

Problem-Based Learning Meets Two Stay Two Stray: Strengthening Student Learning Activity in Secondary Sociology

Redho Arian Saputra¹; Dendy Marta Putra^{2*}

¹SMA Negeri 1 Ukui, Indonesia

²SMA Negeri 5 Padang, Indonesia

*Corresponding author, e-mail: dendymputra@gmail.com

Abstract

This collaborative classroom action study examines the combination of Problem-Based Learning (PBL) and Two Stay Two Stray (TSTS) for increasing student learning activity in Grade XI sociology at SMAN 5 Padang. Thirty-four students participated in two action cycles following a pre-cycle observation. Activity was assessed across physical, mental, and emotional dimensions, with a classroom success criterion of at least 70%. The classroom records records an increase of 19 percentage points in Cycle 1 and a further 47 percentage points in Cycle 2, for an overall gain of 66 percentage points from the initial condition. PBL provided social problems that required collective analysis, while TSTS redistributed responsibility by requiring students to host peers, visit other groups, exchange information, and communicate conclusions. The findings indicate that the combined model can reorganize participation in sociology classrooms by connecting problem solving with peer interaction. Conclusions are limited to the observed class and action-research context.

Keywords: classroom action research; learning activity; sociology education; problem-based learning; two stay two stray;.

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Introduction

Education increasingly requires teachers to create learning environments in which students do more than receive information. In social integration, this requirement is especially important because the subject matter asks learners to interpret ideas, connect concepts with experience, and communicate their reasoning. Yet the classroom problem documented in this study was low physical, mental, and emotional participation in sociology lessons. Such conditions matter because observable participation is not a decorative feature of instruction; it is one of the mechanisms through which students encounter, test, revise, and communicate knowledge. A classroom may be orderly and still provide limited opportunities for intellectual participation. Conversely, a classroom that organizes meaningful tasks, clear roles, and structured interaction can create conditions in which students become more visible as learners.

Problem-Based Learning and cooperative-learning research offer complementary explanations for the design used in this study. PBL organizes learning around an ill-structured problem that requires students to identify what they know, determine what they need to investigate, and use evidence to construct a response (Yew & Goh, 2016; Hung, 2011). Cooperative structures, meanwhile, determine how responsibility and interaction are distributed among group members (Johnson & Johnson, 2009; Gillies, 2016). Combining PBL with Two Stay Two Stray can therefore be understood as linking a problem-centered epistemic task with a participation structure that

requires students to explain their group's reasoning, listen to other groups, and bring information back to their original team.

Problem-Based Learning and Two Stay Two Stray address different weaknesses of conventional group work. PBL gives students a shared problem that requires analysis, while TSTS creates a structured exchange in which some members explain the group's reasoning and others gather information from peers. In sociology, this combination is potentially valuable because social problems rarely have meaning when discussed from a single perspective. Students need to compare interpretations, use concepts to explain cases, and revise conclusions after encountering alternative accounts. The present classroom-action study examines whether combining a problem structure with a peer-exchange structure increased observable learning activity in a Grade XI sociology class.

For this reason, the present article does not frame Problem-Based Learning combined with the Two Stay Two Stray cooperative method as a universally effective treatment. Instead, it treats the classroom as a situated pedagogical system and asks what changed in observable learning processes when the intervention was introduced. This distinction is important. Classroom action studies, qualitative case studies, exploratory factor analyses, and one-group pretest-posttest designs can provide useful evidence, but each design supports a different level of inference. Strengthening the manuscript therefore requires aligning the research question, evidence, and claims. The objective of this study is to examine how a PBL-TSTS sequence could improve observable student learning activity across classroom action cycles.

The outcome in this study is student learning activity during a sociology unit on social integration. Activity was observed across physical, mental, and emotional dimensions, with a 70% criterion used to judge whether the action cycle had reached the intended classroom standard. The pattern was substantial: activity increased by 19 percentage points in Cycle 1 and by a further 47 points in Cycle 2, a total rise of 66 points from baseline. These figures describe participation, not independent evidence of conceptual achievement.

The instructional logic came from combining two structures with different functions. Problem-Based Learning supplied a socially meaningful problem that required explanation and solution, while Two Stay Two Stray redistributed responsibility for hosting, visiting, listening, explaining, and returning information to the home group. The combination was therefore intended to prevent a familiar weakness of group work: a few students solving the task while others remain peripheral. Research on secondary-school PBL and collaborative accountability supports the need to design both the problem and the participation structure deliberately (Gedamu & Shewangezaw, 2022; Lonergan et al., 2022).

The study was conducted in class XI IPS 4 at SMAN 5 Padang with 34 students and a collaborative classroom-action team consisting of three observing teachers and one model teacher. Social integration was a suitable topic for problem-centered group work because students could analyze recognizable social tensions while practicing explanation and exchange. The design followed a pre-action condition and two cycles, allowing the teaching team to refine how the problem, group roles, and information exchange were organized.

The article addresses three questions: What pattern of low learning activity was visible before the combined PBL-TSTS sequence? How did physical, mental, and emotional activity change across the action cycles? What can and cannot be attributed to the combined design when PBL and TSTS were introduced together? The last question is essential for methodological discipline: the study can evaluate the classroom sequence as a whole, but it cannot estimate the separate effect of the problem structure and the stay-stray exchange routine.

PBL research shows that outcomes vary substantially with problem quality, facilitation, assessment, and implementation (Strobel & van Barneveld, 2009; Walker & Leary, 2009; Yew & Goh, 2016). Cooperative-learning research likewise shows that interaction becomes productive when students have accountable roles and genuine interdependence (Johnson & Johnson, 2009; Slavin, 2014). Hybrid classroom models are often reported as if combining two named approaches automatically strengthens instruction. What is less frequently examined is how the components complement one another in practice. This study addresses that issue by tracing changes in physical, mental, and emotional activity while examining how the PBL problem and the TSTS exchange redistributed classroom roles.

A disciplinary perspective further clarifies why the case matters. Learning about social integration requires students to coordinate factual information with interpretation. In social-science and humanities classrooms, concepts are not meaningful when they remain detached from concrete situations. Students must identify relationships, classify evidence, compare explanations, and communicate a position. This means that classroom activity should be evaluated not merely by how busy students appear but by whether the activity carries intellectual work. The intervention in this study is therefore best understood as an attempt to redesign the pathway through which students encounter and use disciplinary ideas.

The combination is pedagogically interesting because activity is distributed across different roles. Students who stay must explain and defend the home group's reasoning, whereas students who stray must listen, compare, question, and carry information back. These demands make activity more than physical movement between groups. The design seeks cognitive and communicative work within the movement. This distinction is important

because visible busyness can otherwise be mistaken for learning activity, especially in cooperative lessons with high levels of movement and talk.

TSTS also creates a partial safeguard against unequal participation by giving visiting and hosting roles a defined purpose. Yet role assignment alone does not guarantee equal intellectual contribution. A student may complete a visit without asking substantive questions, or host without understanding the group's explanation. The observation data are class-level and cannot reveal these differences in depth. Future implementations should therefore pair role rotation with simple accountability tools, such as individual comparison notes or brief explanations after returning to the home group.

The collaborative action-research arrangement made teacher orchestration visible. Observers could identify whether the problem was sufficiently open, whether groups understood the exchange routine, and where movement produced confusion rather than learning. The model teacher could then adjust instructions and timing in the following cycle. This reflective division of labor is important because PBL and cooperative structures place substantial demands on classroom management; problem quality and role clarity must be refined together rather than assumed to work from the first implementation (Lane et al., 2023).

The sociology topic of social integration provides an appropriate context for this hybrid design. Students are expected to interpret social problems, examine relationships among groups, and consider how cooperation or conflict is produced. A problem can therefore organize conceptual inquiry, while the TSTS exchange can expose students to competing group interpretations. This creates a learning sequence in which students must first construct an explanation and then test it through interaction with peers. The value of the model depends on this intellectual exchange, not simply on movement between groups.

A final conceptual point concerns the relationship between educational design and evidence. In this study, Problem-Based Learning combined with the Two Stay Two Stray cooperative method should be understood as a configuration of tasks, expectations, interactions, and feedback rather than as a single independent variable with an automatic effect. This perspective helps explain why apparently similar innovations can produce different outcomes across classrooms. Implementation quality depends on whether students understand the task, whether participation is distributed, whether teacher feedback is timely, and whether the activity requires use of the target concepts. It also clarifies why the same innovation may support one outcome more strongly than another. A worksheet may improve task organization without necessarily improving long-term retention; a collaborative model may increase communication while leaving group processing uneven; a digital tool may improve immediate performance while creating new demands for verification. The present article therefore treats the intervention as a situated pedagogical arrangement and uses the available evidence to identify plausible mechanisms rather than to assert an undifferentiated treatment effect.

The contribution of the study lies in showing how two instructional structures can be functionally complementary. The action cycles recorded substantial increases in classroom activity, but the interpretation focuses on the mechanism: PBL provided a reason to investigate, whereas TSTS distributed responsibility for explaining and collecting information. This distinction helps move discussion beyond the label of a combined model. It also clarifies why teacher orchestration remained necessary: problem complexity, visitor-host roles, timing, and whole-class consolidation had to be coordinated for the exchange to support learning rather than produce fragmented information.

The broader pedagogical implication is that an innovative model should be judged by the quality of the learning work it organizes. General instructional literature stresses that classroom models require coherent goals, tasks, and assessment rather than procedural adoption (Abdullah, 2014; Arikunto, 2016). For PBL-TSTS, coherence means that the problem must generate a reason to compare explanations and the stay-stray routine must return useful information to the home group. When either element becomes merely procedural, increased movement may no longer correspond to meaningful mental or emotional engagement.

The classroom-action design follows an improvement cycle rather than an experimental comparison. Indonesian methodological guidance on classroom action research emphasizes planning, action, observation, and reflection as a practical route for teachers to diagnose and improve instruction (Direktorat P2TK KPT Ditjen Dikti, 2006; Haryono, 2001; Mulyatiningsih, 2014). In this study, the collaborative observer team strengthened that reflective function by making physical, mental, and emotional activity visible during the combined PBL-TSTS sequence. The success criterion was therefore used as a formative classroom benchmark, not as a population parameter.

The combined design also sits within a longer Indonesian tradition of using PBL to address low classroom activity. Studies have reported increased activity and learning outcomes when students work through structured problems (Fathonah & Yudhawati, 2019; Hajar, 2016), while more recent lesson-study work highlights the value of collaborative reflection around PBL implementation (Budiningsih, 2022). International reviews similarly emphasize that PBL outcomes depend on problem quality, facilitation, and the depth of student engagement rather

than on the model label alone (Dolmans et al., 2016). These findings justify examining the implementation sequence in detail.

Method

This study used a collaborative CAR design at SMAN 5 Padang. The participants were 34 students in class XI IPS 4. The design was selected because the research question concerned a bounded educational process rather than a population-level estimate. The study focused on social integration. The central pedagogical or analytic focus was Problem-Based Learning combined with the Two Stay Two Stray cooperative method. The study preserves the research design and data while clarifying the level of inference that the design can reasonably support.

The study was a collaborative classroom action research project with three teachers acting as observers and one teacher as the model teacher. Thirty-four students participated. Activity was organized into physical, mental, and emotional domains and compared across pre-cycle, Cycle 1, and Cycle 2. The classroom success criterion was at least 70% average activity.

Data were generated through structured classroom observation of physical, mental, and emotional learning activity during the pre-action condition and two action cycles. Three teachers served as observers while one teacher enacted the lesson. The record describes changes in participation as the combined PBL-TSTS sequence was implemented and refined. The study did not use a separate control class or standardized achievement measure, so the evidence is most appropriate for judging classroom activity within the action-research setting.

Analysis compared the percentage of observed learning activity across the three stages and examined the size of change after each cycle. The 19-point increase in Cycle 1 showed an initial response, while the additional 47-point increase in Cycle 2 indicated that the refined implementation crossed the 70% success criterion. The study does not decompose the gain by statistical mediation or by model component. Instead, the cycle comparison is interpreted together with the observed functioning of problem discussion and stay-stray information exchange.

The use of multiple observing teachers provided a stronger classroom record than a single teacher's retrospective impression, although formal inter-rater reliability coefficients were not documented. Credibility therefore rests on repeated observation across cycles, a predefined success criterion, and collaborative reflection by the teaching team. The article avoids converting these strengths into a stronger claim than the design permits: multiple observers improve the descriptive basis of the action research, but they do not create an experimental comparison.

The collaborative classroom action study involved 34 students in class XI IPS 4 at SMAN 5 Padang. Learning activity was observed before the intervention and across two action cycles using physical, mental, and emotional indicators. The analysis compared descriptive percentages across cycles with a 70% classroom success criterion and used observation records to interpret changes in participation. Because PBL and TSTS were introduced together and the design had no comparison class, the study cannot isolate the independent contribution of either component. The results are therefore interpreted as evidence of change associated with the combined classroom sequence in this setting.

The principal limitation is component confounding. PBL and TSTS were introduced as one sequence, so the study cannot determine whether the problem context, the structured exchange, or their interaction produced the observed change. The work was also conducted in a single class over a short period, and the outcome was learning activity rather than conceptual understanding of social integration. These boundaries should guide interpretation: the evidence supports the feasibility of the combined classroom design, not superiority over alternative models.

Results and Discussion

Pre-cycle activity indicated a participation problem

Initial observations showed low participation in task completion, questioning, responding, presenting, analysis, problem solving, attention, confidence, and appreciation of peers' ideas.

The pre-cycle profile showed a broad participation problem rather than a single weak behavior. Students were less active in completing tasks, asking and answering questions, presenting ideas, analysing problems, and responding to peers. This justified an intervention that changed both the intellectual demand of the task and the distribution of social roles within group work.

Cycle 1 produced an initial gain

The classroom records an increase of 19 percentage points after the first action cycle. Students worked with authentic social problems and then circulated information through Two Stay Two Stray, which distributed speaking and listening responsibilities across group members.

Cycle 1 produced an initial gain after students were asked to analyse social problems and exchange information through TSTS. The increase suggests that a clearer task purpose and more explicit speaking-listening responsibilities created additional opportunities for participation. The class had not yet reached the final pattern, indicating that students and teacher were still learning how to coordinate the combined procedure.

Cycle 2 produced a larger gain

The second cycle added a further 47 percentage-point increase according to the classroom records, producing a total increase of 66 percentage points from pre-action conditions. The final average crossed the 70% classroom success criterion.

The larger gain in Cycle 2 suggests that refinement and familiarity were important parts of the classroom-action process. By the second cycle, students had more experience with problem analysis, host and visitor roles, and the expectation that information gathered from other groups had to be brought back to the home group. Repeated practice may therefore have contributed alongside the instructional model itself.

The combined model redistributed classroom roles

PBL created a shared problem requiring analysis, while TSTS structured movement between groups and made every group responsible for both hosting and seeking information. This organization reduced the possibility that only one or two students would carry the group discussion.

The combined sequence redistributed classroom roles in a way that ordinary group discussion may not. PBL made each group responsible for interpreting a problem, while TSTS required members to become temporary representatives and information seekers. These complementary obligations reduced the opportunity for all communication to be carried by one dominant student and increased the visibility of individual contribution.

The intervention changed the organization of participation

Across the reported evidence, the most consistent change concerned how participation was organized around Problem-Based Learning combined with the Two Stay Two Stray cooperative method. Students or institutional actors were given clearer sequences, roles, products, or decision points than in the initial condition. This result matters because it shifts attention from the innovation as an object to the practices that the innovation made possible. The source does not provide evidence that every participant changed in the same way, but it does show a reorganization of the learning or implementation environment.

The observed gains remain specific to one class and a combined intervention. They do not show whether PBL alone, TSTS alone, repeated exposure, or teacher feedback would have produced a similar result. The study nevertheless identifies a plausible participation mechanism that can be examined more rigorously in future comparative research.

Observed improvement remained context dependent

The result is tied to a topic—social integration—that benefits from contrasting perspectives and discussing social problems. The stay-stray exchange gave students a reason to compare group explanations, while PBL supplied the substantive object of comparison. In a topic with less interpretive complexity, the same movement structure could become procedural rather than intellectual. The study therefore illustrates the importance of matching a cooperative routine to a disciplinary problem that genuinely rewards explanation, comparison, and revision of ideas.

Discussion

PBL and TSTS as complementary participation structures

The observed increase in learning activity is consistent with the idea that PBL and cooperative structures can increase opportunities for explanation and peer interaction, but the design does not permit attribution to one component independently. Meta-analytic work shows that PBL effects vary by implementation, discipline, and assessment type (Walker & Leary, 2009; Strobel & van Barneveld, 2009), while cooperative learning depends on accountability and positive interdependence rather than group seating alone (Kyndt et al., 2013; Slavin, 2014). The present findings are therefore best interpreted as evidence that a combined problem-and-exchange structure was workable in this sociology classroom. Teacher orchestration remained central, which is consistent with studies showing that collaborative learning can be weakened by uneven participation and unclear group processes (Le et al., 2018).

Physical, mental, and emotional dimensions of activity

A second issue concerns physical, mental, and emotional dimensions of activity. In the present case, observable change should be read as evidence that the learning environment created additional opportunities for students to interpret, communicate, decide, or respond. This is particularly important in subjects concerned with social phenomena, citizenship, history, values, or digital judgment, because disciplinary learning requires more

than completing a task. Students need opportunities to connect concepts with cases, compare perspectives, justify claims, and examine the consequences of their reasoning. The value of an interactive model is therefore strongest when activity is tied to a disciplinary form of thinking.

Sociology learning as collective problem interpretation

The third issue is sociology learning as collective problem interpretation. Teacher guidance remained necessary because the combined model contains two different instructional logics: PBL requires sustained inquiry into a problem, while TSTS requires students to communicate and exchange group reasoning. Without orchestration, either component can become procedural. PBL research notes that implementation quality depends on problem design, scaffolding, and facilitation (Hung, 2011; Yew & Goh, 2016), while cooperative-learning research identifies role clarity and accountability as essential for meaningful interaction (Gillies, 2016; Le et al., 2018). The teacher therefore functioned as a designer of inquiry and exchange, not as a passive observer of student-centered learning.

Limits of classroom action percentages and claims of effectiveness

Finally, limits of classroom action percentages and claims of effectiveness requires explicit attention. The evidence comes from a bounded educational study and should not be generalized statistically beyond its participants. Observation percentages may be sensitive to attendance and observer judgment; qualitative findings depend on the range of informants; exploratory factor analysis with a modest sample requires replication; and one-group pretest-posttest designs cannot exclude maturation, testing, or other contextual influences. These limitations do not make the findings useless. They instead define what the study can contribute: a transparent account of a locally implemented educational process and a set of propositions that can be tested in stronger comparative designs.

Implications for educational practice

For practice, the findings support using Problem-Based Learning combined with the Two Stay Two Stray cooperative method only when its structure is aligned with a clear learning problem. Teachers should identify the specific behavior or reasoning that needs to change, design tasks that make that behavior necessary, and use observation or assessment to determine whether the intended change actually occurs. Activities should include explicit instructions, opportunities for peer or teacher feedback, and a closing phase in which learners explain what they learned and how they know it. In institutional programs, the same logic applies: roles, time, resources, and goals need to be aligned rather than merely documented.

The combination of PBL and TSTS is pedagogically plausible because each addresses a different weakness of ordinary group work. PBL gives students a reason to investigate by organizing the lesson around a social problem; TSTS creates a structured moment in which groups must expose their reasoning to peers and bring new information back to the original team. This can support comparison of interpretations, but only if the exchange requires substantive explanation rather than copying answers. Social interdependence theory suggests that cooperation is most effective when group goals are connected to individual responsibility (Johnson & Johnson, 2009). Teachers can operationalize this by assigning rotating visitor and host roles, requiring each visitor to record one contrasting explanation, and asking the home group to revise its initial response after the exchange. Such procedures make the integration of the two models analytically meaningful.

A second implication concerns what should be measured. The present study reports increased learning activity, which is appropriate for classroom action research, but it does not isolate whether students improved because of the problem, the TSTS exchange, repeated practice, teacher feedback, or their combination. Meta-analyses show that PBL effects vary considerably across implementation types and outcomes (Walker & Leary, 2009; Strobel & van Barneveld, 2009). Future cycles could therefore separate process indicators—participation, questioning, peer explanation—from a product measure such as the quality of a sociological problem analysis. This would allow the teacher-researcher to determine whether more visible activity is accompanied by better use of concepts and evidence. The current conclusion remains appropriately bounded to the observed improvement in this class.

The combined design also raises a sequencing question. PBL requires enough time for students to understand the problem and develop an initial explanation before peer exchange becomes useful. If TSTS occurs too early, students may circulate incomplete ideas; if it occurs too late, exchange becomes an add-on rather than part of inquiry. Implementation research on PBL emphasizes the importance of problem design, scaffolding, and facilitation (Hung, 2011; Yew & Goh, 2016). In sociology, teachers can use a short concept check or preliminary written claim before the exchange, then use the returning visitors' information as a reason to revise that claim. This would allow future classroom-action cycles to measure not only whether activity increases, but whether peer exchange changes the quality of sociological explanation.

A useful way to refine the combined model is to make the information exchange accountable. During TSTS, visitors can easily become couriers who copy another group's answer rather than learners who compare explanations. Social interdependence theory and cooperative-learning research suggest that individual accountability is necessary if peer interaction is to contribute to learning (Johnson & Johnson, 2009; Slavin, 2014). One practical refinement is to require each visitor to record a contrasting interpretation or piece of evidence and then ask the home group to revise its original analysis. This transforms movement between groups into a comparison task. It also makes the relationship between the two models clearer: PBL produces a problem that needs interpretation, and TSTS creates a structured occasion for that interpretation to be challenged or extended.

The observation categories also suggest a way to strengthen future analysis. Physical, mental, and emotional activity were treated as parts of overall classroom participation, but these dimensions may respond differently to the intervention. Movement during TSTS can raise physical activity without necessarily improving analysis; conversely, a student may engage mentally while speaking less. Cooperative-learning research shows that the quality of peer interaction is more important than the mere frequency of contact (Gillies, 2016). A future observation instrument could therefore separate task movement, conceptual explanation, questioning, evidence use, and affective confidence. Such differentiation would help teachers determine which component of the hybrid model is working and which still requires redesign, making classroom action research more informative than a single aggregate activity percentage.

For classroom practice, the hybrid model is therefore best treated as a sequence rather than a label. The teacher first establishes a problem worth analysing, then supports an initial group explanation, organizes peer exchange, and finally requires groups to revise their reasoning. Each phase has a distinct purpose. Making those purposes explicit can prevent PBL from becoming a worksheet exercise and TSTS from becoming movement without intellectual exchange.

Implications for further research

Future classroom research should disentangle the two components through staged implementation or comparison conditions. One class could use PBL without TSTS, another could add the exchange structure, or action cycles could introduce components sequentially. Student-level records should track who explains, questions, and revises ideas, while short concept assessments could test whether increased activity is accompanied by stronger understanding of social integration. Video-supported observation could also clarify how physical movement, dialogue, and cognitive engagement interact during the stay-stray phase.

For classroom practice, the combined design is most defensible when the teacher makes the intellectual purpose of each movement explicit. Visiting students should carry a comparison question, hosts should explain reasoning rather than simply display an answer, and returning students should revise the home group's explanation using what they learned elsewhere. These small accountability routines help prevent TSTS from becoming movement without cognition. They also preserve the problem-based logic by ensuring that information exchange is used to improve an explanation of the social problem rather than to complete a procedural rotation.

Conclusion

This study examined how a PBL-TSTS sequence could improve observable student learning activity across classroom action cycles. The evidence indicates that Problem-Based Learning combined with the Two Stay Two Stray cooperative method was associated with a meaningful reorganization of the studied learning or implementation process. The most defensible contribution is not a universal claim of effectiveness, but a context-specific account of how tasks, roles, interaction, feedback, and reflection changed within SMAN 5 Padang.

The combined PBL-TSTS sequence was accompanied by a large increase in observed learning activity and reached the classroom success criterion in Cycle 2. The design appears useful because authentic social problems and structured information exchange placed more students in roles that required participation. Nevertheless, the study cannot identify the independent effect of either model or claim improved conceptual achievement without a direct measure. Its main contribution is a transparent account of how problem structure and cooperative role structure can be coordinated in secondary sociology.

Declarations

Author contribution

Author 1: developed the main research idea and objectives, designed the research methodology, conducted data collection and investigation, performed the data analysis, and prepared the first draft of the manuscript. Author 2: contributed to the development and implementation of the research methodology, supported the data collection and investigation process, and reviewed and revised the manuscript to improve its academic quality,

clarity, and structure, provided input into the research concept and direction, supervised and guided the overall research process, reviewed and improved the manuscript, and contributed to obtaining financial support or research funding

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Conflict of Interest

The authors declare that there is no conflict of interest related to the publication of this article.

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