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UNDERGRADUATES' CONCEPTIONS OF ONLINE EDUCATION AND TECHNOLOGICAL MEDIATION

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Abstract:
In the process of learning, the learner and the environment have a mutualistic relationship as a change in one affects the other. Inevitably, the increasing digitalization of the educational environment in the aftermath of the COVID-19 pandemic has altered the way learners learn. Understanding this change through learners' eyes is crucial for questioning the educational value behind this transformation. Adopting this student-centered stance and using the notion of technological mediation, the present study aimed to investigate the various ways students conceptualize online education and discuss technology mediation accordingly from the perspective of sociocultural learning theory. Designed as a phenomenographic study, it was carried out with fifteen undergraduates undertaking online courses during the fall semester of the 2021-22 academic year at a state university in Turkey. The data gathered through face-to-face interviews was analyzed using phenomenographic data analysis. The results showed that the students experienced online education in four distinctive ways as (a) a way of displaying information; (b) a way of acquiring information; (c) a way of exchanging information; (d) a way of enhancing self-learning, with each affecting technology mediation in particular ways. As a result, it was concluded that students' perceptions of online education and the way technology mediate their learning are strongly related, and for technology to mediate students' learning as intended, it might be necessary to develop students' conceptions first.

Keywords: technological mediation, phenomenography, conceptions of online education, sociocultural learning theory

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1. Introduction

The technological trend in education has reached a new peak in the aftermath of the COVID-19 pandemic, influencing students' learning experiences and perceptions substantially (Peimani & Kamalipour, 2021). As a result, the need to better understand how students interact with digital media and technologies has increased (Alqurashi, 2020). Expanding Vygotsky's (1986) theory of tool mediation and stressing the mutual relatedness of people, technologies, and the world (De Boer et al., 2018), the theory of technological mediation offers a useful framework to investigate human-technology relations (Verbeek, n.d.). What lies at the heart of this approach is the view that, rather than being external tools, technologies help define what it means to be human (Verbeek, 2015). From this perspective, the notion of mediation has been used to identify the ways digital technologies shape people's perceptions and experiences (Kaptelinin, 2013; Ihde, 1990) and is often referred to whenever a theoretical grounding is needed in computer-supported learning research (Wegerif, 2007). The concept has been operationalized by educational researchers for various purposes, such as to design learning environments and online courses (Hall, 2007; Engeness, 2021); identify learners' interaction patterns (Wu et al., 2022); investigate learner-tool engagement (Pullenayegem et al., 2020); and to understand the relationship between learner interactions and academic learning expectations (Bailey, 2022). Similarly, the present research uses mediation as a fruitful concept to understand the dynamic interaction among students, online education, and the learning process.

As noted by Verbeek (2016), although there has been a growing interest in the mediating role of technology recently, how humans appropriate and give meaning to these mediations has remained largely unstudied. However, individuals' conceptions of a given phenomenon are decisive in that they inform and guide associated acts and outcomes (Pastore, 2020). It is therefore necessary to understand how technology is perceived and conceptualized by students first, before attempting to discuss the ways technology mediates learning in online education. After all, students' need and use of technology are expected to be different when learning is conceptualized as a process of information transmission or as a student-centered and collaborative process (Valtonen et al., 2022). Further, Tsai (2017) found that undergraduates' conceptualization of mobile learning instruments ranges from the "*capture tools for memorization*" to "*focusing on continuous learning*". Moreover, students' conceptions of online learning can be different from their perceptions of learning in general. On this, Tsai (2009) concluded that college students' conceptions of online learning are more sophisticated than their conceptions of learning in general, whereas Tarchi et al. (2022) found that university students' conceptions of online learning were underdeveloped and they differed according to the learning environment.

In today's digitalized educational environment, understanding the student perspective on online education is seen as a crucial factor in determining the quality of online courses (Van Wart et al., 2020). Despite the increasing reliance on digital means in higher education, the research on undergraduates' conceptions of online learning is still

relatively limited (Tsai, 2009) and further inquiry on the issue is invited (Yang & Tsai, 2017; Lin et al., 2019). Although there are studies concerning views on e-learning in the literature, these are different from the phenomenographic studies as the purpose is generally to investigate commonly held opinions of online learning, rather than to reveal the variation in held conceptions (Stein et al., 2011).

The present research aims to fill these gaps in the literature in two main respects: first by exploring various ways students conceptualize online education and second by discussing the relationship between these conceptions and the mediating role of technology in students' learning. It is thought that the results might provide complementary information on students' perceptions of the usefulness of technology for their learning (Cohen et al., 2022) and help instructors improve the quality of their online courses so students' overall learning experience can be enhanced (Alqurashi, 2019).

To serve these purposes, the research questions for this study were formulated as follows:

1) What are the qualitatively different ways in which International Trade and Logistics undergraduates experience online education?
2) How do different conceptualizations shape the way technology mediates students' learning in online education?

3. Material and Methods

In this study, the phenomenographic research method was used as it is acknowledged as a highly influential research specialization in research on learning and teaching in higher education (Bradbeer et al., 2004). In phenomenographic research, the variation in students' experiences of a particular phenomenon is investigated with a particular focus on what and how aspects of learning in an educational context (Booth, 1997). Figure 1 illustrates how phenomenography as a research specialization was applied in this research.

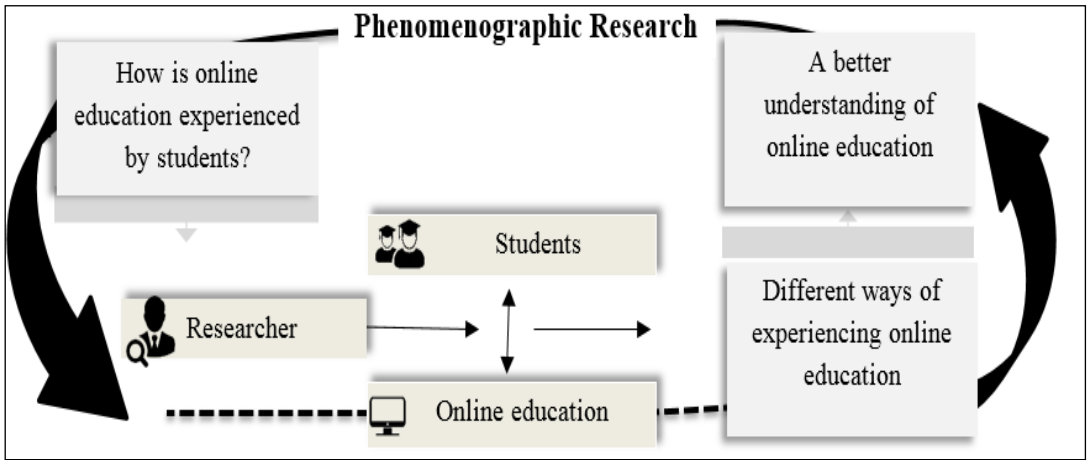

Figure 1: Research design

3.1. Participants

In phenomenographic research, the sample used is usually purposive in that specifically, respondents having experienced the given phenomenon are sought out (Boon et al., 2007). This research was conducted with International Trade and Logistics undergraduates undertaking their courses online, namely, statistics, academic Turkish, history, strategic management, production management, logistics and transportation law, during the fall semester of the 2021-22 academic year at a state university in Turkey. As the recommended sample size for phenomenographic research is usually between 15 to 20 interviewees (Trigwell, 2000), the study was carried out with the voluntary participation of 15 students, 9 male and 6 female. The students, whose ages range from 19 to 23, were selected from different grades to enable maximum variation in a small sample size, which is traditional in phenomenography (Åkerlind et al., 2005). The online courses students undertook in the program were delivered synchronously via Microsoft Teams throughout the semester as it was chosen as the official online teaching platform of the university.

3.2. Data Collection

In the research, semi-structured interview forms prepared by the researchers were used as the data collection tool. Each participant was informed about the purpose of the research, and read and signed the consent form before the interview. All interviews were conducted face-to-face in a room where the participants could express themselves comfortably, lasted no less than 30 minutes, and were recorded with a tape recorder. The interviews were conducted in line with the phenomenographic research tradition, so that underlying meanings and attitudes towards online education could be elicited (Åkerlind, 2005). Accordingly, questions such as "What is online education for you?", "What do you do to learn in online education?" and, "What do you learn in online education" were asked and additional follow-up questions such as "What do you mean by that?", "Can you give an example of this?" and, "Why do you think so?" were posed when necessary.

3.3. Data Analysis

The data from the interviews were analyzed using phenomenographic analysis through an iterative and interpretive process, adhering to the key stages proposed by different researchers in the literature (Feifei & Ellis, 2019). At the first stage of the data analysis process, all transcripts were read to gain a general sense of the data as a whole. In the second stage, salient points and related units of meaning in the transcripts were identified to form pools of meaning. Then, identified units of meaning were analyzed in relation to each other. After the reliability was checked by another researcher, the outcome space was finalized with hierarchically related categories of description, representing the variation in the ways students experience online education.

3.4. Rigor and quality of the research

Marton and Booth (1997) list three criteria for the quality of findings in phenomenographic research. The first is that each category is distinctive and stands in clear relation to the phenomenon being investigated; the second is that there should be a logical, and typically hierarchical relationship between categories, and the third is that the system should be parsimonious. Taking these into consideration, the outcome space for this research was constructed with concise and hierarchically related categories. The results were supported with direct quotations from the students' views. To ensure reliability, each step of the research process was presented in detail, and the preliminary categories and excerpts from transcripts were checked by another researcher.

4. Results

As a result of the data analysis, the outcome space including four distinctive and hierarchically related conceptualizations of online education was generated. The categories of description were presented in the form of a table from the least (Category A) to the most complex (Category D), covering the previous considerations. Each conceptualization was depicted in terms of its referential and structural aspects, the former denoting its meaning and the latter representing its parts and structure. The internal horizon shows the critical aspects that are in the focus of awareness and dimensions of variation, whereas the external horizon refers to the way the concept is discerned from and is related to its context (Marton & Booth, 1997).

Table 1: Outcome space

	Referential Aspect	**Structural Aspect**		
		Internal Horizon		**External Horizon**
Sophisticate <---------- Surface	Category	The focus of awareness	Student roles	
	A- displaying information	Focuses on presentation and transmission of information	Students are passive listeners and recipients who are exposed to information	School setting
	B- acquiring information	Focuses on the acquisition of information	Students are active listeners maintaining their study habits to acquire information	School setting
	C- exchanging information	Focuses on expanding and exchanging information	Students are active participants in the construction and sharing of information	School setting
	D- enhancing self-learning	Focuses on using information autonomously to serve learning goals	Students are initiators and directors of their own learning as lifelong learners	Beyond School setting

Conception A: Online education as a way of displaying information

In this conceptualization, online education was perceived as a display tool, simply used to deliver and (re)view information. It is understood that, in this perspective, online education functions like a remote and idle platform where students are provided with

ready-made information and related class materials. Conceiving it as an external tool, the students either remained as passive listeners or dealt with off-task behaviors during the learning process, having no or little gain in terms of learning at the end of the learning process. Negative consequences of low levels of self-discipline and motivation on students' learning were frequently emphasized in this category. Due to these reasons, students' approaches to online learning remained only at a surface level. S2 for example, reflected on his experience of online education as follows:

> *"For me, online education is about watching the presentation slides that the teacher shows. I switch on the computer, I lie in bed, and put on my headphones as the teacher goes over the slides. So, I just listen as the teacher gives the lecture. I do not do anything else. Then I eventually get bored and start checking my social media account. In the end, I don't remember anything about the lesson. But when I come to school, I feel obliged to listen to the lecture since I cannot do these things that I do at home here in the classroom."* (S2)

S4 also described online education as a platform where information is presented and relevant learning materials about courses are uploaded and stored. Like S2, S4 stressed that school as a structured learning environment, contributes more to her learning by creating a sense of discipline:

> *"Online education is a platform where the slides are presented and read to us by teachers. And we can also find other files related to the course, such as word documents and pdfs. During the lessons, we don't talk too much as we just listen. I don't do anything else rather than listening to learn there because I can watch the recordings of videos later as they are uploaded. And I sometimes take screenshots just in case the teacher forgets uploading the materials. I don't think that online education is really effective in terms of learning. I should say, I find the school environment more serious in that respect. When you come to school, you have to adapt to its rules. We have no choice but to listen and answer the teacher's questions. Maybe, students need this type of discipline to learn or else we can start engaging in things that can disrupt our learning."* (S4)

Conception B: Online education as a way of increasing information

Unlike conceptualization A, in conceptualization B, online education was seen as a medium that helps students acquire information. As understood, students were also more active in the learning process as they followed particular ways of studying which meant that they managed to develop a sense of self-discipline and self-regulation. That said, these ways of studying mostly included rather simplistic habits acquired during face-to-face education like taking notes or doing revision. In this respect, online education was seen as similar to face-to-face education by some students. This parallelism between face-to-face and online modes of learning was reflected in S1's remarks below:

> *"I can define online education as a platform that improves my knowledge about the subjects. I mean, I can really learn new things there. When I have an online lesson, I sit at my desk and switch on the computer. It is better for me to attend on a daily basis because if I don't do this, then I have to watch all the lesson recordings that have piled up, which can be annoying. I generally try to take notes and ask about things that I don't understand during online lessons. All of this really helps me learn. Online education and face-to-face education have more or less become the same thing for me now."* (S1)

S5 also defined online education as a learning platform which facilitates his learning. Stressing the important role self-motivation and self-study play in online learning, S5 further exemplified what and how he learns during online education which reflects his level of awareness about his own learning, an aspect that was not considered in the previous category:

> *"I can learn new things with the help of online education. For example, I mostly learn new concepts, facts, and definitions. I believe that when you focus and pay enough attention, there is no way that you cannot learn. That's why I am very careful about my study routine in online lessons. I listen and take notes throughout the lessons, and I always do some revision after it to not to forget the things that I've learnt."* (S5)

Conception C: Online education as a way of exchanging information

Beyond acquiring information, online education was conceived as a means of searching, producing, and exchanging information in conception C. Students often expressed their satisfaction with online learning as a mode of education which allows them to learn in a collaborative way. Accordingly, online education was regarded as an interactive community of learning where the teacher and students are all connected, with each having various responsibilities and contributing to the learning process. As their comments indicated, this way, students could find more opportunities for reflecting on and evaluating their own learning with their peers. Focusing on these aspects, S7 described her online learning experience as such:

> *"Online education is a platform that I use for learning as much as staying connected and sharing information. Before joining in, I usually do some research about the topic we are going to learn that day as the teacher always recommends us to do so. During the lessons, we talk about the topic and share the information that we have gathered from various sources. This way, all of us can find a chance to participate in discussions and learn from each other. I really feel like I am learning in online education as we do everything together, exchange and develop our ideas."* (S7)

S8 also expressed his contention with online learning and stressed how it turned into a collaborative learning space for him when the information was produced and exchanged by students themselves:

> *"The lessons we have in Teams are really effective. Online education allows us to find and share all kinds of information and media with each other over the Internet. You can search for and access any type of information you need in seconds as everything is at your fingertips. This way, everyone can find an opportunity to say something and participate in the lessons. You can't do this at school while sitting at the back of the room by yourself. For this reason, I find online education quite practical and useful for learning."* (S8)

Conception D: Online education as a way of enhancing self-learning

In conception D, online education was not understood as an external tool in itself or as a learning and teaching platform that can be primarily used for academic studies but mainly in relation to one's own. Thus, rather than its role in increasing or exchanging information, it was evaluated in terms of its contribution to a person's self-growth and continuous learning. This emphasis is evident in S12's comments:

> *"I think the main advantage of online education is that it helps you keep learning and improving yourself. Thus, I see online education as a way of attaining my goals as it contributes to my learning greatly. To give an example, this year, some of my friends were prepared for the exams online, and managed to enroll in medicine programs of faculties. I mean, if the student is aware of its potential, and knows what things she can do with it, online education affords a lot of opportunities."* (S12)

Additionally, S12 exemplified the necessity of embracing online learning by touching upon its competitive advantages not only for school but also for the world of work:

> *"I hope online education lasts and lessons continue to be provided online. After all, some of the biggest companies went fully remote, and none of the employees could say, "Sorry, but I can't write a statement online." So, online education is everywhere, and it shouldn't bother you as long as you know how to use it to support your own learning."* (S12)

S15 also shared the view that online education should not be merely perceived as related to schooling but as a way of enhancing one's self in different spheres of life, which indicates that his experience of online education is not delimited within the school setting:

> "*In my opinion, online education is of the same quality as face-to-face education. You can get the same or even more efficiency from it. It doesn't necessarily need to be treated as something that you can only use for school subjects. Thanks to online education, I was able to improve myself a lot not only academically but also professionally. At work, where I did my internship, it contributed a lot to me as I experienced new ways of learning through it and learnt how to deal with the business-related problems on my own."* (S15)

5. Discussion

In this research, four different conceptualizations of online education were identified. Below, these conceptions were discussed in relation to the mediating role of technology in facilitating students' learning, with some theoretical and practical suggestions to improve online teaching practice.

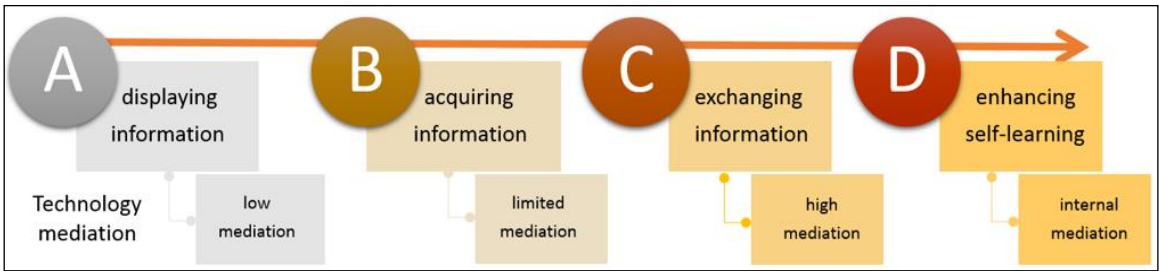

Figure 2: Mediating role of technology in relation to conceptualizations of online learning

In category A, it was seen that technology had either an insufficient or a low mediating function in the learning process, as online education was mainly perceived as an instrument which is used to present or display information. This might be related to the fact that the mere availability of tools is useless unless they are properly mediated to learners (Kozulin, 2003). For such learners, strong teacher mediation can be of help, particularly at the beginning of the online teaching process. This can be achieved through making regular announcements, preparing weekly video briefings, setting up and joining discussions, or establishing virtual office hours, all of which can make students feel more connected to the teacher, other students, and the course (Kennedy, 2020). Throughout the course, this control can be gradually passed on to students as they start to become more competent in managing their own learning process. It is also important to reward and promote the learner's takeover of this regulatory role as the teacher gradually withdraws from joint activities (Díaz, Neal, & Amaya-Williams, 1990).

In category B, online education was described as a platform that is primarily used for acquiring information. Different from category A, it thus functioned as a medium that students engaged more actively to improve their learning. However, it is also understood from students' comments that, seeing it primarily as a source for gaining information, students missed the opportunity to reap the benefits of online education to the full. For this reason, it can be claimed that technology could only play a limited mediating role in students' learning. From the perspective of socio-cultural theory, providing learners with an enriched and supportive educational environment is of great importance since it presumes that if there is no appropriate ideal form to interact in the environment, the development of the child will fail eventually (Vygotsky, 1994). Therefore, the teacher, as the designer and director of the learning environment, needs to make sure that students can access and benefit from a variety of high-quality digital learning materials and diverse resources that can support their learning. For this purpose, in addition to their traditional ways of learning and studying, students can be encouraged to experience various online learning tools and platforms in the digital environment. Digitally

unexposed learners might have opportunities to gain a positive digital learner presence through wikis, prezis, blogs, discussion boards, virtual worlds, or another type of educational tools and applications with careful scaffolding (Gregory & Bannister-Tyrrell, 2017).

In category C, online education was conceptualized as an active, social learning space where information can be produced and exchanged in a collaborative way. With this view in mind, students particularly emphasized the role technology played in social co-construction of meaning. Such a perspective is in complete agreement with the main assumptions of socio-cultural theory, which advocates that knowledge is constructed and shared socially through the interaction of individuals (Vygotsky, 1986). Moreover, the degree of interaction is accepted as one of the most important factors determining the learners' perceived outcome in online education (Baber, 2021). To improve social context, online communication, and interactivity, several strategies such as using scaffolded and self-reflective topics, encouraging personal reflection and disclosure, creating instructor-featured videos, utilizing video discussion boards, providing audio feedback can be applied (Jones-Roberts, 2018).

In the broadest category D, the experience of online education was considered in relation to one's self-improvement, as students' perception of online education went beyond the school setting. This category revealed that technology has a high mediating function in the learning process when it is internalized by learners; that is when they can make the tool their own (Esteban-Guitart, 2014) by mastering and using it to serve their own learning purposes and needs. Such traits like being conscious, self-aware, rational, and autonomous are of crucial importance from the perspective of socio-cultural theory in that they are perceived as the aspects of the mature mind (Bakhurst, 2007). For this reason, Vygotsky believed that the role of instruction should be to bring about a state of reflective understanding so learners can regulate and master their own learning process (Miller, 2014). Having said this, for those learners who can employ the right learning and thinking activities on their own initiative, loose teacher regulation would be more appropriate, as destructive friction might be expected to occur when such students have a teacher who prescribes the way they should learn in detail (Vermunt & Verloop, 1993).

6. Conclusion

This research attempted to examine the relationship between the students' conceptualization of online education and their impact on the mediating role of technology through consulting students' experiences. As such, it draws attention to the fact that the lived realities of online learners are important sources for understanding the complex nature and dynamics of online education, which instructors need to be cognizant of (Henderson, et al., 2017). As a result, four qualitatively distinctive ways of experiencing online education were identified. From these conceptions, it is understood that how online education is perceived and the degree to which technology is internalized by learners are crucial factors that determine the way technology mediates learning in online education. It is also evident in the research findings that more

sophisticated perceptions of online education are associated with more effective technology use and higher learning gains, as suggested in the literature (Purdie & Hattie, 2002). It can thus be concluded that for technology to mediate learning in an intended and efficient way, it might be necessary to cultivate more sophisticated perceptions of online education among students first, as Hsieh W.-M. & Tsai C.-C. (2017) proposed.

Another takeaway of this research is that, apparently, the mere presence of technology as a tool never guarantees to learn by itself. As the results showed, although it may be tempting to consider the role of the instructor as secondary or even dispensable in technology-mediated learning environments compared to traditional modes of education, technology-mediated learning environments may be very demanding in terms of teaching effort (Wan et al., 2007). As found by Marzilli et al. (2015), one of the major complaints that students have against online education is about instructors who make little use of it or who do not specifically teach the content included in it. Indeed, what students expect from online courses is not much different than what they demand from face-to-face education, which is to feel connected and engaged (Lederman, 2020). This view is also consistent with Simonson's (1990) equivalency theory, which assumes that regardless of the mode of education, both online and face-to-face learners should attain equivalent outcomes on the condition that they are provided with equivalent learning experiences. Therefore, in addition to technology mediation, the key role of teacher mediation that would accompany it should not be underestimated in online education so students can regulate their own learning by internalizing and using these tools in a competent way (He et al., 2022).

7. Recommendations and Limitations

The present research is limited to International Trade and Logistics undergraduates' experiences of online education. Therefore, studies to be carried out with undergraduates from other departments are recommended owing to the finding that branches of study might influence students' perception of the ease and usefulness of the medium (Cabero-Almenara et. al., 2021).

Another limitation is that, in this research, the research participants' experiences of online education are mainly restricted to Microsoft Teams as the online learning platform. More research to be conducted with other online learning platforms and management systems might be complementary as it was reported that university students' perceptions of different technology-enhanced learning tools and their value for learning tend to differ (Peart et al., 2017).

Finally, the main purpose of this research was to illuminate students' perspective on online education and its relation to technology mediation. Apart from students', other participants', such as teachers' or school managers' experiences of online education can be consulted and the findings can be discussed comparatively from a broader perspective. As indicated, teachers' conceptions and approaches to teaching in online educational environments also vary (Naimi-Akbar et al., 2020). It was further argued that teachers' pedagogical and technological practices cannot be fully understood without

taking the social and cultural norms of their specific cultures into consideration (Adam, 2017). In another study, it was found that both school administrators and teachers have negative perceptions of online education (Demirbilek et al., 2021). With research addressing these issues, the societal roots of particular perceptions of online education might be traced and the relationship between contextual factors, preferred ways of learning and teaching, and technology mediation can be better understood (Shah et al., 2020).

Conflict of Interest Statement
The authors declare no conflicts of interest.

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