



Peer Norms and Active Break Behaviour in University Learning Environments

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Abstract: University learning environments often involve prolonged sitting, sustained academic concentration, and limited opportunities for movement during lectures, seminars, and independent study. Active breaks provide a practical strategy for interrupting sedentary time, but students' participation may depend not only on personal attitudes but also on perceived peer norms and the social acceptability of movement within academic settings. This paper examines the relationship between peer norms and active break behaviour in university learning environments from an educational social psychology perspective. The conceptual framework integrates social-norm perspectives, social cognitive theory, self-determination theory, and research on sedentary behaviour and classroom movement interventions. Existing evidence indicates that university students spend substantial amounts of time sedentary, while classroom movement breaks may reduce sitting and fatigue and support perceived attention and focus. Because no original participant dataset was available, the manuscript adopts a simulation-based conceptual design. Illustrative active-break behaviour scores of 2.64, 3.58, and 4.41 represent weak, moderate, and strong perceived peer-norm conditions. A second simulated analysis assigns contribution indicators of 48% to peer norms, 41% to perceived social support, and 34% to classroom climate. These values are methodological illustrations rather than empirical estimates. The conceptual analysis suggests that students may be more willing to take active breaks when peers visibly participate, approve of movement, and treat it as a normal part of the learning environment. However, instructor attitudes, academic workload, time pressure, physical space, and confidence may also influence participation. Future research should use longitudinal or experimental designs,

objective movement measures, and clear distinctions between descriptive and injunctive norms.

Keywords: Peer Norms; Active Break Behaviour; University Students; Educational Social Psychology; Sedentary Behaviour; Classroom Movement; Physical Activity; Social Influence; Descriptive Norms; Injunctive Norms;

1. Introduction

Background

University students often spend long periods sitting while attending lectures, completing computer-based tasks, reading academic material, studying independently, and taking part in online learning. Sedentary behaviour is especially relevant in higher education because academic work usually requires sustained concentration while offering limited opportunities for movement.

Research shows that university students spend a large amount of time sedentary. A systematic review and meta-analysis reported around 7.29 hours of sedentary time per day based on self-reported measures. Studies using accelerometers reported even higher estimates, at around 9.82 hours per day. These findings show that prolonged sitting is common among university students, but they do not fully explain why students remain sedentary or why some students are more willing than others to interrupt long sitting periods.

Active breaks offer one practical way to address this issue. An active break is a short period of movement introduced during an otherwise sedentary learning or study session. Depending on the setting, this may involve light movement, walking, stretching, mobility exercises, or other brief forms of activity.

One advantage of active breaks is their practicality. Students do not necessarily need to leave the classroom or devote a long period to exercise. Research on movement breaks in university classrooms suggests that these interventions may reduce sedentary time and fatigue while supporting concentration, alertness, and enjoyment.

Participation in an active break, though, is not based only on personal choice. Students observe what their classmates do and receive social signals about what is normal, acceptable, or unusual in the learning environment.

If students regularly see classmates taking movement breaks, participation may feel like a normal part of academic activity. In contrast, if movement is viewed as distracting,

embarrassing, inappropriate, or inconsistent with serious study, students may avoid taking part even when they understand the possible benefits.

This is why peer norms matter. Social norms influence behaviour through perceptions of what other people do and what they approve or expect.

These processes are especially relevant in classrooms because students share the same physical or virtual learning environment. A student deciding whether to stand, stretch, walk briefly, or join a structured movement activity may consider personal motivation as well as how classmates are likely to respond.

Active break behaviour is therefore shaped by both individual and social influences. Factors such as self-efficacy, fatigue, workload, time pressure, perceived benefits, and personal attitudes may affect participation. Peer behaviour and perceived social expectations may then influence whether those personal intentions translate into action.

A fuller explanation of active break behaviour therefore requires both behavioural and social-psychological perspectives.

The wider educational environment may also strengthen or weaken peer norms. Instructor behaviour may signal whether movement is compatible with academic engagement. Classroom design may determine whether movement is practical. Scheduling may make active breaks predictable. Assessment pressure may make students feel that stepping away from study carries a cost.

Peer norms should therefore be understood as part of a broader classroom and organizational environment rather than as an isolated influence.

Research on university classroom movement interventions provides useful support for this perspective. Lynch and colleagues reviewed 14 studies involving nearly 6,000 university students. Their findings suggested that classroom movement breaks and physically active learning were feasible in tertiary education and were associated with higher physical activity, lower sedentary behaviour, improved well-being, reduced fatigue, and greater focus and attention.

At the same time, the review reported poor average methodological quality across the included studies. This means the findings are promising, but stronger research designs are still needed.

Problem Statement

The central problem addressed in this paper is that active break behaviour is often treated

mainly as an individual decision, even though students make this decision within highly social learning environments.

A student may understand the value of movement but still remain seated if classmates do not participate or if the student expects negative social judgment. In contrast, a student with only moderate personal motivation may join an active break when movement is already viewed as normal and acceptable within the classroom.

A second problem concerns the distinction between descriptive peer norms and injunctive peer norms.

Descriptive norms refer to perceptions of what peers commonly do.

Injunctive norms refer to perceptions of what peers approve or disapprove.

These two forms of social influence may operate differently.

For example, students may observe that few classmates take active breaks and conclude that such behaviour is uncommon. At the same time, they may still believe that classmates would support active breaks if they were encouraged.

Measuring only one type of norm may therefore provide an incomplete explanation of active break behaviour.

A third problem concerns the academic implications of prolonged sedentary behaviour.

Research examining physical activity, sedentary behaviour, and educational outcomes among university students has produced mixed results. A systematic review of 35 studies found inconsistent relationships and also identified substantial methodological weaknesses, including heavy reliance on self-reported measures.

For this reason, claims that active breaks automatically improve academic performance should be treated cautiously.

A fourth problem concerns the social acceptability of movement during academic activities.

Even when active breaks are formally introduced, students may interpret them differently depending on classroom culture. Some students may view them as helpful interruptions of prolonged sitting. Others may see them as distracting, unnecessary, or uncomfortable.

Peer norms may shape these interpretations by signalling whether participation is ordinary and socially accepted within the group.

The central research problem is therefore concerned with understanding how peer-based social information shapes students' willingness to take active breaks while remaining engaged in university learning activities.

Research Motivation

The first motivation for this research comes from growing evidence that university students spend substantial amounts of time sedentary and that classroom movement interventions offer a practical way to interrupt prolonged sitting.

Research on university-based movement breaks suggests that brief classroom interventions are feasible and may reduce sedentary time while supporting concentration, alertness, and enjoyment.

The key unanswered question is how the social environment influences students' willingness to participate.

A second motivation concerns the importance of social norms in health behaviour.

Students do not make behavioural decisions separately from their social surroundings. Their perceptions of what classmates do and approve may influence both their intentions and their later behaviour.

Recent research examining sedentary behaviour among university students has also considered peer influence and social norms, which supports the relevance of social processes in decisions about taking breaks.

A third motivation concerns educational practice.

Active breaks are unlikely to become sustainable if they are treated as isolated health activities with little connection to normal classroom culture.

Understanding peer norms may help educators decide whether active-break programs should emphasize collective participation, peer modelling, normalization of movement, or stronger instructor involvement.

A fourth motivation is theoretical.

Bringing together social norms, physical-activity research, and educational psychology provides a broader explanation of active break behaviour than approaches based only on individual motivation.

This perspective may also help explain why similar active-break interventions produce different participation levels across different university classes.

2. Literature Review

Sedentary Behaviour in University Students

Sedentary behaviour has become an important concern in higher education because university

students spend large amounts of time in lectures, studying, completing computer-based academic work, and using screens during both academic and leisure activities.

Castro et al. conducted a systematic review and meta-analysis involving 125 studies and found that university students accumulated substantial sedentary time. Estimates varied depending on how sedentary behaviour was measured. The review found that 84% of the included studies were cross-sectional. Self-reported sedentary time averaged about 7.29 hours per day, while accelerometer-based estimates were higher.

These findings show that sedentary behaviour is a regular part of university life rather than an occasional issue. Academic routines themselves often create long periods of sitting. The concern is therefore not limited to whether students are physically active outside university. It also involves how sedentary periods are distributed throughout the academic day.

Babaeer and colleagues examined the relationship between physical activity, sedentary behaviour, and educational outcomes among university students. Their systematic review included 35 studies and found mixed evidence regarding educational outcomes. Many of the studies relied on self-reported measures and had methodological weaknesses.

This means that claims linking movement directly with improved academic performance should be interpreted carefully. Reducing unnecessary sedentary time remains important, but active-break research should examine behavioural and educational outcomes separately rather than assuming that less sitting automatically improves academic achievement.

Classroom Movement Breaks

Classroom movement breaks are designed to interrupt long periods of sitting through short episodes of physical activity. Their practical value is especially relevant in higher education because they can be included within existing classes without requiring major changes to the curriculum.

Lynch et al. systematically reviewed classroom movement breaks and physically active learning among university students. Fourteen studies involving 5,997 participants met the inclusion criteria. The review found that movement breaks and physically active learning were feasible in tertiary education and were associated with greater physical activity, lower sedentary behaviour, improved well-being, and reduced fatigue. Classroom movement breaks were also linked with higher perceived focus and attention.

A mixed-methods feasibility study involving university students and tutors examined movement breaks lasting between five and ten minutes during two-hour classes. Students in

classes that included movement breaks spent less time sitting, recorded more steps, and reported greater concentration, alertness, and enjoyment compared with classes without movement breaks.

The study also showed that timing matters. Movement breaks need to occur at points where they support students without unnecessarily disrupting academic activity.

These findings suggest that active breaks are practical within university teaching, but successful implementation depends on how they are designed. Poor timing or disruption may reduce students' willingness to participate. Peer norms and classroom culture may therefore interact with practical design features.

Social Norms and Behaviour

Social norms provide information about what behaviour is considered common or acceptable within a group.

The distinction between descriptive and injunctive norms is especially useful for understanding active break behaviour.

Descriptive norms refer to what people believe others commonly do.

Injunctive norms refer to what people believe others approve, support, or expect.

In a university classroom, descriptive norms may be communicated through visible behaviour. When students see several classmates standing, stretching, or joining a movement break, participation may start to feel normal. If most students remain seated, nonparticipation may instead become the expected pattern.

Injunctive norms work differently.

A student may believe that classmates support active breaks even when few students participate. In another situation, students may observe participation but still believe that their peers consider the activity unnecessary or awkward.

Active break behaviour may therefore depend on both what students observe and what they believe others approve.

Recent research on sedentary-behaviour reduction among university students provides direct support for this distinction. A two-week health campaign field experiment examined message framing, peer influence, descriptive norms, injunctive norms, and self-efficacy in relation to intentions to take breaks and achieve daily step goals.

The study found that injunctive norms were associated with students' attitudes and intentions toward taking breaks.

This evidence supports the view that active break behaviour should be examined through social-psychological processes rather than only through individual health beliefs.

Peer Modelling

Peer modelling is closely connected with social norms but focuses more specifically on learning through observation.

Students may learn how to behave by watching classmates participate in an activity and noticing whether that behaviour appears comfortable, accepted, and socially safe.

Social cognitive theory suggests that behaviour is influenced by observational learning, self-efficacy, expected outcomes, and environmental conditions.

In the context of active breaks, a student may observe classmates taking part without embarrassment or negative reactions. This may make participation seem both practical and socially acceptable.

Peer modelling may also reduce uncertainty.

Students who are unfamiliar with active breaks may initially be unsure about what to do, when to join, or whether participation is appropriate. Watching classmates participate provides useful behavioural information and reduces this uncertainty.

Peer modelling may also work in the opposite direction.

If students repeatedly see classmates ignore movement opportunities, remaining seated may become the dominant behavioural pattern. Peer influence does not automatically increase activity. Its effect depends on the behaviour students observe and how they interpret it.

Social Support and Active Behaviour

Social support may encourage health-related behaviour through encouragement, practical assistance, information, and social reinforcement.

Within university settings, peers may support active break participation by initiating movement, inviting classmates to join, or treating movement as a shared group activity rather than an individual choice.

Social support differs from social norms.

Support involves direct encouragement or assistance.

Norms communicate what behaviour is common or socially approved.

The two processes may still reinforce each other. Supportive peers may make participation feel more legitimate, while strong norms may make encouragement more likely.

Research on peer influence and sedentary behaviour supports this interaction. Experimental work with university students found that peer influence interacted with message framing and that social norms were associated with attitudes and intentions toward behaviour change.

This suggests that social information may influence behaviour partly by shaping students' attitudes, expectations, and confidence.

Learning Environment and Classroom Climate

Classroom climate influences whether students view movement as compatible with academic activity.

An instructor who introduces an active break as a planned part of the lesson communicates a different message from an instructor who treats movement as a distraction.

Classroom climate also affects psychological safety.

Students may hesitate to participate in visible movement when they fear looking unserious, disruptive, or physically awkward. This concern may be stronger when students do not know one another well or when classroom culture strongly emphasizes silence and passive attention.

Active breaks may feel more acceptable when participation is organized collectively.

When an instructor invites the whole class to participate, individual students may feel less exposed than when movement is optional and highly visible.

The feasibility study by Lynch et al. also showed that students considered timing important. Participants wanted movement breaks to provide benefits without interfering excessively with academic activity.

This finding highlights the interaction between intervention design and classroom culture.

Self-Determination and Behavioural Regulation

Self-determination theory distinguishes between different forms of behavioural regulation and emphasizes the importance of autonomy, competence, and relatedness.

Active break participation may be more sustainable when students see movement as personally meaningful rather than as a requirement imposed on them.

Autonomy matters because students may resist active breaks if they feel forced to participate. Competence matters because students need to feel comfortable and capable of completing the activity.

Relatedness is especially relevant because active breaks take place within peer groups.

When movement feels socially accepted and shared with others, relatedness may strengthen participation. In contrast, if active breaks produce embarrassment, isolation, or discomfort, students may respond negatively.

The social environment therefore influences whether active breaks are experienced as meaningful and voluntary or as externally imposed interruptions.

3. Research Gap

Existing research clearly shows that university students spend substantial amounts of time sedentary and that classroom movement breaks are feasible.

The review by Lynch et al. found evidence that classroom movement breaks may increase physical activity, reduce sedentary behaviour and fatigue, and improve focus and attention.

Even so, most intervention research has focused on whether movement breaks produce outcomes rather than on how students' perceptions of their peers influence participation.

A second gap concerns the difference between providing an active-break opportunity and students actually taking part.

Making movement available does not guarantee participation. Students' behaviour may depend on motivation, social acceptability, perceived expectations, and the practical conditions of the classroom.

A third gap concerns the distinction between descriptive and injunctive peer norms.

Existing behavioural research shows that social norms are relevant to sedentary-behaviour intentions, including intentions to take breaks. More research is still needed to determine whether perceptions of peer behaviour and peer approval are related to actual active-break participation.

A fourth gap concerns differences between classrooms.

Different classes within the same university may develop different behavioural cultures. One class may treat movement as normal, while another may view it as unusual or distracting.

This variation suggests that the classroom should be treated as a social environment rather than simply as a physical location.

A fifth gap concerns the lack of longitudinal evidence.

Active break participation may initially be influenced by novelty and later become habitual if students begin to view it as a normal part of learning. In other cases, early discomfort or resistance may lead to continued nonparticipation.

Repeated measurement is therefore needed to understand how peer norms and active break behaviour change over time.

The principal research gap is the limited integration of peer norms, classroom climate, social support, and active break behaviour within a single educational social-psychological framework.

4. Novelty / Proposed Contribution

The proposed contribution is a Peer-Norm Activation Model of Active Break Behaviour for university learning environments.

The model presents active-break participation as a socially situated behaviour:

Peer Behaviour → Perceived Descriptive Norm → Perceived Social Acceptability → Active Break Participation

A second pathway focuses on peer approval:

Peer Approval → Injunctive Norm → Behavioural Intention → Active Break Participation

Both pathways operate within the wider classroom environment:

Instructor Climate + Physical Environment + Academic Workload + Peer Norms → Active Break Behaviour

The framework does not suggest that peer norms determine behaviour on their own. Instead, peer norms are treated as one part of a wider system that includes classroom conditions, workload, instructor behaviour, and students' own perceptions.

The model also proposes that peer norms may work differently depending on whether students view movement as compatible with academic activity.

When movement is seen as a normal and legitimate part of learning, stronger peer norms may encourage participation.

When movement is viewed as distracting or inappropriate, peer norms may strengthen nonparticipation.

The novelty of the framework therefore lies in treating peer norms as context-sensitive social information rather than assuming that stronger peer influence always produces more active behaviour.

5. Research Objectives / Research Questions

The primary objective of the study is to examine how perceived peer norms may influence active break behaviour within university learning environments. The framework also aims to

distinguish descriptive peer norms from injunctive norms and examine how both interact with classroom climate, social support, and individual behavioural regulation.

A secondary objective is to provide a foundation for future empirical research using longitudinal behavioural measures rather than relying only on self-reported intentions.

Research Objectives

- To examine the relationship between perceived peer norms and active break behaviour among university students.
- To distinguish descriptive peer norms from injunctive peer norms within classroom environments.
- To examine the relationship between peer modelling and students' willingness to participate in active breaks.
- To examine perceived social support as a potential contributor to active break participation.
- To assess the role of classroom climate in shaping the social acceptability of movement.
- To examine whether perceived peer norms influence behavioural intentions concerning active breaks.
- To develop a conceptual model linking social norms with active break participation in university learning environments.

Research Questions

1. How do perceived peer norms relate to active break behaviour among university students?
2. How do descriptive and injunctive norms differ in their relationship with active break participation?
3. How may peer modelling influence students' willingness to participate in active breaks?
4. What role does perceived peer support play in active break behaviour?
5. How does classroom climate influence the social acceptability of movement?
6. How may academic workload modify the relationship between peer norms and active break behaviour?
7. How does instructor behaviour interact with peer norms?
8. Can perceived social acceptability explain the relationship between peer norms and active break participation?
9. How might peer norms change as active breaks become established within a class?

6. Methodology

Research Design

The present paper uses a simulation-based conceptual research design. The purpose is to illustrate a theoretically plausible relationship between peer norms, classroom social processes, and active break behaviour without presenting the work as a completed empirical study.

The conceptual framework draws on established behavioural theories and published research on sedentary behaviour, classroom movement breaks, peer influence, and university learning environments.

Peer norms sit at the centre of the proposed framework, but they are not treated as the only influence on behaviour. Descriptive norms, injunctive norms, peer modelling, social support, classroom climate, instructor behaviour, and academic workload are all considered relevant factors.

The simulated values are used only to show how these relationships might appear in a future empirical study. They do not support causal conclusions.

Dataset / Sample

No original participant dataset was supplied or analyzed.

A future empirical study should recruit university students enrolled in courses with regular classroom or lecture-based teaching.

Participants should be drawn from multiple classes so that differences in peer norms across classroom settings can be examined.

A longitudinal sample would be especially useful because active break behaviour may change as students become more familiar with movement routines over time.

Researchers should also collect relevant background information, such as age, academic level, course type, study habits, previous physical-activity behaviour, and classroom attendance where appropriate.

Class-level information should be recorded as well because peer norms are shaped by the social context of each classroom.

Tools / Techniques

A future empirical study should measure perceived descriptive norms by asking students how often they believe their classmates take active breaks.

Injunctive norms should be measured separately by assessing whether students believe their peers approve of taking movement breaks.

Peer modelling may be assessed through students' observations of classmates participating in active breaks.

Perceived social support should capture encouragement, companionship, and practical support related to movement.

Classroom climate should assess whether students view movement as compatible with academic work.

Active break behaviour should ideally be measured through direct observation, participation records, accelerometers, wearable activity monitors, or structured behavioural logs rather than through self-report alone.

Behavioural intention may be included as a secondary psychological outcome.

Self-efficacy and perceived autonomy may also be included as individual-level covariates.

Experimental Procedure

The present paper does not report an experiment involving human participants.

A future experimental study could compare classes that use structured active breaks with classes that continue with usual teaching routines.

Peer norms should be measured before the intervention so researchers can examine whether students' initial perceptions predict later participation.

During the intervention, active break participation should be recorded objectively. Researchers could document how many students participate, how long they move, and when the breaks occur.

Repeated assessments could then examine whether students' perceptions of peer norms change after several sessions.

Qualitative interviews or focus groups could also be used to explore why students choose to participate or avoid participation.

A mixed-methods approach would help separate behavioural frequency from the social meaning students attach to active breaks.

Evaluation Metrics

The primary behavioural outcome should be active break participation rate.

Secondary outcomes should include active-break duration, movement intensity, reduction in sedentary time, perceived concentration, alertness, classroom engagement, and intention to participate in future breaks.

The primary social predictor should be perceived peer norms.

Descriptive and injunctive norms should be scored separately.

Peer support and classroom climate should be included as additional explanatory variables.

For longitudinal empirical research, mixed-effects models would be suitable when students are nested within classes.

Mediation analysis could examine whether perceived social acceptability or behavioural intention helps explain the relationship between peer norms and active break participation.

Where objective participation or movement data are available, self-report measures should be used as supporting measures rather than as the only source of behavioural evidence.

7. Results

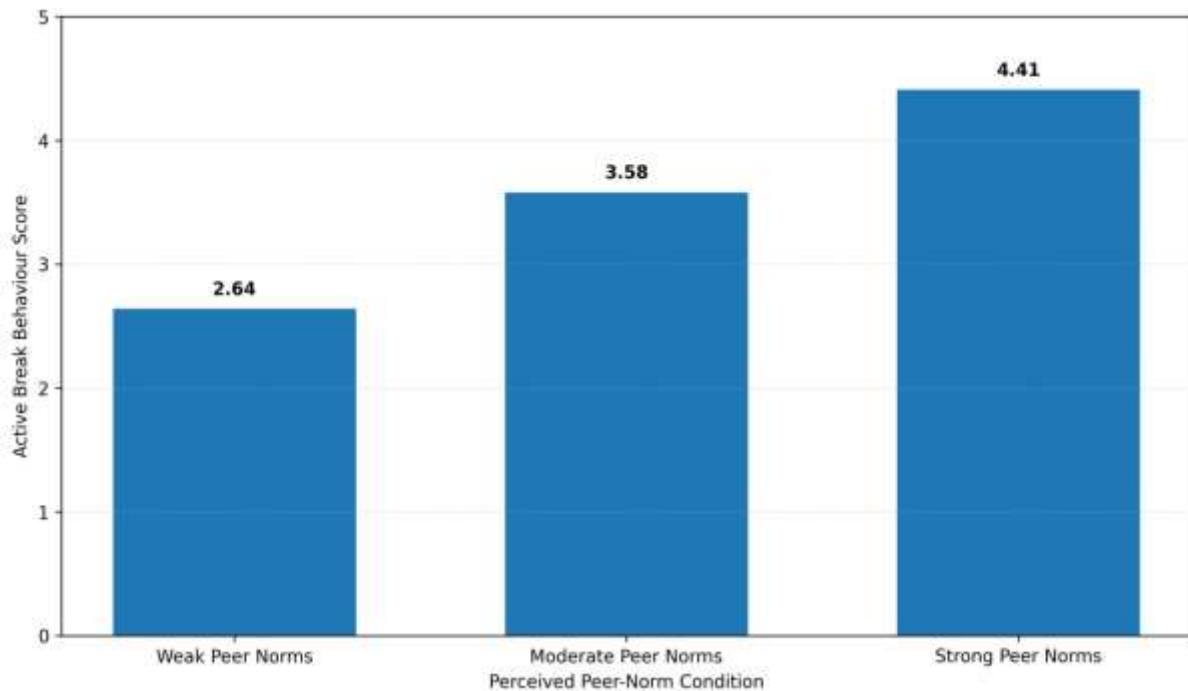
Table 1. Illustrative Active Break Behaviour across Peer-Norm Conditions

Perceived Peer-Norm Condition	Illustrative Active Break Behaviour Score
Weak Peer Norms	2.64
Moderate Peer Norms	3.58
Strong Peer Norms	4.41

The illustrative values show a gradual increase in active break behaviour as perceived peer norms become stronger. The score rises from 2.64 under weak peer norms to 3.58 under moderate peer norms and 4.41 under strong peer norms.

This pattern represents a hypothetical positive relationship between peer norms and active break behaviour. In practical terms, students may be more willing to participate in movement breaks when they perceive that classmates also participate and view such behaviour as socially acceptable.

The values are included only to illustrate the proposed conceptual relationship. They do not represent empirical findings, observed effects, or causal estimates.

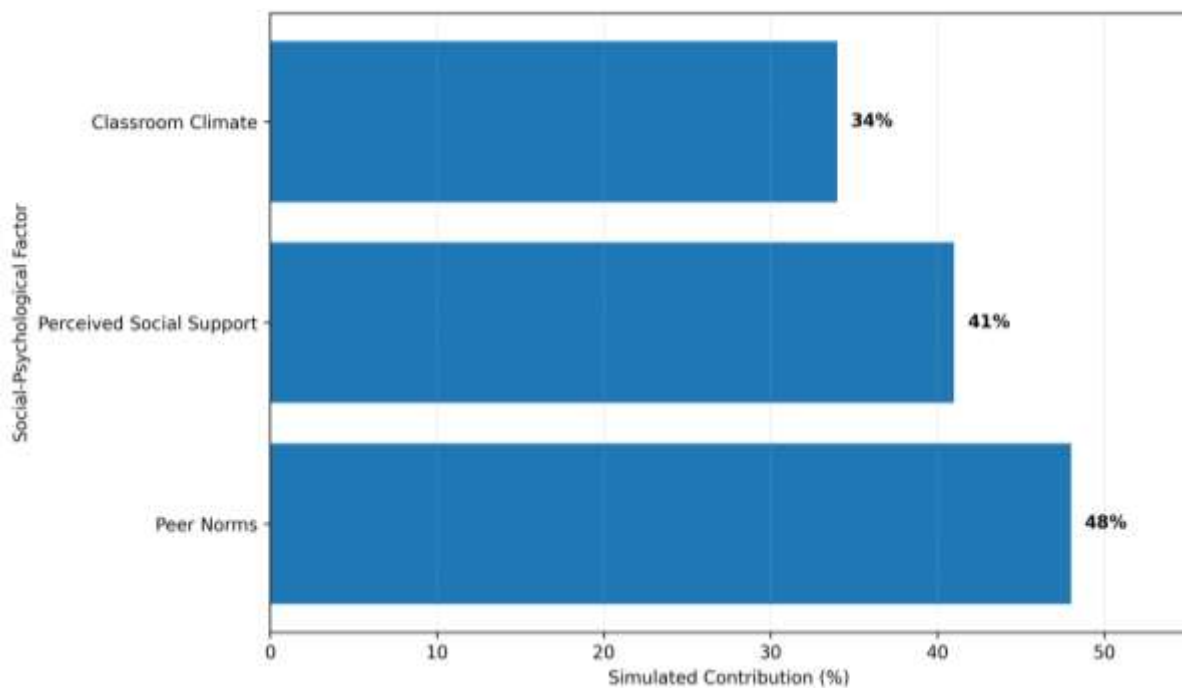
Graph 1. Illustrative Active Break Behaviour Across Peer-Norm Conditions

The graph presents an illustrative increase in active break behaviour as perceived peer norms become stronger. The values are simulated and are not empirical estimates.

Table 2. Illustrative Social Factors Associated with Active Break Behaviour

Social-Psychological Factor	Simulated Contribution (%)
Peer Norms	48
Perceived Social Support	41
Classroom Climate	34

These values are independent illustrative indicators and do not represent regression coefficients, explained variance, causal contributions, or percentages that sum to 100%.

Graph 2. Illustrative Social Factors Associated with Active Break Behaviour

The graph provides a visual comparison of the three simulated social factors included in the conceptual analysis.

Statistical / Experimental Findings

Because no empirical participant dataset was available, no inferential statistical testing was conducted.

The simulated active-break behaviour score increases from 2.64 under weak peer norms to 3.58 under moderate peer norms and 4.41 under strong peer norms.

The illustrative difference between the weak and strong peer-norm conditions is 1.77 score points.

The second simulated analysis assigns values of 48% to peer norms, 41% to perceived social support, and 34% to classroom climate.

These figures are included only for illustration. They should not be interpreted as empirical effects, statistical estimates, regression coefficients, or causal contributions.

The purpose of the simulated analysis is to show how a future empirical study might examine differences in active break behaviour across varying peer-norm conditions.

8. Discussion / Critical Discussion

Results Interpretation

The simulated pattern illustrates a possible positive relationship between perceived peer norms and active break behaviour. The score increases from 2.64 under weak peer norms to 4.41 under strong peer norms. Although these values do not represent empirical findings, they provide a clear conceptual example of how peer influence might shape participation.

One possible explanation is reduced uncertainty about appropriate classroom behaviour. Students who are unfamiliar with active breaks may initially be unsure whether movement is expected, acceptable, or socially comfortable. When several classmates participate, this uncertainty may decrease because the behaviour becomes more visible and normal within the class.

A second explanation involves social acceptability. Students may feel more comfortable engaging in visible movement when they believe classmates will view participation as ordinary rather than distracting or inappropriate. This may be especially important in classrooms where students are usually expected to remain seated and quiet.

A third mechanism involves repeated behavioural reinforcement. When students regularly observe classmates participating in active breaks, movement may gradually become part of the normal classroom routine. Over time, participation may require less conscious decision-making because students become familiar with the practice.

The simulated pattern should still be interpreted carefully. Strong peer norms do not always encourage movement. If the dominant classroom norm is to remain seated, peer influence may reinforce nonparticipation instead. The direction of social influence therefore depends on the behaviour that students perceive as normal.

Comparison with Previous Studies

The conceptual findings are consistent with research showing that university students experience substantial sedentary exposure. Castro et al. reported high levels of sedentary time across a large body of research involving university students. This highlights the importance of practical strategies that interrupt prolonged sitting.

The framework is also consistent with research on classroom movement breaks. Lynch et al. found that movement breaks and physically active learning were feasible in tertiary education and were associated with increased physical activity and reduced sedentary behaviour.

A mixed-methods feasibility study also showed that movement breaks reduced sitting time, increased steps, and were associated with higher reported concentration, alertness, and

enjoyment. The present framework extends this work by focusing on the social conditions that may affect whether students choose to participate.

The relationship between peer norms and active-break intentions is especially relevant. Recent research examining peer influence, descriptive norms, injunctive norms, message framing, and self-efficacy found that injunctive norms were associated with attitudes and intentions related to taking breaks. This supports the inclusion of social norms within research on sedentary-behaviour interventions.

At the same time, the framework does not assume that active breaks automatically improve academic performance. Research examining physical activity, sedentary behaviour, and educational outcomes among university students has produced mixed findings and has identified methodological weaknesses. Claims about direct academic benefits should therefore remain cautious.

Why Results May Differ

Future empirical findings may differ because university classrooms vary considerably in their social and physical characteristics.

The first source of variation is classroom culture. Some classes encourage informal interaction and active participation, while others place greater emphasis on quiet, structured learning.

The second source is instructor behaviour. An instructor who openly supports movement may reduce students' concerns about whether participation is appropriate.

The third is peer composition. Students who already know one another may respond differently from students in classes where most classmates are unfamiliar.

The fourth is academic workload. During examinations or demanding academic sessions, students may view active breaks as interruptions even when peer norms are supportive.

The fifth is physical space. Crowded classrooms may make movement difficult or uncomfortable.

The sixth is student self-efficacy. Students who feel socially and physically confident may be more willing to participate.

The seventh is previous experience. Students who have taken part in active breaks before may require less reassurance from peers.

The eighth is intervention design. A short stretching activity may be received differently from a longer or more physically demanding movement session.

The ninth is timing. Previous feasibility research has shown that the timing of movement breaks matters because students want benefits without unnecessary disruption to learning.

The tenth is perceived academic compatibility. Students may be more willing to move when they believe active breaks fit naturally within learning rather than competing with academic work.

9. Research Contribution / Implications

The principal contribution of this paper is the integration of social norms into the study of active break behaviour within university learning environments.

Existing research has already shown that students experience high levels of sedentary behaviour and that classroom movement interventions are feasible. The present framework adds a social-psychological perspective by proposing that students' perceptions of peer behaviour and peer approval may influence whether movement opportunities lead to actual participation.

A second contribution is the distinction between descriptive and injunctive norms.

This distinction matters because students may observe one behavioural pattern while perceiving a different level of social approval. Separating these two forms of norms allows future research to examine whether active-break participation is shaped more strongly by what students believe their peers do or by what they believe their peers support.

A third contribution concerns classroom-level analysis.

Peer norms are shaped by the social environment, so active break behaviour should not be examined only at the individual level. Students within the same class may develop shared expectations about movement, participation, and academic behaviour. This makes multilevel research particularly relevant.

A fourth contribution concerns intervention design.

If future research confirms that peer norms influence participation, active-break interventions may benefit from collective participation, peer modelling, and visible normalization rather than placing responsibility entirely on individual students.

Practical Implications

- **Normalize movement:** Educators should present brief movement as a legitimate part of the learning environment rather than as an interruption.
- **Use collective participation:** Group-based movement may reduce the social exposure students feel when participating individually.

- **Communicate expectations clearly:** Students should understand whether movement is encouraged and how active breaks fit within the academic session.
- **Consider timing:** Breaks should be introduced at points that reduce disruption to teaching and learning.
- **Strengthen peer support:** Students should have opportunities to participate together rather than relying on individuals to initiate movement.
- **Monitor classroom response:** Educators should assess whether students experience active breaks as helpful, neutral, or disruptive.
- **Separate participation from academic evaluation:** Students should not feel pressured, embarrassed, or academically judged based on whether they participate.
- **Adapt to classroom space:** Movement activities should match the physical constraints of the learning environment.
- **Use objective evaluation:** Future interventions should measure actual movement and sedentary time instead of relying only on reported intentions.
- **Evaluate sustainability:** Researchers should examine whether active break participation continues after the novelty of the intervention has declined.

10. Conclusion

Peer norms may represent an important social mechanism influencing active break behaviour within university learning environments.

Students' decisions to interrupt prolonged sitting are shaped not only by personal attitudes and perceived health benefits but also by beliefs about what classmates commonly do and what they view as acceptable.

The classroom therefore provides an important social context for understanding movement behaviour.

The conceptual framework proposes that descriptive norms, injunctive norms, peer modelling, social support, and classroom climate may influence active-break participation through perceived social acceptability and behavioural intention.

These social processes may operate alongside individual factors such as self-efficacy, autonomy, motivation, workload, and previous physical-activity experience.

The illustrative results show a hypothetical increase in active break behaviour from 2.64 under weak peer norms to 3.58 under moderate peer norms and 4.41 under strong peer norms. These values are simulated and should not be interpreted as empirical findings.

The second set of simulated values also presents peer norms, perceived social support, and classroom climate as potentially relevant social factors. These figures are methodological illustrations and do not represent causal contributions or statistical estimates.

Existing research supports the importance of the broader issue. University students spend substantial amounts of time sedentary, while studies of classroom movement breaks suggest that brief movement interventions may reduce sitting and support attention, alertness, well-being, and classroom experience.

Research on peer influence and social norms also suggests that social information is relevant to students' intentions to reduce sedentary behaviour.

The broader implication is that active breaks should be understood as socially situated educational practices rather than only as individual health behaviours.

Their success may depend partly on whether students experience movement as normal, acceptable, supported by peers, and compatible with learning.

Future empirical research should therefore combine objective behavioural measures with repeated assessments of peer norms, classroom climate, and social support.

11. Limitations

The main limitation of this manuscript is the absence of an original empirical dataset.

The numerical values included in the Results section are simulated only for methodological illustration. They do not establish statistical significance, causal relationships, or population-level effects.

A second limitation concerns the conceptual overlap among peer norms, peer modelling, social support, classroom climate, and social acceptability. These constructs may be closely related in empirical settings, so future research should use careful measurement and test whether the concepts remain meaningfully distinct.

A third limitation concerns the diversity of university learning environments. Lecture halls, seminars, laboratories, online classes, and blended learning settings may develop different behavioural expectations. Findings from one setting should not automatically be applied to another.

A fourth limitation concerns self-report bias. Students may overestimate their level of movement or report stronger acceptance of active breaks than their behaviour demonstrates.

A fifth limitation involves the difference between intention and behaviour. Students may express positive attitudes toward active breaks without consistently participating.

A sixth limitation concerns instructor influence. Peer norms may appear important even when classroom behaviour is strongly shaped by instructor expectations and teaching structure.

A seventh limitation concerns academic workload. Students may respond differently during routine teaching periods and examination-intensive periods.

An eighth limitation concerns physical space. The practicality of active breaks may differ considerably between crowded and spacious classrooms.

A ninth limitation concerns peer-network structure. Students with strong social relationships may respond differently from students who feel isolated or are newly enrolled.

A tenth limitation concerns the simulated quantitative illustration. The reported values cannot be used to estimate actual behavioural relationships or the effectiveness of active-break interventions.

12. Future Work

Future research should use longitudinal designs to examine whether perceived peer norms predict active-break behaviour over time.

Baseline measures could be collected before an intervention, followed by repeated assessments after several sessions. This would help determine whether changes in perceived norms occur alongside changes in participation.

Objective behavioural measurement should receive greater emphasis.

Accelerometers, wearable activity monitors, structured observations, or digital participation records would provide stronger evidence of actual movement than self-report alone.

Future studies should measure descriptive and injunctive norms separately.

This distinction would help determine whether students respond more strongly to what classmates appear to do or to what they believe classmates approve.

Multilevel modelling should also be considered because students are grouped within classes. Classroom-level norms may influence individual behaviour beyond students' personal attitudes.

Experimental studies could ethically manipulate normative information by presenting accurate information about peer participation or approval.

Such research could test whether changes in perceived norms influence later behaviour without misrepresenting what peers actually do.

The role of instructors should also be examined systematically.

Researchers could compare instructor-led, peer-led, and self-directed approaches to introducing active breaks.

Future studies should examine whether participation remains stable over time.

Behaviour adopted because of novelty may decline after several weeks, while behaviour that becomes socially normalized may become more consistent.

Qualitative research could provide further insight into students' decisions.

Interviews or focus groups could explore embarrassment, social approval, academic pressure, perceived disruption, and perceived benefits.

Research should also examine learning-related outcomes separately from sedentary behaviour.

Existing evidence regarding educational outcomes remains mixed, so stronger study designs are needed before firm conclusions are drawn.

Cross-cultural research would also help determine whether peer norms operate similarly across educational systems with different classroom expectations and social conventions.

Finally, future intervention research should treat active breaks as one part of broader classroom health promotion rather than as isolated behavioural events.

This approach would allow researchers to examine how social norms, teaching practices, classroom design, and student motivation work together to shape sustainable movement behaviour.

13. Declarations

Conflict of Interest

The author declares no conflict of interest related to this manuscript.

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No external funding was received for preparation of this simulation-based conceptual manuscript.

Ethics Statement

This manuscript does not report original research involving human participants. The numerical values presented in the Results section are simulated illustrative values.

Any future empirical study involving university students should obtain institutional ethics approval where applicable and follow appropriate procedures for informed consent, confidentiality, privacy, and participant protection.

Data Availability

No empirical participant dataset was generated or analyzed for this manuscript. The quantitative values presented in the Results section are simulated solely for methodological illustration.

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