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How are Self-Selected Groups Formed in University Classrooms: A Social Exchange Theory Perspective Based on Evidence from Chinese Universities

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Abstract

While student self-selection is a prevalent method for forming cooperative learning groups in higher education, the underlying decision-making processes, particularly in non-Western contexts, remain underexplored. Based on in-depth interviews with 20 college students from different universities and disciplines, we revealed how self-selected groups are formed in Chinese university classrooms. Taking the social exchange theory as the analytical framework, it systematically explored the formation motivations, type characteristics and internal mechanisms of self-selected groups in course learning. The research finds that self-selected grouping can be divided into three major categories: convenience-based, utilitarian and free-riding, among which convenience-based type is the main grouping method. Furthermore, the three types are not isolated but dynamically adjust and present integrated features in accordance with the type of course and individual circumstances. The convenience-based grouping focuses on minimizing interaction costs and maximizing the convenience of interpersonal communication, aiming for low transaction costs and high emotional returns, as well as low integration costs and emotional security. The utilitarian-based grouping focuses on maximizing instrumental returns and practical goals, and is further divided into symbolic returns (high-score-oriented type) that pursue high-score-oriented acquisition of scarce academic resources and process-based gains from optimizing the collaboration process (complementary advantage type). The free-riding grouping is manifested as an imbalanced exchange system in social exchange, including strategic avoidance of input through active free-riding (with higher expected returns than personal investment) and passive free-riding due to structural constraints (forced to accept low-cost returns due to unequal exchange power). In this paper, we conducted a systematic study on the “passive free-riding” grouping, a type often overlooked. It depicts the behavioral dilemma of individuals who lose the opportunity to participate and are passively marginalized under the dual constraints of resource endowment and environmental division of labor, providing a new perspective for understanding the unequal exchange relationships in course learning groups.The Chinese students continuously weigh cost and benefit in group decision-making to achieve maximum benefit. This study reveals the rational exchange motives and formation logic of self-selected groups, making up for the limitation of insufficient attention to the group decision-making process in existing studies. This study illuminates the micro-level decision-making in group formation, offering a framework for educators to better guide cooperative learning and providing crucial empirical insights from a non-Western educational context to the broader literature on group dynamics.

Keywords: Chinese college students, self-selected groups, cooperative learning, group formation, social exchange theory

Introduction

In the context of the transformation of global higher education towards a student-centered model, cooperative learning is not only a teaching technique, but also a common practice for universities in various countries to enhance teaching quality and cultivate students' core competencies (Johnson et al., 1991). Whether it is the exploration of STEM (science, technology, engineering, and mathematics) fields by universities in Europe and America, or the extensive practice of interactive learning in language teaching in Asian countries, group cooperation has been proven to be a key vehicle for promoting knowledge co-construction, strengthening collaborative abilities, and stimulating innovative thinking (Beck & Chizhik, 2013; Ning, 2011; Seymour & Hewitt, 1997). This global trend is also reflected in local policies. The "China Education Modernization 2035" clearly states that "cooperative teaching methods should be implemented to strengthen the cultivation of cooperative and innovative abilities" (Ministry of Education of the People's Republic of China, 2019), signaling that cooperative learning has become an important strategic focus for enhancing the quality of higher education in China.

However, the effectiveness of cooperative learning is highly dependent on its micro-organizational form—the group. As the logical starting point of cooperative learning, the choice of group formation mode—whether it is student-selected, teacher-assigned, or algorithm-based—directly determines the quality of interaction within the group, the efficiency of resource exchange, as well as the members' expectations of the cooperative profits, which in turn affects the learning outcome (Bousalem et al., 2023; Chen & Kuo, 2019). Among various group formation modes, based on feedback from international research and practice, student self-selection has become the most favored group formation method in global university classrooms due to its emphasis on individual autonomy and its close alignment with autonomous learning (Hilton & Phillips, 2010).

Although self-selected grouping is widely used, the underlying operational mechanism remains a "black box" that is worthy of in-depth investigation. Understanding the formation mechanism of student self-selected grouping holds significant theoretical and practical significance. It not only concerns the common patterns of social interaction and rational decision-making among learners in cross-cultural contexts, but can also provide universal implications for optimizing cooperative learning designs in different countries. Moreover, analyzing students' grouping preferences in different educational systems and cultural backgrounds can provide empirical evidence for cross-border classroom management and cross-cultural group formation.

In the context of Chinese higher education, while self-selected groups have become the primary format for collaborative learning, their formation process exhibits distinctly local characteristics. It is profoundly shaped by strong-tie networks, such as those based on dormitory proximity and established classroom social circles. However, most studies focus on the evaluation of effects, while paying insufficient attention to the exchange motives, cost-benefit trade-offs, and the formation mechanisms of different types of exchange relationships during the decision-making process of student grouping. This study focuses on Chinese college students and introduces social exchange theory as the analytical framework, aiming to explore the following two core issues:

1.What are the main types of self-selected groups in the classrooms of Chinese universities in the light of social exchange theory, and what are their respective characteristics?

2.From the perspective of social exchange theory, what are the underlying motivations and cost-benefit trade-offs that drive these self-selected grouping behaviors?

By addressing the above questions, this study aims to reveal the underlying formation mechanism of self-selected groups. This not only provides theoretical support for Chinese university teachers to identify grouping risks and optimize teaching guidance, but also supplements empirical data from non-Western contexts, thereby enriching the theoretical framework of global cooperative learning research and offering significant practical implications for promoting cross-cultural educational cooperation and the substantial improvement of higher education quality.

Literature Review

Educational Value of Cooperative Learning and the Importance of Group Formation

Cooperative learning is widely recognized as an effective approach to promoting knowledge sharing and achieving goals. Johnson et al. (1991) emphasized that cooperative learning is a carefully designed teaching structure, with the core being the establishment of a positive interdependence relationship, ensuring that each student's success is closely linked to their group peers, and preventing the "free-riding" phenomenon through a clear individual accountability mechanism. Research has shown that this structured cooperative method not only enhances students' academic performance but also improves their learning attitudes and persistence, and promotes positive social and emotional development (Beck & Chizhik, 2013; Slavin, 1995). Its empirical effects are particularly significant in STEM fields, computer science, and language instruction (Seymour & Hewitt, 1997). Through a long-term follow-up study of a large number of undergraduate students, Seymour and Hewitt (1997) found that the traditional competitive and isolated learning environment was one of the key reasons for students, especially female and minority students, to leave STEM majors. Introducing cooperative learning can effectively reduce this attrition rate because it creates a more supportive peer learning environment. The empirical research conducted by Beck and Chizhik (2013) in the Introduction to Computer Science course further confirmed this point. Their cooperative learning design significantly enhanced students' performance in higher-order cognitive tasks such as programming. Similarly, in the field of language teaching, Ning (2011) introduced the adjusted cooperative learning method in college English teaching. Its research data indicates that this method can significantly enhance students' language output and communicative fluency by increasing meaningful peer interaction.

Group formation serves as the logical starting point for cooperative learning, directly influencing the quality of internal interactions within the group, the effectiveness of resource exchange, and the opportunities for using the target language (Chen & Kuo, 2019). Vygotsky (1978) proposed the social constructivist theory, which emphasizes that advanced psychological functions arise from social interactions within the zone of proximal development. Therefore, how the group is formed and how members are assembled are the key prerequisites determining whether high-level verbal interaction can occur (Webb, 2009).

Diversified Grouping Models

Existing research focuses on three formation mechanisms;

Self-selected groups: Allowing students to choose their own groups is the most favored by students (Hilton & Phillips, 2010). Bergtold and Shanoyan (2024) found that in the later stages of the course, when students have a thorough understanding of each other's working habits and abilities, self-selected groups perform better. This is because it bypasses the "forming period"

and "storming period" in Tuckman's group development model, reducing transaction costs for integration and improving collaboration efficiency. However, this approach has potential problems. Self-selection based on friendship is prone to forming cliques, excluding some students, resulting in fixed role patterns and cooperation friction (Feichtner & Davis, 1984; Küchle et al., 2025). Brouwer et al. (2018) confirmed through longitudinal social network analysis that there is an "achievement isolation" phenomenon in the freshman learning community. High-achieving students are interconnected, while low-achieving students are marginalized, hindering the effective flow of learning resources among students at different achievement levels.

Teacher-led structured allocation: Random grouping is frequently used due to its simplicity; it forces students to interact with peers from different backgrounds, expanding their social scope and exposure to diverse perspectives (Maina et al., 2017; Küchle et al., 2025). However, this grouping method is prone to causing uneven distribution of abilities within the group, and is often less effective than carefully designed structured grouping in initial tasks requiring complex cognitive collaboration (Bergtold & Shanoyan, 2024). Moreover, teachers may dynamically adjust the grouping strategy based on the progress of the course and student feedback (Küchle et al., 2025).

Data-driven algorithm grouping: With the development of educational data mining and machine learning technologies, data-driven algorithm-based grouping has emerged. The goal is to go beyond a single performance indicator and achieve a balanced combination of multiple dimensions of student characteristics (Krouska & Virvou, 2019).

Gaps and This Study

Most existing studies mainly explore "how to group students" from the external perspective of teachers or researchers, or provide a macroscopic description of the social outcomes and subjective experiences within students' self-selected groups, as well as the learning effects of group work under various grouping strategies. They rarely systematically investigate the micro-level decision-making logic behind students' choices of or preferring specific group members. During the team formation stage of the group, how did they subconsciously weigh complex factors such as the academic ability, reliability, interpersonal affinity, social risk cost and time coordination cost of potential group mates (Brouwer et al., 2018; Kuchle et al., 2025)? A deep understanding of these micro-motivations serves as a critical theoretical bridge connecting macro-level grouping strategy design with micro-level internal group dynamic mechanisms. Moreover, the studies often focus on the grouping results, while overlooking the intricate dynamics, negotiations, and strategic maneuvering inherent in the group formation process.

This study adopts Homans' (1958) social exchange theory as the guiding analytical framework. This theory views interpersonal interaction as a latent social exchange process, where individuals continuously weigh "rewards" and "costs" during interactions and tend to choose interaction partners and behaviors that bring the greatest benefits. This study aims to integrate students' grouping behaviors into the "rational social actor" analysis framework, reveal the essential driving forces behind the formation and operation of cooperative learning groups, analyze the micro-motivation mechanisms and formation mechanisms of self-selected grouping among Chinese college students, record the experiences of students extending invitations, evaluating group members, and making final choices. This research will provide a theoretical basis for teachers to identify the potential operational risks of different types of groups and

implement targeted teaching guidance. It will also help students become aware of and improve their own grouping strategies.

Method

This qualitative study is based on semi-structured interviews with Chinese college students. Initially we did pilot study with certain students through convenient sampling to improve the interview outline and expand the scope of potential participants. In the formal interview, 20 students from diverse university types (i.e. "Double First-Class University" and non-"Double First-Class University"), disciplines were recruited as shown in Table 1. All the participants were with rich group learning experience. To protect the privacy of the respondents, all personal information has been anonymized and identified using gender codes (F, M) and letter codes.

Table 1
Demographic information of participants

Code	Gender	University Type	Discipline
F-A	Female	Double First-Class University	Education
F-B	Female	Double First-Class University	Education
M-C	Male	Non- Double First-Class University	Biology
M-D	Male	Double First-Class University	Physics
M-E	Male	Double First-Class University	Law
M-F	Male	Double First-Class University	Education
M-G	Male	Non- Double First-Class University	Clinical Medicine
M-H	Male	Double First-Class University	Education
M-I	Male	Double First-Class University	Materials Chemistry
F-J	Female	Non-Double First-Class University	Accounting
F-K	Female	Double First-Class University	Education
F-L	Female	Non- Double First-Class University	History
M-M	Male	Double First-Class University	Education
F-N	Female	Non- Double First-Class University	Artificial Intelligence
F-O	Female	Non- Double First-Class University	Pharmacy Administration
M-P	Male	Non- Double First-Class University	Financial Management
M-Q	Male	Double First-Class University	Education
F-R	Female	Double First-Class University	Chinese Pharmaceutical Manufacturing
M-S	Male	Non- Double First-Class University	Russian
M-T	Male	Non- Double First-Class University	Accounting

Data collection was mainly conducted through in-depth interviews, including face-to-face and online interviews. The interview outline was composed of two core dimensions: the way the group was formed and group problem-solving mechanisms and strategies and experience for conflict resolution. All questions were open-ended, encouraging respondents to provide detailed accounts. Before the formal interviews, informed consent for the full recording was obtained from the students. The interviews ended when information saturation was reached. All audio recordings were transcribed verbatim into text, forming the original data. Then, the text was read repeatedly for open coding to generate initial concepts; through comparison and categorizing, similar concepts were clustered to form more general themes; and the themes were integrated and refined to construct a thematic framework to respond to the research questions.

Research Ethics and Ethics Committee Approval Information

This study was conducted in accordance with the Declaration of Helsinki and was approved by the the Human Research Ethics Committee at Southwest University, Chongqing,

China (Approval No.: SWUFEIRB 2025-1212) prior to initiation. All participants were informed about the study objectives, procedures, potential risks and their rights and written informed consent was obtained before participating. The confidentiality and anonymity of the participants was strictly maintained throughout the data collection, analysis and reporting.

Findings

The data demonstrates three categories of self-selected group formation among Chinese college students, namely convenience-based grouping, utilitarian grouping, and free-riding grouping. These three categories essentially reflect, from the perspective of social exchange theory, the differentiated strategies adopted by students when establishing temporary exchange relationships, based on different expectations of rewards, cost considerations, and reciprocity norms. The specific manifestations are as follows:

Convenience-Based Grouping

Most interviewees tend to form groups with familiar and close friends or roommates. We term this group formation method, driven by the pursuit of low transaction costs and emotional security, "convenience-based grouping", which focuses on the convenience of interpersonal communication. Friends who are familiar and have a close relationship have frequent interactions and deep emotional connections. This strong relationship is built on long-term communication and shared experiences. Group members have high trust in each other, and there is no need to spend extra time and effort to establish tacit understanding, formulate rules or avoid conflicts and misunderstandings, and the supervision costs and coordination costs brought about by information asymmetry and opportunistic behavior can be significantly reduced during cooperation. This way of group formation can achieve higher group cohesion and task completion efficiency at a lower collaboration cost. For students, this selection strategy not only means the efficiency and smoothness of the exchange process, but also enables them to gain emotional satisfaction and intrinsic rewards (pleasure, sense of belonging and security) while achieving learning goals. Consequently, the benefits of collaboration extend far beyond the task itself, while potential costs and uncertainties are minimized. Some interviewees mentioned that this group formation method forms a "conventional" normal relationship. For example, M-I noted that "it is common for each dormitory to form one group", implying there is no need to constantly search for group members before activities, which further reduces the search costs and negotiation costs during group formation, and forms a stable exchange network.

> F-A: I usually team up with people I know well or my regular partners. It's just more convenient with a regular partner, and with people you're familiar with, you don't need a 'break-in' period. Communicating is super easy and chill, and it's really fast to get a group together.
>
> F-L: Communication just goes a lot smoother. You don't run into situations where you can't get on the same page, or where the other person isn't proactive.
>
> M-M: All it takes is a quick 'hey' and you've got a group. Coordinating everything after that is super fast and easy, so the whole task gets done way more efficiently.
>
> M-E: I mainly team up with classmates I'm good friends with. I'll always start with my friends first; I'd only consider teaming up with someone after we've already built some kind of friendship. I just feel like, since they're my friend, they're definitely not going to slack off on me.
>
> F-R: You have a better sense of each member's strengths, so you can divide up the work more effectively. It just makes the teamwork way more efficient.

Furthermore, some of the interviewed students also mentioned that they were influenced by their personality traits. The characteristics of being introverted or not being good at socializing makes them have individual differences in the perception of exchange costs. For

them, the psychological cost and social risks of establishing exchange relationships with strangers are significantly higher than those within familiar groups. Therefore, even if they have a strong desire to meet more people or pursue higher scores (i.e., higher expected rewards), they find it difficult to actively break out of their current social circle. Eventually, they tend to choose the path with the lowest transaction cost, which is either to form a team with familiar people around them or to wait for others to invite them to join.

> M-F: I usually prefer to choose those who are close to me because I am rather introverted. Working in a group with people I am familiar with and who have a good relationship makes me feel more comfortable. Teaming up with strangers would lead to awkwardness during the cooperation process and make it difficult to interact.

> M-G: I'm not particularly good at social interaction. When working with people I know and handling communication, task arrangement, and collaboration, I can perform much better.

In general education courses or elective classes, due to the relatively lower impact of grades (such as GPA) compared to specialized courses, the perceived input-output ratio for students also changes. They are reluctant to invest too much in exchange costs (such as time and energy to get to know new members) and prefer to choose familiar people to form groups, in order to obtain acceptable returns at the lowest cost.

> M-P: For the general education courses, a score of 60 is sufficient. It won't affect the GPA. So forming a group is just to complete the task quickly. Just find someone you know well and do it.

However, there are obvious limitations to convenience-based grouping. Firstly, long-term teamwork with familiar people can lead to relationship lock-in, reducing the chances of meeting other potential exchange partners and limiting the expansion of one's personal social capital. This might imply giving up alternative exchange relationships that could potentially bring higher rewards in the future. As F-B observed: "The downside is you don't get to interact with that many other classmates, so you miss out on trying new things. And what if some other classmates have really cool strengths—you'd never get the chance to find out!"

Secondly, if the familiar individuals in one's immediate circle generally lack motivation or demonstrate insufficient competence, that is, when the instrumental rewards (such as the quality of task completion) that the exchange partner can offer are limited, and the emotional rewards are unable to make up for this deficiency, the outcome of the cooperation may fall short of expectations. At the same time, familiarity can lead to an implicit increase in transaction costs – due to the difficulty of directly pointing out problems out of a desire to avoid offending others, this results in higher supervision costs or the accumulation of unfair perceptions. F-N remarked that "My friends around me aren't that capable, so the final grade might not turn out great."

Furthermore, familiar individuals are prone to exhibiting behaviors such as complacency and task avoidance within collaborative contexts. F-R mentioned that "Some people get too casual because they're super familiar – they just slap things together half-heartedly. And you're too awkward to call them out to their face, so you end up carrying more of the load yourself." F-A also added: "Since we're all friends, if someone in the group slacks off or messes up, it's awkward to call them out directly."

Utilitarian Grouping

Many students select group members with clear and practical goals when forming study groups, such as aiming to achieve higher scores or ensuring smoother task completion. We define this group formation method centered on the maximization of instrumental rewards as utilitarian. When these students choose group mates, they make a "cost-benefit" trade-off. They tend to select group mates who can offer higher exchange value and lower exchange risks.

Depending on the different core demands, this utilitarian tendency can be categorized into two situations: “high score orientation” and “complementary advantages”.

Students oriented towards high scores tend to actively seek out classmates who are strong in study, have excellent grades, or perform well in certain subjects as their group mates. They regard explicit rewards such as course grades and GPA as having the highest value, so all their choices revolve around “achieving high scores for group assignments and better overall course grades.” Excellent grades are also linked to rankings, scholarships and other “benefits.” Even when they need to actively contact unfamiliar classmates with good grades, the social costs incurred, as well as the competitive pressure that may arise from teaming up with stronger players, are all regarded as necessary investments for obtaining high rewards. Many students mentioned that this grouping strategy would change according to the importance of the course (i.e., the amount of the reward). Many students mentioned that this idea of forming groups changes depending on the importance of the course.

> M-C: “In our bio major, group projects mean we gotta find group mates who’re hardworking, have that research drive, take stuff seriously, and aren’t afraid to grind. Most classmates care about our major classes anyway, and everyone wants to team up with people who’ll dive deep into the topic.”
>
> M-P: “It really depends on the class. For important major courses or required classes, I definitely team up with people who are also aiming for a high GPA.”
>
> F-N: “For more important courses, I’ll actively seek out capable people. I’ll either message them privately or just talk to them in person about forming a group.”

In core professional courses, due to the high “return” in terms of grades, students are willing to pay a higher “exchange cost”. They are willing to invest more search costs to find group members with high capabilities, and are also willing to bear the uncertainty associated with establishing exchange relationships with strangers.

> M-G: “The specialized courses have high requirements for abilities. We definitely need to choose group mates with stronger capabilities.”
>
> M-T: “Specialized courses require high-level group mates. To achieve better grades and GPA, I would choose more professional people to form a group.”

The other type is the complementary advantage type. Students not only consider the strengths of their group mates, but also pay more attention to whether the group mates’ abilities, skills, personalities or resources can match and complement their own and the requirements of the task to form a complementarity of resources. Their goal is to form a group that can achieve the maximization of exchange value and operate efficiently. This is a refinement of the simple “high score-oriented” strategy - by optimizing the combination of resources to enhance overall output, thus enabling each member to achieve higher net benefits. This is also a supplement to the “high score-oriented” approach.

> M-T: “I prefer to choose group mates who have complementary skills, are acquaintances, and a few new classmates. This way, we can balance both chemistry and efficiency, and also generate new ideas.”
>
> M-H: “I tend to pick familiar group mates, but I also consider their abilities... Even if they are good friends, if their skills are not up to par, I might not choose them for the group.”

Under this grouping model, when selecting group members, students pay special attention to the complementarity of abilities and skills. This is reflected in the search for partners who are proficient in different fields. The groups formed in this way can ensure that all the skills required for the task are covered. For example, M-T stated: “I will choose group mates with complementary abilities, such as classmates who are good at making PowerPoint slides and writing literature reviews.” Secondly, students also attach great importance to a positive working

attitude and are more willing to form groups with diligent and responsible peers. Once the tasks are reasonably allocated, everyone can contribute effectively, avoiding shirking responsibility in the later stages. This not only ensures a balanced workload but also leads to better outcomes. This can reduce supervision costs, ensure that reciprocal norms are implemented, and prevent exchange imbalances (such as shirking responsibility) from occurring later. M-S stated: "I will find group mates who are all willing to do things so that we can assign tasks well and complete them well."

Free-riding Grouping

The concept of "free-riding" was introduced by American economist Mancur Olson in his 1965 book *The Logic of Collective Action: Public Goods and the Theory of Groups*. In essence, it refers to benefiting from the efforts of others without contributing oneself. This study reveals that within group cooperative learning, "free-riding" behaviors is essentially a serious imbalance in the exchange relationship, with significant differences in motivation and behavior within it, manifested as a significant inequality in the input-output ratio among members, and the norm of reciprocity being violated. Based on members' strategic behavior in group interactions, their perception of reciprocity norms, and their self-attribution tendencies, free-riding can be categorized into two types: "active free-riding" and "passive free-riding". This distinction mainly differentiates from two dimensions: the intentionality of exchange (whether one actively chooses to reduce input) and the cognition of reciprocal responsibility.

Active free-riding refers to students who are clearly aware of the mutual benefit norms within the group. However, in order to maximize their personal net income, they consciously choose to reduce or conceal their contributions, and consider this as a reasonable strategy, which is a strategic avoidance of investment and costs. In the early stage of the formation of study groups, students who are active free-riders tend to select groups that have insufficient personnel or a lack of a strong learning atmosphere to join. They do not show obvious intentions to free-ride because most students are opposed to free-riding.

> M-G: "I'm quite against this kind of behavior. Since it's a group activity, everyone should participate. Such people are very irresponsible and unfair to both me and others."
>
> F-L: "I've come across classmates who just ride on the coattails of others. They do nothing but just hang around and get their names on the list, or they complete tasks poorly. There was one such person before. He was invited away by a roommate from another dormitory. We won't cooperate with him anymore."

After the group is formed, students who engage in active free-riding often subjectively assess the importance of the tasks and choose the relatively easier ones or those that can be done with a bit of trickery and without effort, or simply deal with the tasks carelessly. When the behavior of free-riding is obvious, other members often choose to tolerate it or attempt to solve the problem in a relatively gentle way. This indulgence to some extent allows the behavior of free-riding to persist. Behind this tolerance lies a rational choice made by other members after weighing the costs of intervention (such as direct conflict potentially damaging relationships and consuming time) against the costs of tolerance (such as taking on more work). F-R said "For those who hitch a ride, I just smile and scold them in private." M-D seemed to be more tolerant: "I usually just agree when someone wants to hitch a ride. As long as they don't cause trouble, it's fine."

Passive free-riding refers to a situation where individuals do not lack the willingness to cooperate or the motivation to contribute. Instead, due to their subjective assessment of lower exchange value (such as ability gap), or disadvantaged power status (such as weak social capital, introverted personality), they are gradually marginalized in group interactions, losing effective channels and opportunities to participate, eventually becoming silent followers. Passive free-

riding is essentially an involuntary outcome resulting from the combined effect of structural constraints and psychological factors, which is a manifestation of being passively involved in an unequal exchange relationship. From an individual perspective, some members may have insufficient knowledge reserves and professional skills, and their exchange resources is deemed to be lacking, thus it is difficult to establish reciprocal value within the group, developing the perception of "being unable to contribute". Some other members may have weak social capital and are in a disadvantaged position in group interactions, experiencing exclusion or restricted expression rights. From an environmental perspective, unreasonable task allocation models can create situational capital restrictions, resulting in some members lacking clear job responsibilities and participation paths. In essence, it deprived them of the opportunity to fulfill their reciprocal obligations.

> F-B: "One reason is that the person doesn't know the workload in advance due to the work allocation, which may result in them having less work. Another reason is that they are more negative in attitude. Their negative behavior is shown when everyone is discussing, they don't speak up, they reply to assigned tasks late, and they need to be reminded to submit their work."
>
> M-D: "Slacking off definitely exists. Many times, the whole group is slacking off. After all, many tasks have to be done step by step, and you have to wait for the person doing the previous step to finish before you can proceed. It kind of feels like slacking off."

Among the three grouping types, many students tend to adopt the convenience-based type, while the utilitarian type and the free-riding type are in the minority. Moreover, when students form study groups for courses, they do not necessarily always follow a single grouping strategy. They may dynamically adjust among different exchange modes to maximize net benefits in specific situations, depending on the type of the course or their own circumstances.

Discussion

The Interpretation of Three Types of Self-Selected Group Formation Based on Social Exchange Theory

This study identified three typical types of self-selected group formation among Chinese college students, namely convenience-based grouping, utilitarian grouping, and free-riding grouping. These group formation behaviors reflect the principles of social exchange theory in the context of group cooperative learning. According to social exchange theory, the essence of human social interaction is a rational exchange process. Individuals continuously evaluate the "benefits" and "costs" of their actions during interaction and tend to choose the action strategies that maximize their benefits (Homans, 1958).

Convenience-based grouping focuses on low transaction costs and emotional security, and the exchange logic centers on the "low cost - high stability" return. According to social exchange theory (Homans, 1958), individuals in social interactions not only pursue material gains but also value emotional and functional gains. The core "benefits" of forming groups with acquaintances are reflected in three dimensions. At the functional level, the trust and tacit understanding established through long-term interaction can significantly reduce the cost of communication and coordination and effectively avoid risks arising from conflict in division of labor or unclear responsibilities, thereby enhancing the task completion efficiency of the group (Bergtold & Shanoyan, 2024). At the emotional level, stable cooperative relationships can provide members with psychological security and pleasure, thereby strengthening the existing emotional connection, such an intrinsic benefit is an important foundation for maintaining long-term exchange relationships. Finally, this cooperative model also has implicit benefits, namely, the habitual group formation method eliminates the search costs and negotiation costs required for

searching for and integrating new group members, bringing a stable exchange networks and reciprocal expectations.

The cost control mechanism of this type of grouping is notable. The strong relationship network among acquaintances reduces information asymmetry and supervision costs, enabling efficient collaboration without the need to formulate additional formal constraints. For introverted and socially anxious students, collaborating with acquaintances avoids the psychological cost of breaking out of the social circle and the risk of social failure. This finding is consistent with the view proposed by Bergtold and Shanoyan (2024) that self-selected groups reduce transaction costs, but it further clarifies the types of costs and the dimensions of benefits, and reveals the constraints of how personality factors influence an individual's perception and assessment of transaction cost on group selection. From the perspective of the essence of exchange, convenience-based grouping is a two-way exchange of "emotion-efficiency", where students give up the potential benefits of expanding new social circles in exchange for the low risk and emotional satisfaction of collaboration. Feichtner and Davis (1984) argued that self-selection based on friendship might form closed circles, but this study found that students do not simply form groups based on "friendship", but rather make choices after rational consideration, and most students can clearly recognize their limitations. This indicates that the decision-making process of self-selected grouping is more complex than what existing studies have described as "merely relying on friendship".

The utilitarian grouping mechanism, centered on the explicit realization of practical goals, embodies the rational decision-making principle of "maximizing benefits - minimizing costs" in social exchange theory. Moreover, based on the differences in goals, it forms two distinct exchange patterns (Homans, 1958). The exchange logic of high-score-oriented grouping focuses on the acquisition of scarce resources. Academic performance, grade point average, and other explicit rewards, as well as extended rewards such as scholarships and the qualification for postgraduate recommendation, are the core instrumental rewards that students pursue. As scarce social capital, academic performance and grade points are the core benefits that students pursue. To obtain this benefit, students are willing to bear the corresponding "costs". This exchange has significant contextual adjustment characteristics. In core professional courses, the weight of "grade-related benefits" increases, and students tend to increase "exchange costs", while in general education courses or elective courses, the grade benefits decrease, and students turn to low-cost acquaintance exchange patterns. This dynamic adjustment process is a rational trade-off made by students based on the "benefits - costs" in different contexts. Brouwer et al. (2018) discovered the "achievement isolation" phenomenon, which is essentially the macro manifestation of high-score-oriented grouping. This study further reveals its micro exchange logic, that is, high-achieving students mutually select to form "strong alliances" to maximize instrumental benefits, while low-achieving students avoid high-achieving students because the expected cost of seeking help from the strong is excessively high. In addition, the contextual adjustment characteristics discovered in this study complement the view of Bergtold and Shanoyan (2024) that self-selected groups perform better in later stages of courses, enriching the research perspective on the dynamic adjustment of grouping strategies.

Students in the complementary grouping approach evaluate the compatibility of their group members' resources with their own and the requirements of the task, thereby establishing complementary exchange relationships. The "cost" of this model mainly lies in the time investment in selecting group members, while the "benefit" is the minimization of internal conflicts and the maximization of collaborative efficiency. The "multi-dimensional balance grouping" algorithm design proposed by Lambić et al. (2018) reflects the complementary advantages, but this study found that students' complementary choices also include implicit

factors such as work attitude, communication style, and familiarity, providing more empirical evidence that is closer to students' actual needs for optimizing algorithmic grouping strategies.

The nature of free-riding grouping is a state of imbalance within the group exchange system. Active free-riding behavior is a typical one-way benefit exchange deviation. Active free-riders clearly recognize the reciprocal norms of group cooperation but they deliberately choose strategic cost avoidance to maximize their personal net gains, reducing or disguising their contributions. Other group members choose to tolerate the free-riding behavior to avoid conflicts that could lead to the breakdown of cooperation, thereby reducing the "social cost" of active free-riding. This one-way exchange will undermine the reciprocal norms of the group and lead to the breakdown of the trust relationship, ultimately excluding the free-riders. Previous studies mostly attribute free-riding behavior to the lack of individual responsibility awareness (Liu & Huang, 2021), while this study finds that active free-riding is a choice made by students after weighing costs and benefits, and the tolerance of other group members is the key external factor for its persistence. This addresses the limitations of existing studies on free-riding, uncovering its nature as a phenomenon of exchange relations.

The passive free-riders, on the other hand, present a different logic of exchange imbalance. These individuals are not lacking in the willingness to cooperate, but are gradually marginalized in group interactions due to their subjective assessment of lower exchange value (such as ability gap), or due to their disadvantaged power status (such as weak social capital or introverted personality), and thus are unable to effectively participate in the exchange process. Eventually, they fall into a passive state where the rewards exceed their efforts, which is a manifestation of being involuntarily drawn into an unequal exchange relationship. As a micro exchange system, if the group fails to provide equal participation channels and resource complementation opportunities for disadvantaged members, it will prevent the establishment of an exchange relationship and ultimately lead to passive free-riding. Existing research mostly focuses on "active free-riding" (Küchle et al., 2025), ignoring the existence of "passive free-riding". However, this study has found that some free-riding phenomena are caused by passivity. This reminds researchers and educators that not all behaviors where benefits outweigh costs should be attributed to an individual's subjective intention. We also need to pay attention to the fairness and inclusiveness of the group exchange system, and how structural constraints shape the possibilities of an individual's participation in exchange.

The three types of group formation behaviors revealed in this study are not mutually exclusive. Convenience-based grouping often merges with utilitarian grouping formation, manifested in that some students consider the ability and complementarity of the partner when choosing a group with acquaintances, and in high-score-oriented group formation, they also prefer to select familiar and academically accomplished classmates. This integration reflects that students not only pursue low-risk exchanges of emotions and efficiency, but also attach importance to high-yield exchanges with goal orientation. Convenience-based grouping is a derivative imbalanced state of these two positive exchange patterns. In convenience-based grouping, the lack of supervision due to the influence of personal connections may provide a space for active free-riding, while in the utilitarian group, excessive ability gap or unreasonable division of labor may give rise to passive free-riding behavior.

The Educational Risks Arising from the Neglect of Different Motivations

The convenience-based team formation aims to enhance interpersonal communication, reduce collaboration costs, and provide emotional security as its core motivations. On one hand, ignoring this motivation will lead to the social isolation and limited ability of students, with them

being confined to small circles such as roommates and close friends for a long time, reducing the opportunities to meet students from different majors and with different personalities. On the other hand, the "social obligation constraints" among acquaintances will make it difficult to solve problems such as unreasonable division of labor and perfunctory tasks, and is not conducive to cultivating students' ability to actively communicate and negotiate division of labor. Especially for introverted and socially anxious students, it is not conducive to their social avoidance mentality and their future social adaptation.

The core of utilitarian team formation is the rational consideration of pursuing high scores and completing tasks efficiently. However, this can easily exacerbate the academic polarization. High-achieving students form strong alliances with each other, thereby forming superior groups, while low-achieving students have difficulty accessing high-quality collaborative resources and can only team up with classmates of similar abilities or those who are passive and slack in their studies. This can easily lead to a situation where "the better gets better and the worse gets worse", violating the principle of educational fairness. Moreover, internal conflicts within the group and interpersonal conflicts may also arise from this. Students oriented towards high scores overly emphasize the priority of ability, easily excluding and criticizing less capable group members; for students of the complementary strengths type, if they lack guidance, the selection criteria may become unbalanced, resulting in uneven division of labor and poor communication. Some students may claim credit, shirk responsibility, and undermine group trust. This type of team formation can also lead to the utilitarianization of learning goals. Students overly focus on short-term benefits such as grades and GPA, neglecting the development of core competencies such as communication and collaboration, and falling into the trap of the sole focus on scores.

There are two types of free-riding behavior: active (strategic avoidance of participation) and passive (unwillingness to participate involuntarily). Ignoring students' motivation may lead to low efficiency in group collaboration and a decline in task quality. The active form of free-riding occurs due to the lack of supervision and constraints, and most tasks are pushed onto a few members, increasing their burden. The passive free-riders, lacking support, cannot effectively participate in the tasks, further reducing the collaboration efficiency. The active free-riders also undermine group fairness and learning enthusiasm, causing the conscientious members to feel unfairness and even leading to "following the trend and free-riding". The passive free-riders are often excluded for a long time, which can further reduce their learning confidence and cooperation willingness. Additionally, active free-riding can lead to the breakdown of group trust and the alienation of cooperative culture, resulting in the loss of effective interaction and trust.

The Trap of Strong Ties and the Strength of Weak Ties: A Re-Examination Based on Social Network Theory

The findings of this study reveal a profound paradox in the group cooperation of Chinese college students: the "strong ties" groups that are the most efficient and cohesive, may actually be the least conducive to the flow of heterogeneous information and the equal participation of members. By introducing Granovetter's (1973) theory of "weak ties advantage", it will help us move beyond the moral judgment of "free-riding" and instead examine the fundamental shaping of cooperation quality by the internal network structure of the group.

In most highly efficient groups, a "core circle" consisting of 2-3 highly competent and communicative members usually forms rapidly at the early stage of the group's formation. From the perspective of social networks, this is a typical "strong tie" network, where they interact frequently, have close emotional ties, and have a strong expectation of mutual benefit.However, this strong interconnection structure inherently has a functional limitation, as the information it conveys is often redundant and homogeneous. In the context of group collaboration, this means:

(1) The discussions within the core circle heavily rely on each other's existing knowledge reserves, course understanding, and method preferences, which easily leads to "group blindness", resulting in a single source of information; (2) The lack of connection with external information hinders innovation, and the efficiency of the core circle may be achieved at the expense of the diversity and depth of the solutions, or it may adhere to conventional patterns, with members' roles remaining rigidly fixed.

Granovetter's (1973) insight is that it is often the less closely connected "weak ties" that can actually provide new information. In this study, the "passive hitchhikers" are precisely located at the structural periphery of the group network - they have sparse interactions with the core circle and limited communication channels, which instead gives them the potential to become "weak ties". However, under the existing group interaction model, this potential might be wasted: (1) Exclusion of heterogeneity. The passive free-riders, due to their insufficient initial "exchange capital" (such as different knowledge background, different information sources, those brought in just to count, and weak social capital), their potential differentiated contributions are systematically ignored. They may possess materials, cases, or perspectives that the core circle has not encountered, but because they "can't speak up" or are "not familiar", they find it difficult to join the discussion. (2) The blocked information bridge. When discussing task allocation and making decisions, the "core circle" tends to favor the viewpoints of its members. Information providers with weak ties lack sufficient social capital and thus have difficulty catching the attention of the core circle, not because of their insufficient value.This is exactly the structural waste in group collaboration. The "strong ties" core circle constructed by the group in pursuit of short-term efficiency, at the expense of long-term innovation and member participation, closes off the "weak ties" channels that might bring breakthrough information.

Research Implications and Practical Intervention Suggestions

The implications of this study for educational practice are as follows. Firstly, teachers should pay attention to identifying different types of groupings and consider optimization strategies. Teachers should monitor students' group formation and cooperation performance. For students in convenience-based grouping, they can be encouraged to form groups across dormitories and disciplines, breaking out of their comfort zones. For students in utilitarian grouping, they can be guided to balance result orientation and process engagement. Students should be aware of the advantages and disadvantages of their own grouping preferences and flexibly adjust their grouping strategies. Secondly, establishing a fair evaluation system is of crucial importance. To avoid free-rider behavior, we can adopt a Jigsaw technique to highlight interdependence. For instance, we can break down the group assignment into several interdependent and indispensable sub-tasks, and each member must independently be responsible for a core module. This design gives passive free-riders the sense of being "needed", and also makes active free-riders have nowhere to hide. Without any piece of the puzzle, the overall task cannot be completed. Secondly, through embedded process evaluation, make contributions visible. We can add process-based assessments such as periodic feedback, anonymous peer evaluations, and personal reflection logs beyond the final outcome. The "low investment" strategy of active free-riders will be exposed through process records, and the minor efforts of passive free-riders can also be seen and recognized, thereby changing the ambiguity of responsibility caused by only focusing on the results. Finally, we can establish a structured speaking mechanism to break the silence. It is important to set up a turn-taking speaking session (such as one minute for each person to present their viewpoints) for each group discussion to ensure that every member has an equal opportunity to express themselves. This not only creates a low-cost participation entry for passive free-riders but also forces active free-riders and core

circle members to step out of their social comfort zones and truly listen to voices from the periphery.

Conclusions and Recommendations

This study examined the formation motives and typological characteristics of self-selected student groups in Chinese university courses. Social exchange theory provided a valuable explanatory framework for various group formation behaviors. Based on this framework, we found that college students, as rational social actors, continuously weigh "benefits" and "costs" during group formation decisions and choose action strategies that can maximize their benefits. The patterns of voluntary group formation in college students' course learning can be classified into three major categories: convenience-based type, utilitarian type, and free-riding type. These types are not isolated from each other but often exhibit overlapping characteristics.

By revealing the formation mechanism and internal logic of self-selected grouping among college students, the present study contributes to the understanding of motivations for grouping at a micro level. The research findings not only help students make rational choices regarding group formation and enhance their collaboration skills, but also provide targeted practical implications for teachers to optimize teaching management and improve the quality of cooperative learning. This research supplements empirical data from a non-Western context, enriches the theoretical framework of global cooperative learning research, and promotes the improvement of higher education quality.

This study has certain limitations. Firstly, this qualitative research with a sample of 20 people is limited in its statistical generalizability, and there may be differences in grouping behavior among students from different disciplines and grades. Secondly, limited attention was paid to the dynamic evolution process of various behaviors. Thirdly, the influence of external factors on the exchange logic has not been deeply explored. Future research could increase the sample size by adopting questionnaire surveys to quantify the distribution characteristics and influencing factors of various grouping behaviors. Studies could also expand the research perspective by introducing social network theory to complement social exchange theory. In addition, the impact of generative AI on group formation methods and free-rider behavior also awaits further research.

Declarations

Authors' contributions: X.Y. was responsible for the study design, data collection and analysis, discussion and conclusion, and manuscript writing and revising. H.L. contributed to the literature review and data collection. J.L. was responsible for the methodology and data collection. X.Z. reviewed and revised the final manuscript.

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