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Examining the Attitudes and Anxiety of Teachers and Administrators Towards Artificial Intelligence: Relational Browsing

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Abstract: *The widespread use of artificial intelligence (AI) has been growing in various fields. While concerns about the use of basic computer technology still continue today, anxiety about a new technological revolution, artificial intelligence, has also surrounded the education sector. The cause of anxiety can be derived from knowledge, skills, and attitudes towards the use of technologies. In this study, the attitudes and anxiety levels of administrators and teachers in primary and secondary schools towards artificial intelligence and the relationship between anxiety and attitude scores were investigated. A total of 130 participants, consisting of administrators and teachers, participated in this study. In this context, survey models are one of the quantitative research methods. Artificial intelligence attitude and anxiety scales were used in accordance with the data collection method. When the research results are corrected, there is a negative relationship between the attitude variable towards artificial intelligence and the anxiety variable; as the attitude increases, the anxiety level decreases. It is seen that administrators and teachers experience significant anxiety.*

Keywords: Artificial Intelligence; anxiety; attitudes; school administrators; teachers.

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1. Introduction

Artificial intelligence is increasingly influencing various aspects of our lives, with advancements in information and communication technologies gaining momentum. Research in this field is accelerating; developments in artificial neural networks and humanoid robots further accelerate changes in this field.

With Industry 4.0, a new level emerging with rapidly developing technology today, it aims to access big data efficiently, quickly, and at the lowest cost, and to ensure that current needs are met best. The necessity of societies to adapt to these developments due to reasons such as cyber-physical systems, the internet of things, countless devices that can connect, and the ability to store data, which have occurred along with major developments in the digital field, has revealed the concept of Industry 4.0 (Soylu, 2018).

Industry 4.0 has main features such as the integration of production with technology, automation, the relationship of people with machines, and automatic information exchange (Lu, 2017). Industry 4.0 is the process of living-object interaction with artificial intelligence and robotic technologies (Yıldiz & Genç, 2019). Industry 4.0 consists of components such as the Internet of things, cloud technologies, autonomous robots that can make their own decisions, augmented reality, and simulation technologies (Dalenogare et al., 2018; Gönen et al., 2021; Petekçi, 2021). With the digitalisation brought by Industry 4.0, education is also needed to train the qualified manpower of the future, who can adapt to all these innovation processes, have 21st-century skills, can use technology in the best way, can design, and develop the products they design, can meet all the needs required by change.

To achieve success in the Industry 4.0 process, it is important to move to Education 4.0. Education 4.0 differs from memorisation-focused education; it can be used as an education system that meets today's expectations with a personalised education system centred on artificial intelligence, augmented reality, and other educational technologies (Akcil & Başta, 2020; Yelkikalkan et al., 2019). Moreover:

- Establishing a digital culture in the education process,
- Developing innovation-oriented and interdisciplinary education programs,
- Education programs enriched with artificial intelligence, virtual and augmented reality systems,
- The education system should be redesigned with distance education technologies and support systems, and education policies in this direction should be developed (Öztemel, 2018).

The continuation of developments has led to the emergence of Industry 5.0, a new society model that is considered an extension of Industry 4.0. Industry 5.0 is a philosophy that evaluates the impact of the technological transformation in the world on the human population from an economic, social, and ethical perspective, and will enable people to establish relationships with artificial intelligence technologies, including robots, to achieve the highest efficiency (Develi, 2017). The new society model that carries this philosophy is also called "Creative Society" or "Digital Society" (Arı, 2021).

It seems that societies can adapt to this digital transformation in the world and enter the cycle of change with qualified human power only with an efficient education approach using artificial intelligence technologies. In recent years, the term "School" has been defined as a place where students come together both physically and on the internet to participate in activities carried out for learning and teachers for teaching (Timms, 2016). According to the student profile of our age, education and training programs need to be revised in line with the age of artificial intelligence, and effective changes must be made in teaching method techniques (Holmes, Bialik, & Fadel, 2019). Artificial intelligence in education can save teachers time in the learning process by saving them from boring repetitions, ensuring that homework and questions are answered on time, and providing teachers with useful information about the personal learning style of the students under their learning speed. It can also offer opportunities and options (Rouhiainen, 2016; Chan and Zary, 2019). By using artificial intelligence-equipped technological tools, teachers can create learning

environments suitable for each student's pace and determine appropriate tools for methods and techniques. As a result, students can experience increased self-confidence and motivation in the learning process (Della Ventura, 2018).

AI can facilitate online group interaction or be used by the teacher to guide students toward the goals and objectives of the course, enabling collaborative learning by summarising discussions and suggestions (Zawacki-Richter et al., 2019).

It not only makes the learning process effective but also facilitates the teacher's evaluation process. Pardo and Siemens (2014) highlight the advantages of using AI tools in measuring student success rates, providing timely feedback, and improving the assessment process, thus enhancing the overall learning experience.

Artificial intelligence also plays an important role in the management of schools and universities. As a matter of fact, artificial intelligence can be used and provides benefits in areas such as the preparation of curriculum, task distribution of school employees, planning and management of evaluation, protection systems against cyber attacks, and administration of the institution (Arslan, 2020; Holmes, Bialik, & Fadel, 2019). The efficiency of schools and institutions using artificial intelligence technology tools can increase, the financial expenditures and expenses of institutions can be minimized, and transparency can be brought to financial management by increasing accountability in institutions (İsler and Kılıc, 2021). It would be appropriate for higher education institutions and the Ministry of National Education to make the necessary contribution to the professional development of educators who will educate students, center the acquisition of 21st-century skills, and structure the education system in a way that provides students with skills that will enable them to adapt to the developing age of technology (Bayburt and Egin, 2021). In this context, it is important to inform teachers about the use, effectiveness, and benefits of artificial intelligence technologies in education and to conduct research on the adaptation process to these technologies (İsler and Kılıc, 2021).

Although the benefits of computer technologies such as artificial intelligence are known, it is known that there are also individuals who develop a phobia of technology. Regarding AI, which has been discussed by societies recently, concerns have been expressed about the future development of AI, and there are discussions that AI may get out of control, affect people and society negatively, and even develop in a way that will harm humanity. Many of these news concerns are unrealistic (Akkaya, Özkan, & Özkan, 2021).

From an evolutionary perspective, anxiety is a kind of motivational alarm system that drives us to perceive, inhibit, and control uncertainties and potential threats. The state of restlessness and uneasiness that a person experiences, even though there is no concrete danger, is called anxiety (Şahin, 2019). Although it is temporary, it sometimes brings along psychological treatments. In general, technology anxiety is associated with computer anxiety in particular. Raub (1981) defines the complex emotional reactions that occur in individuals who interpret computers as threatening as computer anxiety. It occurs in individuals who do not have sufficient knowledge about the relevant technology.

Taş and Turanlıgil (2020) according that, when harmony with technology is not achieved, this situation affects people's business and private lives; It can create psychological effects that cause people to approach technology with fear and anxiety. Measuring self-perceived fear and discomfort about AI technologies and products also plays an important role in determining how AI will be structured. In addition, eliminating concerns about artificial intelligence applications being used in education will benefit teachers and students (Akkaya, Özkan, & Özkan, 2021).

When research on artificial intelligence in education is examined abroad; "Artificial intelligence applications in education, the use and development of artificial intelligence in education, the awareness and attitudes of teacher candidates about artificial intelligence technologies, the awareness of Turkish teacher candidates towards artificial intelligence, the training of the trainer on artificial intelligence, the artificial intelligence learning of university students, the artificial intelligence attitudes of sports science students It includes studies on the

opinions of dentistry students about artificial intelligence application, the difficulties that school leaders may encounter with artificial intelligence, teachers' perceptions and opinions about the use of artificial intelligence, a theoretical perspective on innovation with artificial intelligence modeling for a sustainable education, artificial intelligence in different educational fields, application examples. It has been determined that (Arslan, 2020; İsler and Kılıc, 2021; Cam et al., 2021; İçöz & İçöz, 2024; Gülel, Sargın, & Çetin, 2023; Aytaç, 2022; Doğan, Doğan, & Çetinkayalı, 2023; Özel and Büyükçavuş, 2021; Sincar, 2023; Seyrek et al., 2024; Tosun, 2023; İncemen and Öztürk, 2024).

Considering the characteristics of the generations educated in the Industry 4.0 era, traditional education and training methods and tools do not meet the needs, and an education system where multiple learning environments and artificial intelligence applications are dominant is needed. Teachers, who will train the manpower of the 21st century, will be able to effectively teach with artificial intelligence in the classroom. It is necessary to use technological applications during the teaching process in order to attract the attention of new generation students to the lesson, to create interaction between the students with this classroom environment and tools, and to ensure that the student has a positive attitude during the lesson (Işık, 2014).

Starting from this point, this study includes the determination of teachers' attitudes and concerns towards artificial intelligence applications. This study, conducted in primary and secondary education, which is described as the age of basic education, will reveal the current state of anxiety and attitude at the relevant level in particular. In the North of Cyprus, artificial intelligence applications have not yet begun to be widely used in public schools. Determining the anxiety and attitude towards artificial intelligence will be important research to support the development of public schools, based on the knowledge that artificial intelligence will be an effective tool in the learning-teaching process in the near future.

2. Purpose of the Research

This study aims to determine the attitudes and anxiety levels of administrators and teachers working in primary and secondary schools towards artificial intelligence. Within the framework of this purpose, the research questions of the study are as follows:

1) What are the attitudes and anxiety levels of administrators and teachers working in primary and secondary schools towards artificial intelligence?
2) Do the attitudes and anxiety levels of administrators and teachers working in primary and secondary schools towards artificial intelligence differ according to various personal variables?
3) What is the relationship between attitudes and concerns towards artificial intelligence?

3. Method

3.1. Model of the research

This study aims to assess the attitudes and anxiety levels of administrators and teachers in primary and secondary schools towards artificial intelligence and the relationship between these attitudes and anxiety. In this context, this study is quantitative research. Quantitative research is generally carried out by performing statistical analyses on data collected with scales or survey tools. (Büyüköztürk, 2017). Adhering to this method, the survey model was first used to determine the attitudes and anxiety levels of the participants. The relational screening model was used to determine the relationship between the two variables used in the study. The relational screening model was also employed to examine the relationship between two variables, aiming to determine the existence, direction, and degree of the relationship between these variables. The survey model allows for the examination of trends, attitudes, and ideas within a sample (Creswell, 2017; Karasar, 2009).

3.2. Sample group

130 people participated in this study. Participants reside in the north of Cyprus. A convenience sampling method was used in this research, in which administrators and teachers working in public primary and secondary schools participated. Aaker, Kumar, and Day (2007) suggested that if the population is homogeneous or a random sampling method is not possible, non-random sampling methods can be used. Convenience sampling is used for the researcher to collect participants selected from the main participant group in the easiest, fastest, and most economical way (Malhotra, 2004). It is a common sampling method. Below is the distribution of the demographic information of the participants.

Table 1. Distribution of demographic information

Variables	**Groups**	**f**	**%**
Gender	Female	104	80,0
	Male	26	20,0
	Total	130	100,0
Age	22-27 years	17	13,1
	28-33 years	14	10,8
	34-39 years	27	20,8
	40-45 years	50	38,5
	46 and above	22	16,9
	Total	130	100,0
Education status	Licence	81	62,3
	Graduate	49	37,7
	Total	130	100,0
Working years	1-5 years	23	17,7
	6-12 years	14	10,8
	13-20 years	44	33,8
	21 and above	49	37,7
	Total	130	100,0
Duty	Administrator	29	22,3
	Teacher	101	77,7
	Total	130	100,0
School type	Primary school	94	72,3
	Middle school	36	27,7

	Total	130	100,0

4. Data collection process

In this research, the attitude scale towards the use of artificial intelligence (AI) applications and the anxiety scale towards artificial intelligence were used as data collection tools. Wang and Wang (2019) the anxiety scale developed by Akkaya, Özkan, and Özkan (2021) the scale, which was translated into Turkish, and validity and reliability analyses were conducted, was used. The Kaiser-Meyer-Olkin value of the anxiety scale was given as 892 and the Cronbach alpha coefficient was given as 809. After factor analysis, the scale has sub-dimensions: Learning, Job Switching, Sociotechnical Blindness, and AI Configuration. There are a total of 16 items on the scale. Schepman and Rodway (2020), The Turkish adaptation of the attitude scale towards artificial intelligence developed by Kaya et al., (2022). In this study, where the Turkish version was used, the total number of scale items was 20. The scale is unidimensional and items 1-12 have a positive sentence structure and items 13-20 have a negative sentence structure. The Cronbach alpha coefficient of positive items was given as 82 and the Cronbach alpha coefficient of negative items was given as 84. Both scales were deemed appropriate to be used in this study.

The measurement tools used in this study were structured on Google Forms. After the application permissions for the scale were obtained, the link was sent to primary and secondary schools. The measuring tool consists of 3 parts. The first section contains personal information. In the second and third sections, there are attitude and anxiety scales. Data were collected over 3 months.

5. Data analyses process

The data collected with Google Forms was downloaded to the computer as an Excel file. The data was examined, and incorrectly and incompletely filled forums were not included in the analysis. The obtained data were transferred to the SPSS 25 software program. First of all, a normality test was applied to the data. If the data set was less than 50, the Shapiro-Wilk test results were taken into account, and if it was greater than 50, the Kolmogorov Smirnov normality test results were taken into account (Büyüköztürk, 2020).

Table 2. Normality of data and Cronbach's Alpha test

Groups	Kolmogorov-Smirnov[a]					
	Statistic	df	p.	Skewness	Kurtosis	Cronbach's Alpha
AI Attitude	,068	130	**,200***	,210	,013	,874
AI Anxiety	,057	130	**,200***	,170	,221	,940

Extended Kolmogorov-Smirnov analyses as shown in the table reveal that the signal (p>,05) shows a normal distribution with significance values recorded planned by the scales. However, parametric analyses were used. It is said that the data recorded with the scales are normally distributed from records with skewness and kurtosis values between +2 and -2. The reliability of the collected data (Cronbach's alpha) is at a high level.

6. Finding

The main purpose of this study is to determine the attitudes and anxiety levels of administrators and teachers working in primary and secondary schools towards artificial intelligence. The findings regarding the research questions organized within the framework of this purpose are reported under the following subheadings.

Table 3. Findings regarding the average levels of the variables

Groups		N	Min	Max	Mean	SD
Administrators	AI Anxiety levels	29	31,00	65,00	46,13	11,02
	AI Attitude levels	29	4,00	18,00	67,41	8,92
Teachers	AI Anxiety levels	101	16,00	73,00	44,33	11,36
	AI Attitude levels	101	35,00	100,00	68,93	10,53

As seen in Table 3, the average attitude levels and anxiety levels towards artificial intelligence applications are seen. When the findings are examined, it is seen that anxiety and attitude are generally at a moderate level. It can be said that administrators (X = 46,13) have a higher anxiety level with a rate of 2% compared to teachers (X = 44,33). When the attitude levels towards artificial intelligence are examined, it can be said that teachers' attitudes are higher (X = 68,93). However, this difference may be due to the imbalance in the number of participants.
It can be said that the anxiety levels of all participants regarding artificial intelligence are at a medium level, and that administrators and teachers have not yet adopted artificial intelligence applications or are hesitant. For this reason, analyses were made within the framework of the sub-dimensions of the anxiety scale and are presented in Table 4.

Table 4. Descriptive statistical findings within the framework of the sub-dimensions of the anxiety variable

	N	Min	Max	Mean	SD
Total AI Anxiety levels	130	16,00	73,00	44,738	11,26
1. Dimension: Learning Anxiety	130	5,00	23,00	10,97	3,54
2. Dimension: Job change anxiety	130	4,00	18,00	11,03	2,91
2. Dimension: Socio-technical blindness anxiety	130	4,00	20,00	12,88	4,04
3. Dimension: Artificial Intelligence configuration anxiety	130	3,00	15,00	9,83	2,87

As seen in Table 4, there are average levels of the sub-dimensions of the anxiety level of the participants regarding artificial intelligence applications. When examined in the context of its sub-dimensions, it is seen that the socio-technical blindness concerns (X = 12,88) are relatively higher since the participants have not yet adopted artificial intelligence systems, their acceptance level of the relevant technology is not sufficient, or their knowledge about the relevant technological development is not sufficient. Likewise, it can be said that the anxiety of the participants who think that their jobs will be taken away with the development of artificial intelligence applications is also high (X = 11,03).

Examining the participants' attitudes and anxiety levels according to various demographic variables

Table 5. ANOVA test findings of Attitude and Anxiety levels according to age variable

		Sum of Squares	df	Mean Square	F	Sig.
AI Attitude	Between Groups	723,248	4	180,812	1,786	,136
	Within Groups	12654,144	125	101,233		
	Total	13377,392	129			
AI Anxiety	Between Groups	239,446	4	59,861	,464	,762
	Within Groups	16141,662	125	129,133		
	Total	16381,108	129			

As seen in Table 5, the difference between the participants' attitudes and anxiety levels towards artificial intelligence and the age variable was not statistically significant (p = >,05).

Relatively speaking, it was observed that the attitudes of participants between the ages of 22-27 towards artificial intelligence (X = 71,82) were more positive than the older participants (X = 64,77, over 34 years old). Inversely, it can be said that the anxiety levels among the same age groups (X = 42,11) are lower than the older participants (X = 45,82).

Table 6. ANOVA test findings of Attitude and Anxiety levels according to seniority variable

		Sum of Squares	df	Mean Square	F	Sig.
AI Attitude	Between Groups	528,213	3	176,071	1,727	,165
	Within Groups	12849,179	126	101,978		
	Total	13377,392	129			
A,ı Anxiety	Between Groups	44,744	3	14,915	,115	,951
	Within Groups	16336,363	126	129,654		
	Total	16381,108	129			

As seen in Table 6, the difference between the participants' attitudes and anxiety levels towards artificial intelligence and the seniority variable was not found to be statistically significant (p = >,05). Relatively speaking, when attitudes towards artificial intelligence are examined, participants with working years between 1-5 years (X=70,92) have a more positive attitude level than participants with working experience between 13-20 years (X=66,20). Inversely, it can be said that the anxiety of participants with 13-20 years of seniority is higher (X = 45,50).

Table 7. ANOVA test findings of Attitude and Anxiety levels according to education level

	Education Status	N	Mean	SD	F	df	p
AI Attitude	Undergraduate level	81	68,34	11,44	3,392	128	,699
	Postgraduate	49	69,00	7,74			
AI Anxiety	Undergraduate level	81	45,12	11,91	1,311	128	,605
	Postgraduate	49	44,10	10,20			

As seen in Table 7, the difference between the participants' attitudes and anxiety levels towards artificial intelligence and the education level variable is not statistically significant (p = >,05). Relatively speaking, when attitudes towards artificial intelligence are examined, participants with working years between 1-5 years (X=70,92) have a more positive attitude level than participants with working experience between 13-20 years (X=66,20). Inversely, it can be said that the anxiety of the participants with 13-20 years of seniority is higher (X = 45,50).

The relationship between attitudes and concerns towards artificial intelligence

Table 8. Pearson correlation test findings of the relationship between variables

		A.I. Attitude	A.I. Anxiety
AI Attitude	Pearson Correlation (r)	**1**	
	Sig. (p)		
AI Anxiety	Pearson Correlation (r)	**-,516****	1
	Sig. (p)	**,000**	,

**. Correlation is significant at the 0.01 level (2-tailed). 1 - ,70 loud; ,70 - ,30 medium; ,30-,00 low.

As seen in Table 8, it was observed that there was a negative and medium strength (r2 =,516) relationship between attitudes towards artificial intelligence and concerns. According to this finding, it can be said that as participants' attitudes toward artificial intelligence increase, their anxiety will also decrease.

7. Discussion, Conclusion and Recommendations

In this research, the attitudes and concerns of teachers working in public schools towards artificial intelligence were investigated. When the research results were examined, it was concluded that attitudes toward artificial intelligence and anxiety showed a negative and moderate relationship. It was concluded that the participants' anxiety and attitudes were at a moderate level.

It was observed that although the participants were anxious, they also had a certain degree of positive attitude towards the relevant technology. However, no statistically significant difference was found according to the demographic characteristics of the participants. A relatively small change in mean scores was observed. Considering that the education and experience levels of the participants were quite similar, it is normal that there was no difference in characteristics such as gender, age, and seniority. In the study conducted by Keser (2021) to determine the attitudes of management candidates toward technology, it was determined that the majority of management candidates preferred to use technology; in addition, it was determined that the attitudes of management candidates toward technology did not differ according to the variables of gender, age, level of duty, and branch.

When examined in the context of its sub-dimensions, it was concluded that the participants' anxiety about socio-technical blindness (inability to accept the relevant technology) was higher.

In today's age, learning AI-related technologies is very important. However, human beings, who can sometimes ignore the incredible benefits of technology, are afraid of accepting technology with the rapid development and change of technology (Akcil et al., 2017). As a matter of fact, the results of this research show that despite educators' positive attitudes toward artificial intelligence technology, they also have concerns. It can be said that the type of anxiety mentioned in this study emerged with the birth of computer technology. Computer anxiety can be considered an obstacle that prevents reaching the expected "basic awareness" stage. Managers with high levels of computer anxiety may experience problems such as inefficient and low-quality education practices with inadequate facilities, tools, and equipment and using traditional teaching processes despite various technological opportunities (Teker, 1987; Alkan, 1998).

The dimension of socio-technical blindness may increase the anxiety levels of individuals who cannot understand that artificial intelligence can only work with the combination of people and social institutions, that is, artificial intelligence will not work without the production of science, which is people and their products (Johnson & Verdicchio, 2017).

This is a misunderstood concept that in the future, AI technology may operate spontaneously without human involvement (Terzi, 2020). The anxiety levels of individuals who think that artificial intelligence applications are scary and unmanageable may increase (Wang & Wang, 2019).

With the development of artificial intelligence techniques and products, anxiety levels may increase in individuals who think they may lose their jobs. It is known that this type of anxiety is expressed as job change anxiety (Terzi, 2020). It can be said that when employees cannot fully internalise the benefits of artificial intelligence when they cannot understand that artificial intelligence can be used as an assistive technology, they fall into such unrealistic thoughts.

Despite beliefs in the benefits of AI, negative perceptions are also common, such as fear of unemployment, ethical concerns, data privacy concerns, possible biases of AI systems, and reduced human interaction (Holmes and Bialik, 2019). These negative perceptions may prevent the widespread adoption and effective use of AI technologies in education. For this reason, there is always a need to measure stakeholders' perceptions and attitudes towards artificial intelligence comprehensively and reliably in the education sector (Dinler, 2024).

Today, as the use of artificial intelligence applications begins to play a more important role in various fields including health, finance, education, transportation, and production, it can be said that artificial intelligence literacy has become an important literacy that must be acquired by individuals from all fields (Mertala, Fagerlund, & Calderon, 2022). McKinsey Global Institute

(MGI) has reported that with the integration of Artificial Intelligence in different sectors, workers may need to improve their skills by 2030 (Manyika et al., 2017).

The main purpose of using artificial intelligence in education is to improve students' learning experiences in effective and efficient ways. In doing this, teachers should use assistive technologies in the classroom, and learning environments should be arranged according to the skills of the students (Timms, 2016).

Understanding the background, that is, the working logic, of artificial intelligence applications will make it easier for users to benefit from these applications more reliably and effectively. For this reason, it is stated that individuals should be artificial intelligence literate today (Yilmaz & Karaoglan Yilmaz, 2023)

It shows that the applications of AI in education are not limited to only pedagogical and technological dimensions but also include ethical, political, and social dimensions (Duran and Aydın, 2024). Therefore, it is also important to consider artificial intelligence applications as an educational policy in future studies. How artificial intelligence applications that will be widely used in all schools will be and what their limitations will be will only be possible with the education policy to be developed.

More research is needed to determine the adoption of advanced technologies and AI technological systems in terms of employee concerns and to properly reduce these concerns. The faster AI technology advances, the greater employee anxiety may arise. However, considering the benefits of artificial intelligence, its use will quickly become widespread in every sector. Although the results of AI cannot be predicted today, it is likely to be the most important educational technology in the next 20 years. It should not be forgotten that AI-based tools and services have a high potential to support the student-teacher and administrator triangle (Zawacki-Richter et al., 2019).

It is seen as a necessity for schools that will educate future generations to use artificial intelligence applications. The use of artificial intelligence will make teaching effective and provide students with flexibility in the learning process. For this reason, a large-scale investigation of the concerns of administrators and teachers will enable variables other than anxiety about the use of artificial intelligence to be revealed and it will be possible to take the necessary precautions.

Conflict of interest

The authors have no competing interests to declare that are relevant to the content of this article.

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