	23–27	109	32.4
Education	Undergraduate	303	89.9
	Graduate	34	10.1

modified according to the Chinese context and medical students' characteristics. All items were measured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The instrument can be found in the Appendix.

For occupational identity, we measured belonging and career choice intention. Medical students were asked to report their feelings toward medical workers and their future occupations. Belonging was measured by three items from Lin et al. (2014). Items of career choice intention were adapted from Ding and Wang (2019). We measured intrinsic motivation and extrinsic motivation by adapting items from Gagné et al. (2015). We asked medical students to report their intrinsic and extrinsic reasons for choosing their major.

The measures for good and sad news exposure were adapted from measures for information exposure in Tan et al. (2015). In addition, the content measurement of good news and sad news was self-developed according to the media news environment during the pandemic. As this study examines the occupational identity of medical students, we collected news about medical workers from online media in China during the pandemic and chose the commonly reported ones. After several rounds of discussion, we selected two good news and two sad news articles respectively. After the pilot study, we also interviewed the participants to get their feedback about the measures for good news exposure and sad news exposure. They admitted that they often encountered similar good and sad news in the media during the pandemic. Specifically, to measure good news exposure and sad news exposure, this section was labeled "How often did you

get exposed to the following types of information related to medical workers in online media?" Then participants read brief good news and sad news reports.

Knowledge about occupation was measured by asking medical students to indicate their knowledge about the medical occupation, leveraging items from Tan et al. (2017). The measures for experience with occupation were also adapted from Tan et al. (2017), who treated experience with occupation as one dimension of student learning and regarded it as essential for developing occupational identity. Our data were collected in May 2022, and most of the subjects were undergraduate students. Due to the influence of the pandemic, they had little opportunity to engage in offline internships. Given the lack of direct occupational experience, we extended the measures for experience from the authentic contact to students' feelings about the experience and their cognition about the professionals and industry, in line with Tan et al. (2017). We also conducted interviews with medical students, which revealed that they took part in online internships, and their experience largely depended on their feelings and cognition about the practice. Hence, we measured medical students' feelings about their experience using the statement "I am serious about the practice related to what I am studying." We also asked medical students to report their experience with the professionals in the domain using the statement "I know personally some people who work in my future occupation" and their experience with the industry using the statement "I follow developments in my future medicine industry."

Data analysis and results. The data were analyzed with structural equation modeling (SEM) using AMOS 25.0. The measurement model and structural model were tested sequentially. Overall, this model fits well to the data according to the evaluation of model fit indices (Goretzko et al., 2023). Specifically, the values of fit indices for our research model follow the threshold recommended by Gefen et al. (2000) and Hu and Bentler (1999), as listed in Table 2. Although 0.881 of GFI does not exceed 0.9, the value meets the 0.8 acceptability requirement of Baumgartner and Homburg (1996).

Measurement model assessment. Confirmatory factor analysis was conducted to investigate the reliability and validity of constructs. The results in Table 3 show that the Cronbach's α values and the composite reliabilities (CRs) of all constructs exceeded the threshold of 0.7, and the values for average variance extracted (AVE) were higher than the recommended value of 0.5. In addition, all item loadings except one item for good news exposure and one item for sad news exposure were higher than 0.7. Since these two loadings approximated 0.7, we kept them for the

sake of content validity. Hence, the convergent validity of this measurement model is validated (Fornell and Larcker, 1981).

Discriminant validity requires the square root of AVE for each construct exceeds the correlations of all other constructs (Fornell and Larcker, 1981). Table 4 shows that each construct's square root of AVE is greater than its correlation coefficients with other factors, suggesting a good discriminant validity. All values of the

Table 2 Model fit indices.

Model fit index	Recommended value	Value in this model
χ^2/df ($\chi^2 = 504.009$; d.f. $= 202$, $p < 0.001$)	<3.00	2.495
CFI	>0.90	0.954
GFI	>0.90	0.881
TLI	>0.90	0.942
NNFI	>0.90	0.926
IFI	>0.90	0.954
RMSEA	<0.08	0.067
SRMR	<0.05	0.047

Table 3 Confirmatory factor analysis.

Variable	Items	Factor loadings	AVE	CR	Cronbach's α
Intrinsic motivation (IM)	IM1	0.953	0.889	0.960	0.943
	IM2	0.950			
	IM3	0.926			
Extrinsic motivation (EM)	EM1	0.775	0.768	0.930	0.915
	EM2	0.902			
	EM3	0.907			
	EM4	0.914			
Good News Exposure (GNE)	GNE1	0.694	0.575	0.729	0.723
	GNE2	0.817			
Sad News Exposure (SNE)	SNE1	0.922	0.656	0.788	0.768
	SNE2	0.679			
Knowledge about Occupation (KO)	KO1	0.905	0.746	0.921	0.921
	KO2	0.931			
	KO3	0.837			
	KO4	0.773			
Experience with Occupation (EO)	EO1	0.794	0.676	0.862	0.860
	EO2	0.827			
	EO3	0.844			
Belonging (BE)	BE1	0.760	0.756	0.902	0.894
	BE2	0.921			
	BE3	0.918			
Career Choice Intention (CCI)	CCI1	0.901	0.815	0.898	0.898
	CCI2	0.905			

Table 4 Construct correlations and square roots of AVE.

Construct	Mean (SD)	IM	EM	GNE	SNE	KO	EO	BE	CCI
Intrinsic motivation	4.223 (1.361)	**0.947**							
Extrinsic motivation	4.289 (1.230)	0.553	**0.870**						
Good news exposure	3.594 (1.425)	0.116	0.156	**0.752**					
Sad news exposure	4.840 (1.615)	0.121	0.198	0.598	**0.808**				
Knowledge about occupation	4.555 (1.060)	0.299	0.269	0.207	0.175	**0.825**			
Experience with occupation	5.080 (1.067)	0.301	0.355	0.302	0.317	0.599	**0.707**		
Belonging	5.132 (1.290)	0.443	0.489	0.199	0.249	0.502	0.465	**0.820**	
Career choice intention	4.872 (1.310)	0.519	0.465	0.136	0.254	0.415	0.532	0.555	**0.842**

Bold figures are the square root of AVEs.
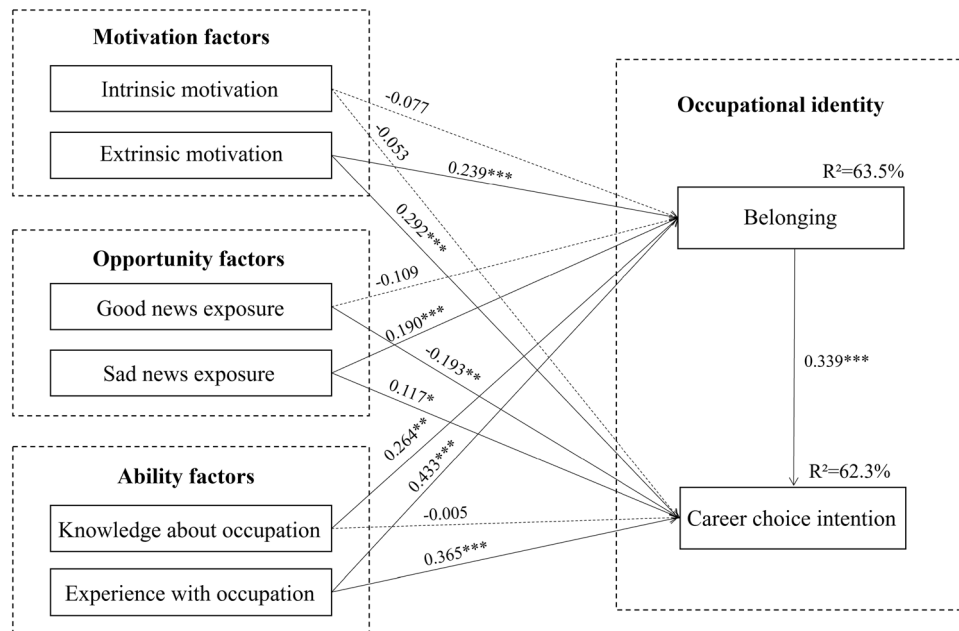
Fig. 2 Data analysis results about the relationships between MOA factors and occupational identity.

variance inflation factors for this research model were lower than 10, indicating that multicollinearity is not likely to be a threat (Hair et al., 2006).

The Harman's one-factor test was used to examine whether the research model was affected by common method bias (CMB) (Harman, 1976). The results showed that the first factor accounted for less than 50% of the total variance. Therefore, CMB did not affect the results of the data analysis.

Hypotheses testing. A structural model assessment was performed to examine the hypothesized relationships. On the whole, this model accounted for 63.5% of the variance in belonging and 62.3% of the variance in career choice intention. Figure 2 displays the standardized path coefficients and path significances.

This study identified belonging and career choice intention as two components of occupational identity. As expected, belonging positively ($\beta = 0.339$, $p < 0.001$) correlates with career choice intention, thereby supporting H1.

This study then examined the impacts of motivation factors. The results showed that effects of intrinsic motivation on belonging ($\beta = -0.077$, $p > 0.01$) and career choice intention ($\beta = -0.053$, $p > 0.01$) are insignificant, failing to validate H2a and H2b. In contrast, extrinsic motivation is positively and significantly correlated with belonging ($\beta = 0.239$, $p < 0.001$) and career choice intention ($\beta = 0.292$, $p < 0.001$), supporting H3a and H3b.

The effects of opportunity factors were also tested. The findings revealed that the relationship between good news exposure and belonging is negative but insignificant ($\beta = -0.109$, $p > 0.01$), and the relationship between good news exposure and career choice intention ($\beta = -0.193$, $p < 0.01$) is negative and significant. Hence, H4a and H4b were not supported. In addition, sad news exposure is positively related to belonging ($\beta = 0.190$, $p < 0.001$) and career choice intention ($\beta = 0.117$, $p < 0.05$), supporting H5a and H5b.

This study also tested the effects of ability factors. As revealed, knowledge was positively and significantly correlated with belonging ($\beta = 0.264$, $p < 0.05$), but its effect on career choice intention was insignificant ($\beta = -0.005$, $p > 0.01$). Hence, H6a

was supported and H6b was not supported. In addition, the impacts of experience on belonging ($\beta = 0.433$, $p < 0.001$) and career choice intention ($\beta = 0.365$, $p < 0.001$) were both positive and significant, lending support for H7a and H7b.

Discussion

Discussion of results. Based on the framework of the MOA model, this study explores the influence of motivation, opportunity and ability on medical students' occupational identity. Some interesting findings are generated. First, belonging has a positive impact on career choice intention. The higher the medical students' feeling of belonging to the medical community and the medical occupation, the higher the possibility they will choose to become medical workers in the future. Second, the impact of extrinsic motivation on medical students' belonging and career choice intention is positive and significant. If medical students get more motivation from the external environment, their belonging and career choice intention will be strengthened. From this point of view, the influence of external environment on medical students' occupational identity cannot be ignored, especially media influence during the pandemic. Third, the positive relationship between sad news and medical students' belonging and career choice intention calls for media workers and medical educators to pay attention to the role of sad news. Sad news can have a more lasting impact than good news (Soroka and McAdams, 2015). Medical workers' difficulties fighting the pandemic motivated medical students to feel responsible and develop a sense of belonging. Fourth, occupational experience has a significant positive impact on belonging and career choice intention. This shows that whether medical students can learn from practice has an influence on their occupational identity.

We have five unexpected results. First, intrinsic motivation does not correlate with belonging and career choice intention. One possible explanation is that intrinsic motivation is an internal state rooted in the heart (Ryan and Deci, 2000). During the prolonged effects of COVID−19, medical students experienced continuous emergence of virus variants, which may shake their cognition about the medical occupation. In such a circumstance, external environment rather than internal

psychological state was more likely to drive their belonging and career choice intention.

Furthermore, contrary to our expectation, the results show that good news exposure exerts negative influence on medical students' career choice intention. We suggest some possible explanations. On the one hand, good news presents positive images of medical workers and reflects mainstream social expectations. Hence, good news exposure may bring stress to medical students by generating and forming the shackles of high social expectation (Berger, 1963), which will result in hesitancy to choose a medical career. On the other hand, medical students can develop an understanding of the ideal image of medical workers via good news exposure. Nevertheless, as most of our subjects are undergraduates who have limited medical training, such good news may trigger discrepancies between their actual selves and ideal selves. According to Higgins (1987), individuals who hold conflicting or incompatible beliefs are likely to experience discomfort. In this sense, medical students exposed to good news may experience self-confusion about their identity as qualified medical workers, further shaking their career choice intention.

Third, occupational knowledge is positively correlated with belonging, but not with career choice intention. The reason may be that most of the medical students in this study are undergraduates, and the knowledge they have mastered at present may not be enough to support them in forming a clear career choice. Faced with the impacts of long COVID, they may be hesitant to make clear and firm decisions on career choices.

Theoretical and practical implications. This study has implications for theory. First, this study uses the MOA model as a theoretical framework to explore the antecedents of occupational identity, providing a comprehensive perspective to understand medical students' occupational identity. Specifically, by categorizing antecedents of occupational identity into motivation, opportunity and ability dimensions, this study develops a nuanced explanation in terms of the drivers of medical students' occupational identity.

Second, this study explores the influencing factors of medical students' occupational identity under the background of a public health crisis. The COVID-19 pandemic has brought severe and long-lasting impacts on individuals all over the world, and understanding the impacts is critical to cope with them. This study complements the literature by focusing on future medical workers and examining the development of their occupational identity in the context of a global public health event.

Third, by uncovering how news exposure relates to belonging and career choice intention, this study highlights the importance of media environment in influencing medical students' occupational identity. In addition, the results show that sad news exposure exerts positive effects on belonging and career choice intention, while good news exposure has negative impact on career choice intention. The findings reveal that good news and bad news play different roles in students' occupational identity, further advancing the understanding of media effects.

This study also has practical implications. First, this study finds that the influence of extrinsic motivation on occupational identity needs to be paid attention to when there are changes in the external environment. In order to promote medical students' feeling of belonging to and choice of a medical occupation, educators need to find ways to increase external incentives to motivate students, such as improving the treatment of medical workers.

Second, the influence of media environment on medical students' occupational identity has practical value for media institutions to set up frameworks of news reporting. For instance, in order to effectively maintain or enhance the occupational identity of medical students, media institutions should not blindly

create heroic images of medical workers, and real working situations should also be reported.

Third, this study re-emphasizes the importance of knowledge and practical experience for medical students' occupational identity through empirical methods. The COVID-19 pandemic largely reduced medical students' clinical experience (Dost et al., 2020). Faced with the challenges of long COVID, educators should take effective measures to overcome the obstacles in medical students' internships and practical activities.

Limitations and future research. This study has several limitations that call for future research. First, measurements were obtained from a cross-sectional survey. Future research can compare the changes of medical students' occupational identity in different stages of COVID-19 pandemic to uncover the causal relationships between the antecedents and occupational identity. Second, the effects of multiple factors were discussed separately in this study, and the existence of interaction effects among multiple factors was not explored. Future studies can conduct in-depth research on the complex relationships among the influencing factors. Third, the participants were medical students in Wuhan, China. Individuals from other countries and cultures may have different behavioral patterns. Future research can recruit samples from other countries and cultures and retest the research model to improve the generalizability of this study.

Conclusion
The existence of long COVID has brought a remarkable risk to society. Faced with this situation, the stability of medical workers becomes more and more important to worldwide health. Since medical students are future medical workers, this study investigates the influence factors of medical students' occupational identity. This study builds a research model based on the MOA framework, providing a comprehensive explanation regarding the development of occupational identity. The results show that medical students' occupational identity is shaped by motivation, opportunity and ability factors. This study sheds light on the management of media usage as well as medical education. Specifically, medical educators can find ways to foster medical students' motivation and ability to promote their occupational identity. They can also make efforts to manage media content to exert positive effects on occupational identity while long COVID lasts.

Data availability
According to the confidential agreements with the participants, the dataset analyzed during the current study are not publicly available. As our dataset includes medical students' opinions and attitude toward their major as well as their medical experience, we promised to keep their answers confidential so as to encourage honest response. However, the dataset can be obtained from the corresponding author upon reasonable requests.

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Author contributions

JY: Conceptualization, Resources, Writing—original draft, Writing—review and editing, Project administration. MW: Conceptualization, Methodology, Writing—original draft, Writing—review and editing, Project administration. YL: Methodology, Data analysis, Writing—original draft. YH: Writing—review and editing.

Competing interests

The author declares no competing interests.

Ethical approval

The questionnaire and methodology for this study was approved by the Ethics Committee of Tongji Medical College of Huazhong University of Science and Technology (No. 2022S009).

Informed consent

The participants were informed that their participation was completely voluntary and could be stopped at any time. The informed consent was obtained from all participants.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1057/s41599-024-02755-6.

Correspondence and requests for materials should be addressed to Manli Wu.

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