Original Article

Adaptation and validation of the Lithuanian-language version of the Performance Enhancement Attitude Scale (PEAS)

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Abstract:

Problem Statement: Research evidence suggests athletes' attitudes toward doping may be a strong predictor of doping behaviour. Therefore, it is important to assess attitudes and facilitate cross-cultural comparisons using validated instruments. **Aim:** The aim of this study was to adapt and validate the Lithuanian version of the Performance Enhancement Attitude Scale (PEAS). **Material and Methods:** Research participants were 205 university students (142 males and 63 females) in sports sciences. Adaptation of the PEAS in Lithuanian was conducted through forward/backward translation. Exploratory and confirmatory factor analyses were performed to assess the scale's structure, and Cronbach's alpha was applied to measure the internal consistency. Pearson's correlation was used to assess the relationship among the PEAS and intention to dope and attitudes toward fair play in sport as evidence of convergent validity. **Results:** The study results did not prove a one-dimensional structure of the 17-item PEAS scale. A two-factor 11-item structure was established by confirmatory factor analysis. The scale showed good acceptable levels of internal consistency. As expected, athletes with less positive attitudes toward doping were less likely to use doping and had more positive attitudes toward fair play in sport. It was found that female athletes had significantly less positive attitudes toward doping than males. Comparing attitudes toward doping in relation to competitive level, a significant difference was not found. Limitations of the study and further research perspectives are also discussed. **Conclusion:** The study results indicate the 11-item scale is a valid and reliable instrument and should be used with Lithuanian-speaking athletes.

Keywords: banned performance-enhancing drugs, attitudes, Lithuanian adaptation, factor analysis, convergent validity.

Introduction

Sports activities are characterised by an achievement context in which athletes must demonstrate their competence to achieve victory. Although highly competitive athletes may seek success through honourable means, the occasionally publicised cases of the use of prohibited performance-enhancing drugs suggest that victories are not always achieved cleanly. Recent research illustrates that up to 57.1% of competitive athletes use doping to improve their performance (Ulrich et al., 2018). So, it is not surprising that athletes start to believe that hard work alone may not be enough to succeed, especially if they must compete with someone who uses doping (Maycock & Howat, 2005). While athletes seem to hold negative views about using doping (Sukys, Karanauskiene, & Smigelskaite, 2019), they often cannot explain their position (Barkoukis, Brooke, Ntoumanis, Smith, & Gucciardi, 2019). Therefore, it remains relevant to try to better understand doping-related decisions for better preventive practice.

Scientists emphasise that in the development of effective doping prevention programmes, a good understanding of what causes athletes to use doping and what factors can help protect them from engaging in doping practices is of vital importance (Mazzeo, Altavilla, D'elia, & Raiola, 2018; Petróczi & Aidman, 2009). Although various factors drive athletes to choose to use banned drugs themselves, their attitudes toward doping play an important role (Petróczi & Aidman, 2009). Numerous studies have revealed that athletes' attitudes toward the use of banned performance-enhancing substances are important predictors of their intention to use doping (Barkoukis, Lazuras, Tzorbazoudi, & Rodafinos 2013; Blank, Kopp, Niedermeier, Schnitzer, & Schobersberger, 2016; Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008; Mudrak, Slepicka, & Slepickova, 2018; Zelli, Mallia, & Lucidi, 2010) or a banned supplement (Jalleh, Donovan, & Jobling, 2014; Zelli et al., 2010). Interestingly, recent studies suggest also that athletes' attitudes toward doping were related not only to doping use but also to cheating behaviours (Nicholls et al., 2019).

Revealing links between athletes' attitudes toward doping and their intentions to use is an important step in better understanding the factors influencing dishonest behaviours. However, at the same time, attempts must be made to establish the factors that may have an impact on athletes' approaches to doping. Scholars suggest that various societal and psychological variables predict athletes' attitudes toward doping (Jalleh et al., 2014;

Zucchetti, Candela, & Villosio, 2015). For instance, research with athletes of various ages demonstrated positive relationships between extrinsic motivation and attitudes toward doping (Zucchetti et al., 2015). Gucciardi et al. (2010) found that athletes who hope to not get caught during doping testing and are more likely to misbehave have more positive attitudes toward doping. It was found that such personality traits as Machiavellianism, psychopathy, and narcissism (referred as the dark triad) were positively linked to doping attitudes (Nicholls, Madigan, Backhouse, & Levy, 2017). Several studies established that athletes with extremely high perfectionism levels are also more inclined toward doping (Bahrami, Yousefi, Kaviani, & Ariapooran, 2014; Zucchetti et al., 2015). Perfectionism, especially over mistakes, was also positively associated with attitudes toward doping among top-level athletes (Bae, Yoon, Kang, & Kim, 2017). Madigan, Stoeber, and Passfield's (2016) study also suggests that children of parents who expect them to be perfect in sports tend to have a more positive attitude toward doping. Thus, scholars also address how athletes perceived achievement in competition and the coaching environment influences attitudes toward doping (Allen, Taylor, Dimeo, Dixon, & Robinson, 2015; Bae et al., 2017). These studies revealed that an ego-involving climate related positively, whereas a coach-created mastery climate related negatively to attitudes toward doping. Coaches who created a climate characterised by less autonomy but more control had a direct effect on attitudes toward performance enhancement drugs. Further, athletes' ego orientation was positively related, whereas task orientation was negatively related to doping attitudes. Finally, athletes' attitudes toward doping were also affected by existing situational temptation to use doping (Blank et al., 2016), contacts with other athletes doping (Zucchetti et al., 2015), or use of sport supplements (Hurst, Kavussanu, Boardley, & Ring, 2019).

This abundance of research suggests the importance of considering the role of the variable of attitude in further research investigating the motives for the use of banned drugs and searching for new preventive measures. Accordingly, it is important to use valid questionnaires when investigating attitudes toward doping. This is particularly relevant in countries where such research is lacking. Most of the studies mentioned above used the Performance Enhancement Attitude Scale (PEAS), which is a 17-item scale that offers a unidimensional measure of attitudes toward doping (Petróczi & Aidman, 2009). The PEAS has been adapted and validated in other non-English speaking contexts (Hauw, von Roten, Mohamed, & Philippe, 2016; Morente-Sánchez, Femia-Marzo, & Zabala, 2014; Mudrak et al., 2018; Sas-Nowosielski & Budzisz, 2018). But few studies related to the use of prohibited substances have been conducted in Lithuania. It is therefore important to use well-known research tools to promote such research, which would not only supplement scientific knowledge about athletes' attitudes but compare it with the findings of other researchers. Further, the adaptation of this scale can provide more evidence on its structure. This is important because although modifications of this scale have been carried out (Elbe & Brand, 2016; Gucciardi, Jalleh, & Donovan, 2010; Vargo et al., 2015), not all found evidence for support (Nicholls, Madigan, & Levy, 2017). Therefore, the aim of this study was to adapt and validate the Lithuanian version of the PEAS and in doing so, encourage future research and offer the possibility of including Lithuanian studies on doping attitudes in the international context.

First, we examined the structure of the PEAS by conducting an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Next, we analysed the construct validity of the scale by examining the convergent validity of the PEAS. Based on previous findings (Barkoukis et al., 2013; Blank et al., 2016; Lucidi et al., 2004; Lucidi et al., 2008; Mudrak et al., 2018; Zelli et al., 2010), we expected to establish positive relations among attitudes toward doping and the athletes' intention to use prohibited substances. We specifically expected that less negative attitudes toward doping would be positively related to athletes' intents to use doping. More negative attitudes toward doping can show more prosocial attitudes of athletes, which in turn may predict respect to fair play in sport (Lucidi et al., 2017). Hence, we also expected that athletes with less positive attitudes toward doping would demonstrate more positive attitudes toward fair play in sport.

Material & methods

Translation of the instrument

To adapt a Lithuanian version of the PEAS, we used a forward and back-translation procedure (Beaton, Bombardier, Guillemin, & Ferraz, 2000). First, the scale was translated into Lithuanian by three native Lithuanian translators. Next, the three translated versions were evaluated by a committee of social sciences experts (all doing research related to cheating in sport, including the first author of this study). Experts concluded the translated technical terms matched the original meanings. However, some small corrections were made. Then, 10 adult athletes were invited to rate the clarity of each statement on a 5-point scale. Finally, the scale text was backward translated from Lithuanian into English by two English language professionals and all discrepancies were discussed by the authors of this research until an agreement was reached.

Participants and procedures

The sample consisted of 205 university student athletes (142 males and 63 females), ranging in age from 18 to 24 years ($M = 19.9$, $SD = 1.23$). Participants' mean experience in their current sport was 9.06 ($SD = 4.16$) years and they represented a variety of individual (track-and-field, swimming, shooting, gymnastics; $n = 87$), combat (boxing, karate, wrestling; $n = 29$), and team (basketball, football, handball, rugby; $n = 89$) sports. Regarding the competitive level, 28.7% had competed at an international level, 56.9% at a national level, and 14.4% at a regional or city level.

Students were recruited from one university in Lithuania after the approval of the Committee for Social Sciences Research Ethics of the Lithuanian Sports University (protocol No. SMTEK-47, 29-10-2019). For this study, students who studied in sports and physical education degree programmes were contacted and invited to participate in the study. All students were informed about the research aim, confidentiality, and anonymity. Those who volunteered to participate were instructed how to complete the questionnaire and given ample time for completion.

Instrument

The PEAS is a self-report 17-item instrument created to measure the attitudes toward doping use (Petróczi, 2002). Participants answer all items using a 6-point Likert-type scale: 1 = 'strongly disagree', 2 = 'disagree', 3 = 'slightly disagree', 4 = 'slightly agree', 5 = 'agree', and 6 = 'strongly agree'. This scale does not have neutral response options. Overall, PEAS scores range from 17 to 102, and higher scores indicate more positive attitudes toward doping use.

Other measures

To evaluate the evidence for convergent validity, the questionnaire also included other variables, those that we expected to be related to athletes' attitudes toward doping. Specifically, participants' attitudes toward fair play were measured as well as their likelihood to use doping.

Attitudes toward fair play in sport were measured using a 10-item scale developed by Telama et al. (2002). Participants rated each item on a 4-point Likert scale (from strongly agree to strongly disagree). Some items were rated in reverse scores. Although the author of this scale proposed two possible factors (fair play and violence), Cronbach alpha coefficients were low (from 0.33 to 0.31). Therefore, we used the overall score for accessing the attitude toward fair play. Acceptable overall scale reliability was supported in previous studies (Cronbach $\alpha = 0.76$; Majauskiene, 2012). We also measured participants' likelihood to use doping. In previous studies measuring the likelihood to use doping, participants were presented with several hypothetical situations (i.e., to use banned substances to enhance performance and aid recovery from injury; Kavussanu, Hatzigeorgiadis, Elbe, & Ring, 2016; Kavussanu & Ring, 2017). In this study, one scenario was used that described a situation before a major competition in which the athlete did not feel better than the other competitors. However, another athlete was advised use doping, which led to higher results for that athlete. In addition, there was little chance of being caught doping. Participants had to answer on 7-point scale, ranging from 1 = 'not at all likely to use doping' to 7 = 'I would very likely use doping'.

Statistical analyses

To assess scale structural validity, both EFA and CFA were performed. Following the recommendation, the total sample of 205 was randomly split into two groups (Schreiber, Nora, Stage, Barlow, & King, 2006). The first group ($n = 102$) of participants were used for the EFA and the other group accordingly for the CFA. We conducted a CFA to test underlying factors emerging from the EFA. Additionally, we tested the unidimensional structure of both the 17-item and 8-item version of the PEAS. To evaluate model fit, χ^2 statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR; Hu & Bentler, 1999) were examined. Acceptable model fit criteria were CFI > 0.90, TLI > 0.90, RMSEA < 0.08, and SRMR < 0.10 (Marsh, Hau, & Wen, 2004). To examine scale reliability, Cronbach's α values were used. For convergent validity evidence (using total sample), Pearson's correlations were performed to evaluate the relationship between athletes' doping attitudes and the subscale scores from fair play attitudes and likelihood to use doping. For gender and competitive-level differences in attitudes toward doping, t-tests and one-way ANOVA were used. All data analyses were carried out using IBM SPSS Statistics 25 (IBM Corp.) and AMOS version 24.

Results

We conducted an EFA for identification of factor structure of the PEAS. Bartlett's test of sphericity was significant ($\chi^2(136) = 1097.68, p < .001$), and the Kaiser-Meyer-Olkin test yielded a value of 0.84, suggesting that the sample was adequate and sufficiently factorable (Tabachnick & Fidell, 2007). Results showed a four-factor structure with eigenvalues greater than 1 explaining 66.52% of the total variance in the 17-item pool. All item loadings were higher than 0.40. However, two factors had just two items, whereas it is suggested there should be at least three items. Further, a scree plot test also provided a two-factor structure. In addition, the fourth factor, which consists of two statements, was difficult to interpret. Consequently, we removed four items ('Health problems related to rigorous training and injuries are just as bad as from doping', 'The media blows the doping issue out of proportion', 'Media should talk less about doping', and 'Athletes have no alternative career choices, but sport') for subsequent analysis. Also, two items with greater than 0.40 cross-loaded on two factors. Worthington and Whittaker (2006) suggested that researchers should consider deleting items with cross-loadings that are less than 0.15 different from an item's highest factor loading. Following this recommendation, an additional two items ('Athletes are pressured to take performance-enhancing drugs', and 'Recreational drugs give the motivation to train and compete at the highest level') were deleted.

Subsequently, we conducted a second EFA with 11 items. The maximum likelihood factor analysis with a cut-off point of 0.40 and Kaiser's criterion of eigenvalues greater than 1 yielded a two-factor solution as the best fit for the data (Table 1). Both factors explained 71.80% and 52.80% of the variance, respectively. According to

the items that composed the factors, the first was labelled ‘Necessity of doping’, and the second ‘Recreational drugs as doping’.

Table 1. EFA and CFA Factor Loadings for the 11-item PEAS

	EFA Factor Loading		CFA
	Factor 1	Factor 2	Standardised Factor Loadings
Athletes should not feel guilty about breaking the rules and taking performance-enhancing drugs	.92	-.03	.91***
Legalising performance enhancements would be beneficial for sports	.90	.10	.88***
Doping is an unavoidable part of the competitive sport	.87	.08	.85***
Doping is not cheating since everyone does it	.84	.01	.84***
Doping is necessary to be competitive	.84	.09	.83***
There is no difference between drugs and technical equipment that can be used to enhance performance	.83	.11	.76***
The risks related to doping are exaggerated	.79	.10	.81***
Only the quality of performance should matter, not the way athletes achieve it	.75	.04	.75***
Recreational drugs help to overcome boredom during training	.01	.90	.84***
Athletes who take recreational drugs, use them because they help them in sport situations	-.02	.88	.80***
Athletes often lose time due to injuries and drugs can help to make up the lost time	.20	.74	.58***

Note: Factor 1 = Necessity of doping, Factor 2 = Recreational drugs as doping. *** $p < .001$

Next, we conducted a CFA to test whether the 11-item, two-factor model was a good fit for the data. Standardised factor loadings are presented in Table 1. The results of the CFA supported a two-factor model of the PEAS (Table 2). However, model fit indices were close to the limit values, especially RMSEA. We conducted an alternative 8-item model, which yielded an adequate fit in previous studies with adult participants (Vargo et al., 2015; Nichols et al., 2017). The results of the CFA showed that the 8-item, one-factor model of the PEAS provided acceptable indices of the model (Table 2), although the value of RMSEA was better than in the two-factor model with 11-items. Finally, we assessed the model fit of the original 17-item unidimensional scale. As Table 2 shows, the one-factor, 17-item model demonstrated poor fit according to all indices.

Table 2. Fit Indices of the CFA Models for the PEAS

Model	χ^2	df	χ^2/df	p	CFI	TLI	RMSEA 90% CI	SRMR
Two-factor, 11-items	102.72	43	2.388	.001	0.939	0.922	0.083 (0.079-0.089)	0.078
One-factor, 8-items	41.151	20	2.057	.001	0.928	0.925	0.079 (0.075-0.085)	0.075
One-factor, 17-items	392.954	119	3.30	.001	0.772	0.741	0.098 (0.084-0.107)	0.083

Next, reliability of the total 11-item scale and both factors were measured. It was found that Cronbach's alpha for the total scale was 0.86. Cronbach's alpha for both factors (necessity of doping and recreational drugs as doping) ranged between 0.93 and 0.78. Assessing convergent validity, Spearman's correlations were analysed among PEAS 11-item scores as well as the likelihood to use doping and attitudes toward fair play in sport. The same correlational analysis was conducted with both PEAS factors. It was expected that those who were less likely to use doping and had more positive attitudes toward fair play in sport would have less lenient views of doping use. The study results demonstrated a significant positive correlation between PEAS score and the likelihood to use doping and a negative correlation between the attitudes toward fair play in sport (Table 3). Participants who reported not being likely to use doping to increase their chances in competitions showed less positive attitudes toward doping. Accordingly, positive correlations were found between both PEAS factors and participants' likelihood to use doping. A positive correlation was also found between athletes' attitudes toward doping and fair play in sport (Table 3).

Table 3. Correlations Among PEAS Scores and Athletes' Likelihood to use Doping and Attitudes Toward Fair Play in Sport

Study Variables	1	2	3	4	5
1. Attitudes toward doping	-				
2. Necessity of doping	.90**				
3. Recreational drugs as doping	.59**	.38**			
4. Likelihood to use doping	.48**	.49**	.38**		
5. Attitudes toward fair play	-.39**	-.40**	-.28**	.36**	-

Note: ** $p < .001$

We also compared doping attitudes by gender and competitive level of athletes. The results showed that female athletes had significantly less positive attitudes toward doping than males ($t(193) = 3.15$, $p < .001$, $d = 0.54$). Accordingly, gender differences were statistically significant for expressing attitudes toward the necessity to use doping ($t(193) = 2.60$, $p < .01$, $d = 0.45$) and recreational drugs as doping ($t(193) = 2.40$, $p < .05$, $d = 0.35$). When comparing attitudes toward doping in relation to competitive level, a significant difference was not found ($F(2, 192) = 0.36$, $p > .05$). Post hoc comparison using Tukey's honestly significant difference test also did not indicate differences in the mean scores. Comparing attitudes to the necessity of doping, no significant differences were found among athletes competing at different levels ($F(2, 192) = 0.12$, $p > .05$). However, significant differences were established in the attitudes toward recreational drugs as doping ($F(2, 192) = 3.10$, $p < .05$, $\eta^2 = 0.031$), though post hoc comparison did not show that the mean score of athletes competing at the international level was significantly different compared to that obtained at the national or regional levels.

Discussion

This study aimed at adapting the Lithuanian version of the PEAS. Results indicate that the Lithuanian version of the PEAS can be used in future studies among Lithuanian-speaking adult athletes. In addition, as in other studies that adapted this questionnaire to different cultures (Hauw et al., 2016; Morente-Sánchez et al., 2014), it is easily understood by the research participants while analysing their attitudes toward doping. During the administration of the survey, we did not have any students commenting on the clarity of the statements, and participants answered all statements on the survey. On the other hand, several key aspects that emerged during scale adaptation need to be discussed separately.

The PEAS was developed as a unidimensional self-report instrument (Petróczi, 2002; Petróczi & Aidman, 2009) and was confirmed in other recent studies (Hauw et al., 2016; Morente-Sánchez et al., 2014). On the other hand, we conducted a CFA, and our results confirmed the multidimensional structure of this instrument. This was not unexpected, as we encountered studies that also showed less support for the unidimensional structure of the PEAS (Mudrak et al., 2018). The EFA of this study suggested a four-factor structure. Similarly, our study identified two factors that represent attitudes to the items related to the necessity to use doping and with items related to recreational drugs as doping. Actually, such a possible additional factor related to recreational drug use in sport was also mentioned in Morente-Sánchez et al.'s (2014) study. Our data did not support separate factors covering the rest of the items. So, we examined the factorial structure of an 11-item shortened scale. This was also supported by other recent studies. Sas-Nowosielski and Budzisz's (2018) study with young athletes from various sports disciplines in Poland found support for the 11-item version of the PEAS. Some scholars (Gucciardi et al., 2010) also used an 11-item shorter version of the PEAS, although this version was not favourably supported. A study by Nicholls, Madigan, and Levy (2016) also showed poor 17-item PEAS support among adult and adolescent athletes. We also conducted a CFA with 17-items and found poor model fit, as all fit indices did not reach satisfactory values.

The CFA results confirmed the two-factor, 11-item version of the PEAS with an acceptable measurement model fit, although some indices of fit were very close to cut-off criteria. Internal consistency of the 11-item scale was good as well as for both attitude factors. It should be noted that previous and recent studies using 17-items (Campian et al., 2018; Morente-Sánchez et al., 2014; Petróczi & Aidman, 2009) or shorter versions (Gucciardi et al., 2010; Nicholls et al., 2019; Vargo et al., 2015) of the PEAS established good or excellent internal consistency values.

When we examined the Lithuanian version of the PEAS, we also tested an 8-item version. Incidentally, the first factor identified consisted of exactly eight statements. Further, these statements were consistent with the previously established adequate short 8-item version of the PEAS with adolescents and adult athletes (Vargo et al., 2015). The results of the present study demonstrate better fit indices compared to the 11-item version. As in our study, Nicholls et al. (2016) established support only for the 8-item version across all fit indices just for the adult athletes. Therefore, the researchers maintained it was better to use the short 8-item version when researching adult athletes' attitudes toward doping. Similarly, our study also suggests that such a version can be used in studies with adult research participants. On the other hand, an 11-statement version can also be used to investigate differences in athletes' attitudes toward the necessity of doping and toward recreational drugs as doping. However, it is important to clearly state what exactly is being sought by investigating athletes' attitudes toward doping and making correct comparisons with the previous findings of other researchers. This is because when other researchers apply the full 17-item version, the scores range from 17 to 102, which does not match the scores of the shortened versions. Our findings imply that the adapted shorter scale should be used with adult athletes. Other scholars (Nicholls et al., 2016) also recommend using a shorter version of the PEAS to assess adult athlete attitudes to doping.

In this study, we also sought to assess the evidence of convergent validity by analysing correlations among PEAS scores and athletes' intention to use doping as well as their attitudes to fair play in sport. It can be summarised that athletes with less positive attitudes toward doping were more inclined to stay away from doping and had more positive attitudes to fair play. These results are consistent with our hypotheses. In addition, similar relationships have been found by separately assessing both factors of attitudes toward doping. But the relationship between attitudes toward recreational drugs as doping and intention not to use doping or especially

attitudes toward fair play were weaker. This suggests that athletes perceived recreational drug use in sport differently, in less contradiction with fair play behaviour.

The study established that gender influenced attitudes toward doping, as females had less permissive attitudes than males, which is in line with previous studies (Vargo et al., 2015). The adapted scale also identified females had less positive attitudes toward the necessity of doping and recreational drugs as doping than those of males. Another important aspect is how athletes of different skill levels have different attitudes toward doping. Previous studies demonstrate contradicting data on the relationship between competitive level and attitudes toward doping. Some studies confirmed that professional athletes were more tolerant toward using doping compared with those having less sporting experience (Vargo et al., 2015). Meanwhile, others did not find such a relationship and suggest assuming possible mediating factors (Zucchetti et al., 2015). Our study also did not establish a significant effect of competitive level on doping attitude. This means that future research should attempt to explain these relationships more clearly.

Overall, this study was an important next step in the validation of the PEAS in the Lithuanian language, but it also has some weakness. The sample size was small and we suggest performing separate cross-validations with female and male athletes in future research. All participants were active in various levels of competition, but all were students of one sports science university. As some study modules cover topics related to sports ethics, we can hypothesise that this also may have influenced the students' attitudes. Although the Lithuanian version of the PEAS appears to be a suitable instrument to assess attitudes toward doping, it was not validated with adolescent athletes. Hence, we do not suggest using it in studies aiming to investigate adolescent athletes' doping attitudes. Nevertheless, we encourage researchers to re-evaluate this scale with adolescent samples.

Conclusion

This study provided evidence for the Lithuanian version of the PEAS in its Lithuanian version. Moreover, it also demonstrated that the shorter version of the PEAS instead of the 17-item version should be used with Lithuanian-speaking athletes. At the same time, this study encourages researchers to further examine the PEAS not only with adult samples but especially with adolescent athletes.

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Conflict of interests

The authors report that they have no potential conflict of interest.

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