

MASTERARBEIT | MASTER'S THESIS

Titel | Title

Competition in Class: How Classroom Goal Structures Relate to Social Comparison
Orientation and Schadenfreude

verfasst von | submitted by

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of
Master of Science (MSc)

Wien | Vienna, 2025

Studienkennzahl lt. Studienblatt |
Degree programme code as it appears on the
student record sheet:

UA 066 840

Studienrichtung lt. Studienblatt | Degree
programme as it appears on the student record
sheet:

Masterstudium Psychologie

Betreut von | Supervisor:

Assoz. Prof. Mag. Dr. Marko Lüftenegger Privatdoz.

Abstract

Students often encounter competitive learning environments in school. How students navigate this environment, however, is not only associated with their motivation and achievements, but also has the potential to shape their social and emotional experiences. Building on different theoretical approaches, the present thesis investigates how the learning climate relates to social-emotional aspects of school, more specifically, social comparison orientation and rivalry schadenfreude (a form of schadenfreude which is defined as the joy felt over a rival's misfortune). The main aim was to identify clusters of classroom goal structures (mastery approach, performance approach, performance avoidance) and examine how these clusters differ in terms of social comparison orientation and rivalry schadenfreude. Data was collected in October and November 2023 at six Austrian schools through self-report questionnaires. The sample comprised 1868 secondary school pupils (7th to 10th grade) from 98 classes ($M_{age} = 14.0$; 52.2% female). Cluster analysis identified five distinct clusters in terms of classroom goal structures: High all cluster, average all cluster, approach cluster, mastery cluster, and low performance cluster. The mastery and low performance clusters were associated with the lowest levels of social comparison orientation and rivalry schadenfreude, compared to the high all, average all, and approach cluster. The findings demonstrate that students' perceptions of the classroom learning environment are linked to their social-emotional classroom experiences. Given teachers' potential to shape the learning environment, they may play a pivotal role in these experiences. Limitations and future directions are discussed.

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Introduction

Classrooms are not only spaces for acquiring knowledge and academic achievement but are also full of social interactions. Students relate to their classmates through these interactions, and different emotions arise because of these comparisons. Therefore, social comparison, which can be understood as the process of gaining information about oneself in relation to others (Festinger, 1954), and social emotions, characterized by emotions that arise within social settings and involve other individuals besides oneself (Yu et al., 2024), are omnipresent. While some social emotions foster the welfare of others (Yu et al., 2024) and are associated with higher well-being (Lee et al., 2021), others have been linked with rather negative outcomes (Yu et al., 2024). For example, *schadenfreude*, defined as the pleasure felt at someone else's misfortune, may feel positive for the individual experiencing it (Jankowski & Takahashi, 2014); however, it can have detrimental effects on others (Cabrera-Vázquez et al., 2025). Furthermore, social comparison processes have also been associated with several negative outcomes (Shang & Bao, 2025; Tian et al., 2017) and are partly responsible for the experience of *schadenfreude* (Wang et al., 2019). It thus appears important to gain a better understanding of what factors shape students' social interactions at school, to potentially avoid the rise of negative outcomes.

The achievement goal theory provides a useful framework for studying contextual factors contributing to students' learning environment (Kaplan et al., 2002). Teachers have the potential to shape this environment by establishing different classroom goal structures through their teaching practices (Epstein, 1988). Most studies have focused on classroom goal structures and their associations with academic-related outcomes (Rolland, 2012). However, the perceived learning environment also encompasses social interactions, such as competitiveness between students, which influences students' social comparisons (Ding et al., 2022) and social emotions (Sun et al., 2025). To better understand how the learning environment is associated with aspects of students' social interactions, this thesis aims to investigate classroom goal structures and their link to social comparison orientation and *schadenfreude*. Adopting a multiple goal perspective, I first aim to identify clusters of classroom goal structures to which students are exposed. Second, I will examine whether these clusters differ in terms of social comparison orientation and *schadenfreude*.

Theoretical Background

Achievement Goal Theory

Goal theories focus on certain types of goals that individuals pursue in achievement settings and belong to the social-cognitive view of motivation. More specifically, achievement goal theory is concerned with students' goal pursuit in the school setting and aims to explain why students engage in specific achievement-related behavior (Dweck, 1986). It includes a personal and contextual facet. The personal facet focuses on individual differences between students regarding their goal pursuit in achievement settings and is defined as personal achievement goals. The contextual facet focuses on how teachers shape the learning environment through their teaching practices and how they communicate them to their students. This facet is referred to as classroom goal structures (Kaplan et al., 2002).

Personal Achievement Goals

Personal achievement goals describe individual goals that students aspire to in achievement situations. They can be classified based on their goal pursuit (mastery vs. performance) and their valence (approach vs. avoidance). Mastery goals are concerned with the development of competence. It defines the development of new abilities, understanding new learning material, acquiring new knowledge, as well as conquering challenges (Meece et al., 2006). Competence is evaluated in terms of absolute (mastering a new skill) and intrapersonal (outdoing one's own previous performance) standards (Elliot & McGregor, 2001). The demonstration of competence is labeled as performance goals. When students pursue performance goals, they are concerned with their ability compared to others (Meece et al., 2006) or with appearing talented (Senko et al., 2011). Performance goals are often studied within the approach-avoidance dichotomy, leading to performance approach and performance avoidance goals. When pursuing performance approach goals, students want to demonstrate high ability and strive to be better than others. In contrast, when pursuing performance avoidance goals, students focus on not being worse than others and avoid unfavorable judgments (Meece et al., 2006). Within performance goals, competence can either be evaluated in terms of normative standards, when one's competence is compared to that of others (normative performance goals; Elliot & McGregor, 2001), or in terms of appearance, demonstrating one's ability or knowledge in front of others (appearance performance goals; Senko et al., 2011). While the two forms of performance goals have

been widely studied, mastery goals are often considered a uniform construct (Meece et al., 2006). However, some researchers (Elliot & McGregor, 2001) suggested applying the approach-avoidance dichotomy also to mastery goals. On the one hand, mastery approach goals focus on the acquisition of new knowledge and learning new material. On the other hand, mastery avoidance goals are concerned with avoiding misunderstanding and not learning from a task. However, the latter achievement goal is rarely found in school (Lee & Bong, 2016). Thus, the trichotomous model seems to be a better fit for describing students' achievement goals. The development of students' individual goals is linked to their perception of their learning environment (Bardach et al., 2020); in other words, they are linked to classroom goal structures.

Classroom Goal Structures

Personal achievement goals not only depend on students' individual motivation but are also established by the learning environment within a classroom. Through teachers' teaching practices, certain goals become salient to students, which are called classroom goal structures (CGS). For example, if teachers emphasize competitiveness regarding grades and performance, students in these classes will more likely adopt performance goals. In contrast, other teachers put more value on improvement, tolerating mistakes, and therefore students are more likely to adopt mastery goals (Meece et al., 2006).

As with personal achievement goals, classroom goal structures can be divided in terms of their goal pursuit (mastery vs. performance) and their valence (approach vs. avoidance); however, the latter is often only applied to performance goal structures (Bardach et al., 2020). Within mastery goal structures (conceptualized as mastery approach goal structure), the aim of engaging in academic work is to understand learning material and develop competence (Meece et al., 2006). In contrast, classrooms, in which performance goal structures are salient, emphasize competition and relative ability among students (Midgley & Urdan, 2001). Teachers who see outperforming others and demonstrating competence as a desirable goal will establish performance approach goal structures. Teachers who value not performing worse than others and avoiding appearing incompetent will establish performance avoidance goal structures (Murayama & Elliot, 2009).

Empirically, classroom goal structures have been associated with academic achievement, and related constructs. Findings from a meta-analysis (Rolland, 2012)

show that mastery goal structures are positively related to grades and performance goal structures are negatively associated with academic achievement. However, these associations varied across different levels of school grades. When only grade 7 and above were considered, the association between mastery goal structures and academic achievement vanished. This suggests that classroom goal structures play a role in academic achievement only among younger students. Furthermore, mastery goal structures are connected to more perseverance for long-term goals (Park et al., 2018) and less academic stress than performance goal structures (Tharaldsen et al., 2023). Especially, performance avoidance goal structures are related to higher stress levels regarding school performance (García-Moya et al., 2023). Classroom goal structures have also been studied with emotional and behavioral outcomes. Mastery goal structures have been associated with fewer emotional problems (Tharaldsen et al., 2023), fewer depressive symptoms and fewer deviant behaviors (Wang, 2009), more positive affect and positive coping strategies (Kaplan & Midgley, 1999), as well as higher efficacy and competence (Rolland, 2012). In contrast, performance goal structures have been found to relate to higher levels of depressive symptoms, more deviant behavior (Wang, 2009), more negative affect, and negative coping strategies (Kaplan & Midgley, 1999). Overall, students perceiving their classroom goal structures as more mastery-oriented showed more beneficial levels of academic, emotional, and behavioral adaptations than students perceiving the classroom goal structures as more performance-oriented.

Some classroom goal structures are highly correlated, indicating that they are often perceived as being present simultaneously within a specific classroom. These correlations include performance approach and performance avoidance goal structures, as well as mastery approach and performance approach goal structures (Bardach et al., 2020). Therefore, goal structures can either vary in terms of their goal pursuit (mastery vs. performance, meaning that, for example, performance approach and performance avoidance goal structures are often present simultaneously) or vary in terms of valence (approach vs. avoidance, meaning that, for example, mastery approach and performance approach goal structures are often present simultaneously). From this observation, mastery approach and performance avoidance goal structures seem to be incompatible (see also Olivier et al., 2024).

Given the fact that some goal structures often co-occur (Bardach et al., 2020), it has been suggested to consider the configuration of multiple goal structures when

studying their associations with other variables (e.g., Gallo et al., 2022). This person-centered approach aims to identify subpopulations of participants who share qualitatively and quantitatively similar configurations of variables (Morin & Litalien, 2019). In terms of goal structures, this approach focuses on the student's overall perception of the present goal structures rather than looking at each goal structure individually, taking the co-occurrence of goal structures into account (e.g., Gallo et al., 2022).

The person-centered approach has mainly been studied with students' personal goals (e.g., Bardach et al., 2023; Luo et al., 2011), rather than classroom goal structures. Only a few empirical studies have focused on profiles of classroom goal structures. However, in most of these studies, only one or two classroom goal structures were considered, and other factors, like teachers' relationships, were also used to define these profiles (e.g., Jaakkola et al., 2015). For example, Olivier et al. (2024) defined profiles regarding perceived classroom goal structures and social climate and found the following five profiles: a low all climate (low CGS, low social climate), a high all climate (high CGS, high social climate), a performance climate (moderate performance approach and avoidance CGS, low mastery CGS, low social climate), a low performance climate (low performance approach, low performance avoidance, moderate mastery, high social climate) and a mastery and positive social climate (high mastery, high social climate, average performance approach, low performance avoidance). Additionally, Gallo et al. (2022) found a profile characterized by generally average levels of classroom goal structures and another profile that showed high levels of mastery and performance approach goal structures. A review, which focused on the prevalence of personal achievement goal profiles, found similar findings regarding the corresponding classroom goal structures (Wormington & Linnenbrink-Garcia, 2017).

Little research has focused on associations between profiles of classroom goal structures and students' outcomes, as studying CGS configurations has only recently gained popularity. However, some studies focused on profiles of classroom goal structures and their associations with academic and behavioral outcomes. In terms of achievement, prominent mastery CGS and a lower level of other goal structures (i.e., performance CGS) have been found to be most beneficial, being associated with higher academic achievement. Within these CGS patterns, students have also shown higher levels of engagement in specific subjects (Gallo et al., 2022; Olivier et al., 2024;

Schenke et al., 2017). Furthermore, it has been found that goal structure profiles with prominent performance goal structures or profiles with generally low goal structures show the highest levels of externalizing behavior (Gallo et al., 2022), like hyperactivity and inattention, as well as deviant behavior. A similar pattern has been found for internalizing behavior (Olivier et al., 2024). Taken together, teachers have the potential to shape students' academic and behavioral outcomes. Beyond that, classroom goal structures also provide a backdrop for students' social interactions, including their engagement in social comparison processes.

Social Comparison

The social comparison theory (Festinger, 1954) states that to evaluate one's abilities (and opinions), people tend to compare themselves with others, especially when there are no objective references to use for comparison. In doing so, one does not compare oneself with just any other person, but with someone who's similar to oneself in terms of relevant characteristics. Comparison processes have been postulated to go in two directions: upward and downward (Suls et al., 2002). Comparing oneself to someone who is better off than oneself is called upward social comparison. In contrast, comparing oneself to someone who is worse off than oneself is called downward social comparison. Another direction of comparison is lateral, where one compares to a similar other. However, research on this comparison direction is scarce (Dijkstra et al., 2008).

The social comparison theory generally states that upward social comparison leads to negative feelings, by noticing that someone else is better off (Tesser et al., 1988), and downward social comparison leads to positive feelings, by noticing someone else is worse off (Wills, 1981). However, this view was challenged by Buunk et al. (2005) and Smith (2000). They postulated that the affective reaction depends on how social comparison information is interpreted. It can either be seen as identification or as contrast. Suppose an individual engages in an upward social comparison and believes they can become as good as the comparison target (i.e., identification). In that case the individual will experience positive emotions, like optimism and inspiration. However, if the individual interprets this information as that they are worse off than someone else (i.e., contrast), they will experience negative emotions, like frustration and envy. The same applies to downward social comparison. If an individual identifies with the downward comparison target, they will experience negative emotions, like fear,

thinking they could possibly end up in a similar situation as the comparison target. However, if the individual sees themselves as being far better off than the comparison target (i.e., contrast), positive affective reactions are likely to occur, like relief and schadenfreude. An additional factor is whether the focus of attention lies on oneself or another person (self- or other-focused). Some emotions, like schadenfreude, encompass a more dual focus, involving oneself and another person (Smith, 2000).

Although the approaches of Buunk et al. (2005) and Smith (2000) suggest that downward comparison and upward comparison can have both positive and negative consequences, recent empirical evidence supports the original assumptions made by social comparison theory (Festinger, 1954). Upward social comparison has been linked to low well-being, and this association is mediated by envy (e.g., Niu et al., 2024; Li, 2024; Li & Liu, 2024). Individuals who tend to compare themselves with others who possess better characteristics experience more envy and therefore feel worse about themselves. It has also been associated with low self-esteem (Shang & Bao, 2025), low quality of life, and low perceived social support (Gomez et al., 2022). Additionally, upward social comparison is linked to higher self-threat, further lowering one's self-esteem (Moon et al., 2025). In contrast, downward social comparison has often been seen as more beneficial for the individual. It can be a way of feeling good about oneself (Wills, 1981). Comparing oneself to someone who one perceives as being inferior or worse off has been found to lead to more life satisfaction, less perceived stress, and fewer depressive symptoms (Cheng et al., 2008; Stewart et al., 2012). Downward social comparison can increase self-esteem, especially for individuals who lack it (Reis et al., 1993). In the presence of self-threat, individuals with high self-esteem tend to engage in more downward social comparison than individuals with low self-esteem, who engage more in upward social comparison (Vohs & Heatherton, 2004). Most of these studies have been conducted with young adults and elderly. This leaves a research gap regarding social comparison and its associations in the school context.

What role do these social comparison processes play in school and students' social interactions? Especially, due to the nature of school, students are exposed to many comparisons, whether in terms of participation in class, grading, or general academic achievements (Dijkstra et al., 2008). Additionally, in the developmental phase of adolescence, peer evaluations become more important, contributing to increased social comparison (Nicholls, 1990). Also, the classroom climate can foster or diminish social comparison processes, depending on which goal structures are

perceived as being present (Meece et al., 2006) (which I will go into more detail in the following chapter). Whether students tend to compare themselves upward or downward depends on the motive behind the comparison (i.e., self-improvement for upward social comparison or self-enhancement for downward social comparison). However, students tend to compare themselves upward more often (Dijkstra et al., 2008). These comparisons have academic and affective consequences. While upward social comparison generally makes students perform better, it also makes them feel worse (Dijkstra et al., 2008). In contrast, downward social comparison has been linked to more positive emotions (Nicuță & Constantin, 2021).

Achievement Goal Theory and Social Comparison

Classroom goal structures are believed to be associated with how students compare themselves to their classmates. Achievement goal theory states that mastery classroom goal structures should not promote social comparison between students, as within this goal structure, the focus lies more strongly on individual progress and mastering specific tasks (Elliot & McGregor, 2001). In contrast, teaching practices focusing on normative evaluations, establish performance-oriented goal structures (Ames, 1992). Students are concerned with their performance compared to their classmates, leading to social comparison processes.

Even though achievement goal theory states that only performance goals should be related to social comparison, as opposed to mastery goals, empirical findings have shown that the role of social comparison in achievement goals is more nuanced. Mastery goals, performance approach, and performance avoidance goals are associated with social comparison (Régner et al., 2007). However, the association between mastery goals and social comparison disappears when performance approach goals are low at the same time and is strongest when performance approach goals are simultaneously high, suggesting an interaction of the different goals. Performance avoidance goals were only associated with social comparison when performance approach goals were low (Darnon et al., 2010). Further differentiation has to be made concerning the measured facet of social comparison. When social comparison is measured as academic social comparison (e.g., comparing one's own *learning* level and achievement to someone else's), positive associations between upward academic social comparison and mastery goals and negative associations between downward social comparison and mastery goals have been found.

Performance goals were not related to academic social comparison (Zhou et al., 2020). Another study found that while opinion-based social comparison (obtaining information about one's own opinion and thoughts in comparison to someone else's opinions and thoughts) is related to mastery goals, ability-based social comparison (obtaining information about one's own ability in comparison to someone else's abilities) is related to performance goals (Chun, 2024). These results suggest mastery goals are not entirely free of social comparison processes, but students who endorse mastery goals do so for different reasons (e.g., comparing learning strategies) than students with high performance goals (e.g., comparing achievements).

The empirical findings reported so far have exclusively dealt with personal achievement goals. There is less research on perceived classroom goal structures and social comparison. However, as stated earlier, social comparison processes have negative consequences for individuals (e.g., Shang & Bao, 2025). Therefore, it is essential to investigate how classroom goal structures are associated with social comparison (as teachers can actively shape the learning environment) to see if similar patterns can be found. One study found that perception of a highly competitive classroom climate is associated with higher upward social comparison and not with downward social comparison (Ding et al., 2022). This finding suggests that students perceiving the learning climate as performance-oriented compare themselves more to students who outperform them, while comparison to lower-achieving students is less likely.

Schadenfreude

Schadenfreude describes the joy felt over the misfortune of another person (Oxford University Press, n.d.). It is a social emotion (defined as emotions which arise within social interaction and relate to other individuals) as it involves another person experiencing misfortune and oneself, who feels good about it. It can also be categorized as being an immoral social emotion, as schadenfreude is not seen as serving the welfare of others nor as leading to positive social outcomes (Yu et al., 2024).

Smith et al. (2009) and Wang et al. (2019) have proposed distinct forms of schadenfreude. Both theories include justice (deserving) schadenfreude. Justice schadenfreude is experienced when the misfortune befalling another person is perceived as being deserved. When another person violates a social norm, the

misfortune befalling them restores a sense of social justice and fairness. For example, when a student cheats on a test and gets caught. In this form, the focus lies on the other person, as one's own status plays a tangential role. Aggression schadenfreude (Wang et al., 2019) describes schadenfreude in an intergroup context and stems from one's social identity. It is experienced when the misfortune befalls a member or members of an outgroup and is beneficial for the ingroup, which is often the case in competitive domains. For example, when an opposing team loses a soccer game, one's own team feels happy about it. In contrast to justice schadenfreude, the focus lies more strongly on the self and the in-group. The third form proposed by Wang et al. (2019) is called rivalry schadenfreude. It describes experiencing schadenfreude in a situation where the misfortune befalling another person leads to an advantage for oneself in terms of social comparison concerns. For example, when an A student gets a bad grade. As in aggression schadenfreude, the focus lies on one's own status within a social comparison process. Smith et al. (2009) proposed a form of schadenfreude that arises due to personal gain from the other person's misfortune. This form can be seen as a mixture of the two previously mentioned forms of schadenfreude: aggression and rivalry. In competitive domains, like sports and politics, the ingroup gains from the loss of the opponent team, leading to the experience of schadenfreude. This is in line with the aggression schadenfreude. However, the form of Smith et al. (2009) also emphasizes that personal gain can result from social comparison benefits, which would be more in line with rivalry schadenfreude. In fact, the three-factor structure, proposed by Wang et al. (2019), was not validated in a recent study (Kato & Izumi, 2025). This suggests that the two forms (aggression and rivalry schadenfreude) are empirically not distinct from one another. The third form proposed by Smith et al. (2009) is schadenfreude resulting from envy. Envy is regarded as an unpleasant emotion. When a misfortune befalls an envied person, it can lead to feelings of pleasure for the envier. This form shares some overlap with rivalry schadenfreude, as (upward) social comparison can be experienced as unpleasant and has often been linked to envy (e.g., Niu et al., 2024).

Like any other social emotion, Schadenfreude can be studied from the perspective of different emotion theories (Yu et al., 2024). From the adaptation perspective, emotions serve some kind of survival advantage through solving adaptive problems. These include aspects like reproduction and protection from threats to one's well-being (Smith & Lazarus, 1990). From this perspective, schadenfreude (especially

the justice form) could serve as protection from others taking advantage of oneself or gaining undeserved advantages. The basic emotion perspective believes certain emotions are universally present and have a strong biological basis. All basic emotions are expressed with a distinct facial expression and can be understood across cultures (Ekman, 1992). This perspective would be concerned with physical manifestations of schadenfreude, like a change in heart rate.

The appraisal perspective focuses on cognitive appraisals and the interpretation of a given event. Different appraisals of the same situation can therefore elicit different emotions. Hence, it is not the situation per se that elicits an emotion, but rather the specific appraisal of that given situation (Moors et al., 2013). Appraisal theorists have postulated different dimensions through which individuals evaluate the importance of an event. These include the significance of the event (Is it relevant to one's goals and needs?), the implication of the event (What are the consequences of that event and how does it affect one's well-being?), coping potential (ability to cope with the situation) and compatibility of the event with personal and social norms and values (Scherer, 2009). Schadenfreude would therefore be expected to occur in situations where the misfortune is appraised as being important to oneself.

Focusing on the appraisal perspective, the question arises as to which aspects of the environment promote the experience of rivalry schadenfreude? Rivalry schadenfreude has theoretically been linked to competition and social comparison (Wang et al., 2019), and this connection has also been found in empirical studies. For example, a study has shown that higher schadenfreude is elicited when misfortune befalls someone you rival (Ma et al., 2022). Also, competitive settings are associated with schadenfreude. When misfortune befalls someone in a competitive environment (compared to a non-competitive environment), schadenfreude increases (Abell & Brewer, 2018; Brambilla & Riva, 2017). Competitive environments are also often accompanied by feelings of envy. While benign envy shows no association with schadenfreude, malicious envy is said to be an antecedent of schadenfreude (e.g., Greenier, 2021; van Dijk et al., 2015; van de Ven et al., 2014). However, social comparison plays an important role in this association. If an individual witnesses a misfortune happening to someone, without precise social comparison information, envy does not lead to schadenfreude. This linkage is only found when an individual knows their own level compared to someone else's level (i.e., precise social comparison) (Lin & Liang, 2021). While benign envy is associated with moderate

upward comparison, malicious envy and schadenfreude are linked to extreme upward, respectively, downward social comparison (Diel et al., 2025). In other words, when an individual feels like they could possibly reach the envied person's status (benign envy), a misfortune befalling that person does not elicit schadenfreude. But if the individual feels too far from the envied person's status, a misfortune befalling that person does elicit schadenfreude. Furthermore, the comparison target has to be relevant for the individual (e.g., same gender), for envy to elicit schadenfreude (van Dijk et al., 2006). The focus of the thesis will, therefore, be on rivalry schadenfreude, as this form is theoretically best embedded in association with the other variables (i.e., competitiveness and social comparison).

Social interactions are an important part of everyday school life. Therefore, social emotions, such as schadenfreude, are also omnipresent in school. However, research on schadenfreude in the school context has been scarce. Due to the negative consequences related to schadenfreude (e.g., Cuadra-Martínez et al., 2022), it would be necessary to gain a better understanding of its potential antecedents and consequences. One study examined potential influences on the school climate. They found schadenfreude to be negatively associated with academic engagement and prosocial behavior (Cuadra-Martínez et al., 2022), showing that social aspects of school life are also relevant for academic aspects. Schadenfreude stemming from personal aversion was linked to in-person bullying perpetration and cyberbullying perpetration. Boys generally reported higher scores of schadenfreude and bullying, compared to girls. In terms of age, only differences in justice schadenfreude were found, with younger students reporting more justice schadenfreude than older students (Cabrera-Vázquez et al., 2025). This suggests that students who experience schadenfreude when witnessing someone else's misfortune are also more likely to engage in bullying behavior.

Classroom Goal Structures and Schadenfreude

Research so far has recognized the important role of teachers' practices in shaping students' emotions at school (Baudoin & Galand, 2020). Mastery goal structures have often been linked to positive emotions (Chim & Leung, 2016; Gertsakis et al., 2020), like enjoyment (Baudoin & Galand, 2020), whereas performance goal structures have been associated with negative affect (Chim & Leung, 2016), like anger, anxiety (Baudoin & Galand, 2020), and shame (Baudoin & Galand, 2017).

Achievement goals have also been associated with academic social comparison emotions. Yu & Chun (2024) looked at differences between profiles of achievement goals in terms of academic social comparison emotions. They found that profiles, characterized by strongly endorsing performance goals, showed heightened upward and downward contrast emotions (like envy and schadenfreude). Students corresponding to this profile directed their attention to comparing themselves to classmates performing better and worse than themselves, especially those who they perceive to be dissimilar to themselves. Furthermore, they found that profiles, which were characterized by strongly focusing on mastery goals, showed relatively low engagement in contrast emotions. Within these profiles, students' attention is directed to their own learning processes and less towards the performance of (dissimilar) others. As achievement goals have been found to mediate the relationship between goal structures and students' emotions (Baudoin & Galand, 2020), a similar pattern of academic social comparison emotions (like schadenfreude) can be expected for goal structures.

What underlying mechanism could be responsible for the association between classroom goal structures and rivalry schadenfreude? Within a highly perceived competitive classroom (i.e., salient performance goal structures), one might appraise a misfortune differently than in a classroom that is perceived as endorsing mastery goal structures more strongly. This can be theoretically explained by appraisal theory (Scherer, 2009). Within a classroom that is perceived as endorsing high performance goal structures, performing better or at least not worse than others is being valued (Midgley & Urdan, 2001). Therefore, a misfortune befalling another classmate (such as receiving a bad grade) is perceived as being relevant to the salient classroom goal structure, with the event becoming significant for oneself. The consequences of the misfortune are also perceived as being positive. First, the academic achievement of the classmate suffering the misfortune is worse than one's own. In other words, one is outperforming one's classmate, and thus the salient goal structure is met. Second, performance-oriented classrooms are associated with higher stress and more concerns about one's school performance (García-Moya et al., 2023; Tharaldsen et al., 2023). Downward comparison (as is the case when a misfortune befalls another classmate) could therefore be experienced as a stress relief (Wills, 1981), reducing perceived self-threat (Vohs & Heatherton, 2004). On the contrary, in terms of present mastery goal structures, the focus lies more strongly on acquiring new knowledge and

improving oneself instead of outperforming others (Meece et al., 2006). Therefore, a misfortune befalling another classmate is perceived as being less relevant, as it is not important to the perceived classroom goal structure. Misfortune does not directly impact one's own skills and improvement. As it is not relevant to oneself, it also has no direct positive or negative consequences for one's well-being or goal pursuit. Therefore, perceived mastery goal structures should not be associated with *schadenfreude*. Regarding the association of goal structures and rivalry *schadenfreude*, the other two processes of the appraisal theory (coping and compatibility with norms) play a less significant role, which is why they will not be discussed further.

To sum up, the literature suggests a link between classroom goal structures, social comparison orientation, and rivalry *schadenfreude*. On the one hand, performance goal structures put focus on outperforming others, not performing worse than others (Midgley & Urda, 2001), and competition between students (Fülöp et al., 2025). They are said to promote social comparison processes, to gain information about one's own position relative to their classmates (Ames, 1992; Régner et al., 2007). Thus, students engage in upward and downward social comparison with dissimilar others (students who gain better and worse grades than themselves). These social comparison concerns make the appearance of social contrast emotions, like rivalry *schadenfreude*, more likely (Yu & Chun, 2024). On the other hand, within mastery goal-oriented classrooms, intrapersonal learning processes are highly valued, focusing less on comparison to dissimilar others (Ames, 1992; Chun, 2024). Therefore, social contrast emotions, like rivalry *schadenfreude*, are less likely (Yu & Chun, 2024). In other words, when a misfortune befalls another classmate in a competitive classroom climate (i.e., present performance goal structure) with highly salient social comparison processes, one is more likely to experience rivalry *schadenfreude*, compared to a classroom climate that endorses stronger mastery goal structures (e.g., Brambilla & Riva, 2017).

The Present Study

The purpose of the present study was twofold. First, I aimed to adequately capture the different configurations of students' perceived classroom goal structures. Specifically, I wanted to identify clusters of students' perception of classroom goal structures, based on the multiple goal perspective (Wormington & Linnenbrink-Garcia,

2017). Based on theory and prior research, I hypothesized that clusters would differ in terms of valence (approach vs. avoidance) and in terms of their goal pursuit (mastery vs. performance) (Hypothesis 1a). Additionally, qualitatively indifferent clusters were expected (e.g., high all classroom goal structures) (Hypothesis 1b).

Second, I aimed to investigate how these configurations are related to social-emotional variables (social comparison orientation and rivalry *schadenfreude*). Achievement goal theory has often been linked with social comparison processes (Ames, 1992). Prior research linked mastery and performance goals to social comparison. However, interactions of mastery and performance goals have been found, suggesting that mastery goals are only linked to social comparison when performance goals are simultaneously high (Darnon et al., 2010; Régner et al., 2007). I therefore take the configuration of multiple goal structures into account. Consistent with achievement goal theory and empirical findings, I expected clusters with stronger perceived mastery goal structures to show less social comparison orientation than clusters that are also perceived as endorsing performance goal structures (approach and avoidance) (Hypothesis 2). In the absence of prior knowledge about the clusters that would be identified, more explicit hypotheses cannot be formulated.

Additionally, I investigated differences between clusters in terms of rivalry *schadenfreude*. Achievement goals direct students' attention to specific events (Yu & Chun, 2024). Prior research found that performance goals direct students' attention to social comparison processes, leading to various social contrast emotions, like *schadenfreude*. In comparison, students endorsing mastery goals are less concerned with comparing their abilities to their classmates' (Chun, 2024), making the experience of social contrast emotions less likely (Yu & Chun, 2024). I therefore hypothesized that clusters with stronger perceived mastery goal structures show less rivalry *schadenfreude* than clusters that are (also) perceived as endorsing performance goal structures (approach and avoidance) (Hypothesis 3). Again, more explicit hypotheses cannot be formulated at this point.

Method

Procedure

Data was collected within a larger research project called “Envy and Schadenfreude in the Classroom” (Grant-DOI: 10.55776/P35411), funded by the Austria Science Fund (FWF). Several schools were contacted by the research team and asked about their interest and willingness to participate in the project. Eventually, six schools (four in Vienna, two in Lower Austria) were recruited. Data collection took place between the 16th of October and the 9th of November 2023. Before data collection started, a research team member gave a short introduction to the procedure for data collection for everyone involved in the process. Data of each class in each school was collected during school lessons by a research team member or associated people (e.g., master’s students). At the beginning of each data collection lesson, the person in charge introduced themselves to the class and gave a short description of the aim of the study. Instructions continued with information about the questionnaire (i.e., content of the questionnaire and requesting to answer the questions intuitively and honestly). Within the larger research project, there was a second data collection, for which students were instructed to create a specific code in order to be able to match the two data points. Furthermore, they were reassured that all their answers would be handled precisely, anonymously, and not given out to anyone else, besides researchers involved in the project. Lastly, students were told to read all the instructions carefully, and when they were done filling out the questionnaire, they should remain silent. After checking if there were any open questions, the person responsible wrote down the link to the online questionnaire on the blackboard, and students could access it through an electronic device. While students filled out the questionnaire, the person in charge ensured a quiet working area and took notes of any conspicuities (e.g., exams handed out prior to data collection, students chatting, questions asked). After the last students had finished the questionnaire, they were thanked for participating in the study and given a flyer with contact information for psychological support. The teacher received a small incentive as a thank you for making their lesson available for data collection.

The questionnaire was set up using Qualtrics (Qualtrics, 2023). Students could access the online questionnaire via a link on their smartphone, tablet or laptop. The

research team also had a few printed-out questionnaires for students who could not access the questionnaire via a mobile device. The overall questionnaire took about 25 minutes to complete. Items of each scale were randomized. The questionnaire was structured as follows (only the parts of the questionnaire that are relevant for the present thesis are reported): after students gave their consent to participate in the study, they first had to answer demographic questions (i.e., age, gender, school, class, and highest educational level of parents). Then they were asked to report their grades in the last report, followed by social comparison orientation items, rivalry schadenfreude items, and classroom goal structure (i.e., mastery CGS, performance approach CGS – normative, and performance avoidance CGS – normative) items. At the end of the survey, students were asked whether they answered the questions honestly and could write down any comments about the questionnaire in an open text field.

Sample

The sample consisted of 1868 students from six schools and 98 different classes. Four schools were located in Vienna and two in Lower Austria. Five schools were academic secondary schools (AHS), and one was classified as a college of higher vocational education (BHS). Participants were aged between 11 and 20 years ($M = 14.0$, $SD = 1.4$), attending secondary school level (7th to 10th grade). Girls were slightly overrepresented in the sample, which is typical for academic secondary schools (46.2% of students identified as male, 52.2% identified as female, 1.6% identified as diverse or did not indicate their gender). Regarding educational background, most students stated that at least one parent had a high level of education, i.e., a university degree (44.0%). Less than one-fifth of the students reported that their parents' highest educational level was the school-leaving examination (Matura). About 15% of the students reported that their parents' highest level of education was below the "Matura", the Austrian school-leaving examination. Almost a quarter (23.5%) did not know their parents' highest level of education. Regarding final report grades in math, over half of the students received a B or C (26.1% and 26.9%). About one-fifth received an A (20.7%) and another fifth a D (19.6%). 5.9 percent received an E. A small number of students (<1%) were not graded. Participation in this study was entirely voluntary. Reasons for students not taking part in the study were either due to absence from school on data collection day or due to refusal to participate.

Measures

Classroom goal structures, social comparison orientation, and rivalry schadenfreude were assessed using self-report measures (see Table C in the Appendix).

Classroom Goal Structures

To assess the perceived classroom goal structures, items of Bardach and Lüftenegger (2018) were used. The following three dimensions were measured: mastery goal structures, performance approach goal structures, and performance avoidance goal structures. Mastery goal structures measure the extent to which students perceive learning and understanding relevant material as being valued within a certain class (Meece et al., 2006). To assess mastery goal structures, four items were used (e.g., “In our math class, the point is to learn something interesting.” [“In unserem Mathematikunterricht geht es darum, etwas Interessantes zu lernen.”]). The internal consistency showed to be acceptable, with Cronbach’s $\alpha = .72$. Performance approach goal structures with a normative focus refer to the extent to which students perceive a certain class to be about achieving higher performance in comparison to other classmates (Meece et al., 2006). It was measured using three items (e.g. “In our math class, the point is to obtain better grades than the others.” [“In unserem Mathematikunterricht geht es darum, bessere Noten als andere Mitschüler:innen zu bekommen.”]) The internal consistency showed to be good, with Cronbach’s $\alpha = .86$. Performance avoidance goal structures with a normative focus measure the extent to which students perceive that hiding or avoiding bad academic performance in front of others is valued within a certain classroom (Meece et al., 2006). It was measured using four items (e.g. “In our math class the point is, to conceal if one knows less than the others.”, [“In unserem Mathematikunterricht geht es darum, es zu verbergen, wenn man weniger weiß als andere.”]). The internal consistency was good, with Cronbach’s $\alpha = .81$. All items referred to students’ math class. Answers ranged from “Totally disagree (1)” to “Totally agree (5)” using a 5-point Likert scale.

Social Comparison Orientation

Social comparison orientation was operationalized using the Short Scale of the Iowa-Netherlands Comparison Orientation Measure (INCOM) (Schneider & Schupp, 2014), which measures one’s general tendency towards social comparison and to use this gained information to relate it to oneself. The scale consists of two dimensions:

ability and opinion. Social comparison in terms of ability focuses on how one is doing in comparison to others, while the dimension opinion focuses more on what others think and feel, compared to oneself. The scale has been translated into German. The validity of the scale was tested and supported within a German sample (Schneider & Schupp, 2014). In the present study, the three items measuring the dimension of ability have been used (e.g., “I always pay attention to how I do things compared with how others do things.” [“Ich achte immer sehr stark darauf, wie ich Dinge im Vergleich zu anderen mache.”]). One item was reverse-coded to control for acquiescence bias. Answers ranged from “Totally disagree (1)” to “Totally agree (5)” using a 5-point Likert scale. Internal consistency was found to be rather questionable, $\alpha = .62$. If the reversed item was dropped, internal consistency would have been higher, $\alpha = .69$, potentially showing some acquiescence bias. However, the content of the reverse-coded item accurately represents the tendency towards social comparison, which is why no item was dropped for statistical analysis.

Rivalry Schadenfreude

Rivalry schadenfreude, a subfacet of schadenfreude, was assessed within the broader research project by using items adapted from Baren (2017) as well as self-developed items by the research team. It measures the extent to which one experiences schadenfreude in situations where one is concerned with social comparison and prefers an inequity in favor of one's own status (Wang et al., 2019). Four items were used to measure this variable. The factor structure showed good model fit, CFI = .998, TLI = .994, RMSEA = .028, SRMR = .008, $\chi^2 = 4.83$, $p = .09$. Standardized item loadings ranged from $\lambda = 0.61$ to 0.67 . All items referred to a school setting (e.g., grades, PE class) and shortly described a situation in which another student befalls a misfortune (e.g., “My mood lightens up when the A student gets a bad grade.” [“Meine Laune verbessert sich, wenn der:die Einserschüler:in mal eine schlechte Note schreibt.”]). Answers ranged from “Totally disagree (1)” to “Totally agree (5)” using a 5-point Likert scale. The internal consistency of the scale was found to be acceptable, $\alpha = .73$.

Statistical Analysis

Statistical analyses were conducted using SPSS, Version 30, and JASP, Version 0.18.1 (JASP, 2025). Data cleaning was done by the research team, prior to receiving the data set for the statistical analyses. The following cases were deleted of the data

set: Participants, who did not consent on using their data, participants who indicated to have not answered the questions truthfully, participants who filled out less than half of the items of the questionnaire, participants who took under 500 seconds or over 2100 seconds (based on exceeding or falling below one and two, respectively, standard deviations from the mean completion time) to complete the questionnaire and finally participants whose answer pattern seemed unreliable (e.g., answering with the same value on almost all items). After data cleaning, the data set included 1868 cases. Those with missing data on at least one variable of the classroom goal structures were excluded from further statistical analyses, as they could not be properly assigned to a specific cluster. This led to a final data set with 1769 cases. Means for each scale were calculated by adding up the value of each item and dividing it by the number of items per scale.

Considering the multiple goal perspective (Wormington & Linnenbrink-Garcia, 2017), students were assigned to groups of similar classroom goal structures using a cluster analytic approach. First, outliers were spotted using the single-linkage method. Four cases were identified as outliers and excluded from further statistical analysis. Second, a hierarchical cluster analysis using the WARD method (squared Euclidean distance) was conducted to estimate the number of clusters that are present in the data set. Dendrogram and scree-plots (with AIC and BIC) were used as decision criteria. Further, based on the prior estimated number, two K-means cluster analyses (one with three clusters and one with five clusters) were conducted. Based on the content of the clusters, the final cluster solution was chosen. Cluster means were categorized into high, medium, or low by using naming rules, which have been previously used in a review (Wormington & Linnenbrink-Garcia, 2017). Naming rules were as follows: categorized as high for means ranging from 3.95 to 5.00, as medium for means ranging from 2.05 to 3.94, and as low for means ranging from 1.00 to 2.04. The most prominent goal (i.e., the highest mean) was identified. If the mean of the other two goals was closer to the mean of the prominent goal, compared to the midpoint of the scale (i.e., 2.5), the said goal was still categorized in the same category as the most prominent goal. For example, in cluster 2, the most prominent goal structure is the performance approach CGS, with a mean of 3.97. This led to a categorization of high. The two other classroom goal structures would be categorized as medium (as both are below 3.95). However, because the means of these two goal structures are closer to the mean of the performance approach CGS than to the midpoint of the scale (3.81 and 3.56 are

closer to 3.95 than to 2.5), they were also categorized as high. Finally, each student was assigned to one cluster of the final cluster solution (five clusters).

The statistical power for the MANOVA was tested using G-Power. With the sample size of $N = 1765$, five groups, two dependent variables and a medium found effect, the statistical power was $>.99$, indicating there was enough power to find this effect. The factor structure of the schadenfreude scale was evaluated using several indices, including χ^2 , Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Cutoff scores for good model fit were the following: CFI and TLI $\geq .95$, RMSEA $\leq .06$ and SRMR $\leq .08$. Assumptions for multiple analysis of variance (MANOVA) and analysis of variance (ANOVA), respectively, were checked. If assumptions were not met, alternative tests were used (e.g., Welch tests for violation of the variance homogeneity assumption). To test differences between clusters in terms of rivalry schadenfreude and social comparison orientation, a MANOVA and two separate ANOVAs with a between-subjects design with one factor were conducted. The grouping factor was the assignment to the five clusters, and the dependent variables were rivalry schadenfreude and social comparison orientation, respectively. In case of statistical significance of the ANOVA, simple contrasts for each hypothesis were calculated. Post hoc analyses were conducted to explore further differences between clusters. Generally, p-values of $< .05$ were considered statistically significant. For the non-orthogonal contrast tests a more conservative p-value was used ($< .01$), as the comparisons are related and p-values are correlated to some extent (Field, 2009).

Results

Descriptive Statistics

Descriptive statistics for all variables can be seen in Table 1. All variables showed intra-individual differences (displayed in their variances). Statistically significant correlations between variables varied from small ($r \leq .1$) to moderate ($r \leq .3$; Cohen, 1988), with the exception of performance-approach and performance-avoidance classroom goal structures, which were highly correlated. Mastery classroom goal structures showed no statistically significant correlation with any other construct, except for the performance-approach classroom goal structure.

Table 1: *Descriptive statistics for all variables used in analyses*

	1	2	3	4	5
1. Mastery CGS	-				
2. Performance approach CGS	.08**	-			
3. Performance avoidance CGS	-.03	.63***	-		
4. Rivalry schadenfreude	-.05	.30***	.29***	-	
5. Social comparison orientation	-.04	.25***	.29***	.25***	-
<i>N</i>	1,765	1,765	1,765	1,758	1,762
<i>M</i> (<i>SD</i>)	3.40 (0.87)	2.65 (1.07)	2.63 (0.97)	2.23 (0.95)	3.09 (0.92)
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00
Kurtosis	-0.14	-0.55	-0.33	-0.03	-0.43
Skewness	-0.29	0.29	0.34	0.68	0.10

Note. CGS = Classroom goal structure.

All scales ranged from 1 to 5 with higher scores indicating higher expression of that variable.

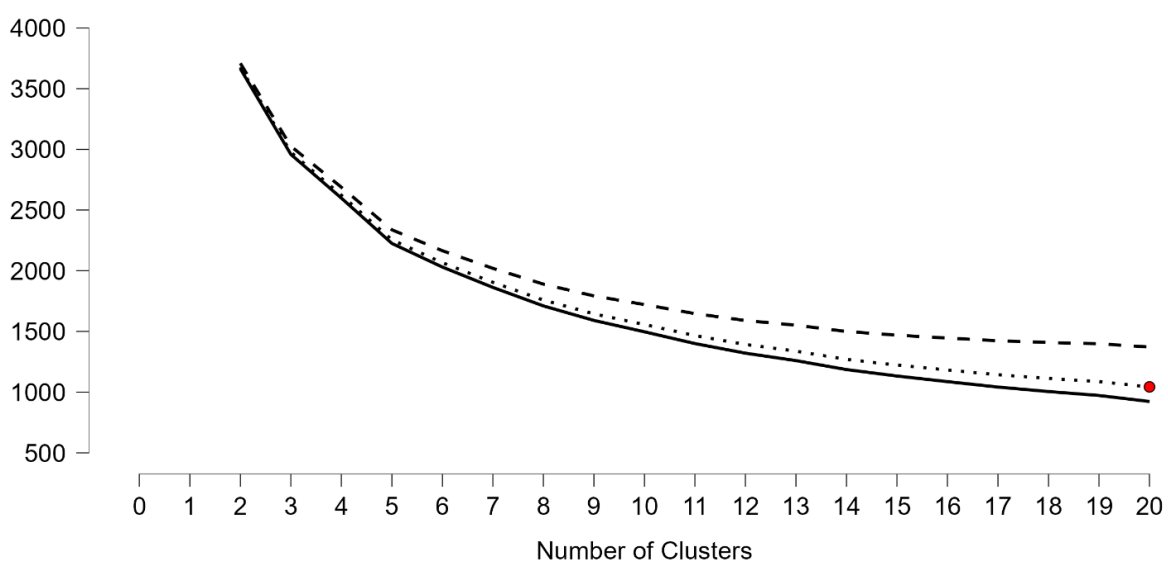
* $p < .05$, ** $p < .01$, *** $p < .001$.

Hierarchical Cluster Analysis

A hierarchical cluster analysis was conducted to estimate the number of clusters present in the data set in terms of the following variables: mastery CGS, performance approach CGS, and performance avoidance CGS. For the hierarchical cluster analysis, the Ward method with squared Euclidean Distance as a distance measure was used. The cluster solution converged after 19 iterations with no change of the cluster centers in the final iteration. The dendrogram (see Figure A in the Appendix)

shows a visual representation of the hierarchical cluster analysis results. The length of the vertical lines represents the distance at which clusters were combined, with longer lines indicating greater dissimilarity between clusters. There are between two to six possible clusters in the data set. One group of cases was combined with all other clusters in only the last step, indicating that this cluster is more diverse compared to the others in terms of their expression in classroom goal structures. The other clusters seem to be more similar, being merged at earlier stages. However, due to the subjectivity of the interpretation of the dendrogram, a scree plot was used to better estimate the appropriate number of clusters. The scree plot (see Figure 1) includes three indicators: the Akaike Information Criterion (AIC) (dotted line), the Bayesian Information Criterion (BIC) (dashed line), and the Within-Cluster Sum of Squares (WSS) (solid line). Notable changes in slopes were observed at the three-cluster solution and the five-cluster solution. The estimates of BIC revealed the largest decrease of BIC between the four-cluster (BIC = 2688.11) and the five-cluster (BIC = 2337.38) solution ($\Delta\text{BIC} = -350.73$), and between the two-cluster (BIC = 3709.11) and the three-cluster (BIC = 3015.85) solution ($\Delta\text{BIC} = -693.26$). These drops in BIC indicate that the three-cluster and the five-cluster solutions provide better model fit compared to the adjacent solutions. Therefore, those two cluster solutions were chosen for further analysis.

Figure 1: *Scree plot of hierarchical cluster analysis*



Note. This figure shows a scree plot of the hierarchical cluster analysis. The dotted line indicates AIC values, the dashed line BIC values and the solid line WSS values. Changes in slope can be observed at the three- and five-cluster solution.

K-means Cluster Analysis

K-means cluster analysis was conducted to group students based on their mastery CGS, performance approach CGS, and performance avoidance CGS. The analysis was run once with three predefined clusters and once with five predefined clusters. Initial cluster centers showed no distinct differences between clusters (see Table A and B in the Appendix). The three-cluster solution converged after 23 iterations with small changes in cluster centers by the 22nd iteration (value change < 0.00). Cluster 1 ($N = 700$) showed average mastery CGS ($M = 3.63$, $SD = 0.83$), low performance approach CGS ($M = 1.73$, $SD = 0.61$), and low performance avoidance CGS ($M = 1.83$, $SD = 0.59$) and can be interpreted as a *low performance CGS cluster*. Cluster 2 ($N = 431$) showed high mastery CGS ($M = 3.81$, $SD = 0.78$), high performance approach CGS ($M = 3.97$, $SD = 0.68$), and high performance avoidance CGS ($M = 3.56$, $SD = 0.85$) and can be interpreted as a *high all CGS cluster*. Cluster 3 ($N = 634$) showed average mastery CGS ($M = 2.86$, $SD = 0.67$), average performance approach CGS ($M = 2.77$, $SD = 0.57$), and average performance avoidance CGS ($M = 2.87$, $SD = 0.64$) and can be interpreted as an *average all CGS cluster*. The ANOVA revealed significant differences between the three clusters in terms of mastery CGS ($F(2,1762) = 253.94$, $p < .001$), performance approach CGS ($F(2,1762) = 1776.16$, $p < .001$) and performance avoidance CGS ($F(2,1762) = 942.87$, $p < .001$), indicating that descriptively performance CGS contributed more to the differentiation of the clusters than mastery CGS.

The five-cluster solution converged after 18 iterations with small changes in cluster centers by the 17th iteration (value change < 0.01). Cluster 1 showed high mastery CGS, high performance approach CGS, and average performance avoidance CGS and can be interpreted as an *approach goal structure cluster*. Cluster 2 showed high mastery CGS, high performance approach CGS, and high performance avoidance CGS and can be interpreted as a *high all CGS cluster*. Cluster 3 showed high mastery CGS, low performance approach CGS, and low performance avoidance CGS and can be interpreted as a *mastery CGS cluster*. Cluster 4 showed average mastery CGS, low performance approach CGS, and low performance avoidance CGS

and can be interpreted as a *low performance goal structure cluster*. Cluster 5 showed average mastery CGS, average performance approach CGS, and average performance avoidance CGS and can be interpreted as an *average all CGS cluster* (for overview see Table 2).

Table 2: Mean and standard deviation of the five-cluster solution

Clusters	N	Mastery approach CGS	Performance approach CGS	Performance avoidance CGS
		M (SD)		
Approach CGS cluster (C1)	408	3.96 (0.53)	3.24 (0.57)	2.62 (0.59)
High all CGS cluster (C2)	228	3.63 (0.86)	4.30 (0.63)	4.11 (0.63)
Mastery CGS cluster (C3)	428	3.98 (0.49)	1.69 (0.50)	1.94 (0.62)
Low performance CGS cluster (C4)	276	2.57 (0.63)	1.64 (0.58)	1.70 (0.54)
Average all CGS cluster (C5)	425	2.68 (0.56)	2.83 (0.58)	3.13 (0.59)

Note. CGS = classroom goal structures.

All scales ranged from 1 to 5 with higher scores indicating higher expression of that variable.

The ANOVA revealed significant differences between the five clusters in terms of mastery CGS ($F(4,176) = 487.26, p < .001$), performance approach CGS ($F(4,1760) = 1128.11, p < .001$) and performance avoidance CGS ($F(4,1760) = 744.13, p < .001$), indicating that descriptively performance approach CGS contributed most to the cluster differentiation, followed by performance avoidance CGS and mastery CGS.

The five-cluster solution was selected because it provides a more differentiated distinction between classroom goal structure clusters with distinct cluster solutions (e.g., separating students with high all goals from students with high approach goals but low performance avoidance goals) and all clusters maintained an adequate size for further analyses.

Cluster Differences

A MANOVA was conducted to assess any cluster differences between social comparison orientation and rivalry schadenfreude. Assumption checks revealed violations of assumptions. The Box's M-test for homogeneity of covariance matrices was significant ($\chi^2(12) = 43.10, p < .001$), as well as the Shapiro-Wilk Test for

multivariate normality ($W = 0.996, p < .001$). Therefore, the Pillai's Trace test statistic was used, as this is most robust against assumption violations. The MANOVA revealed significant differences between clusters in terms of the two dependent variables ($F(8,3506) = 32.03, p < .001$, Pillai Trace = 0.14). Subsequently, a one-way ANOVA for each dependent variable was conducted.

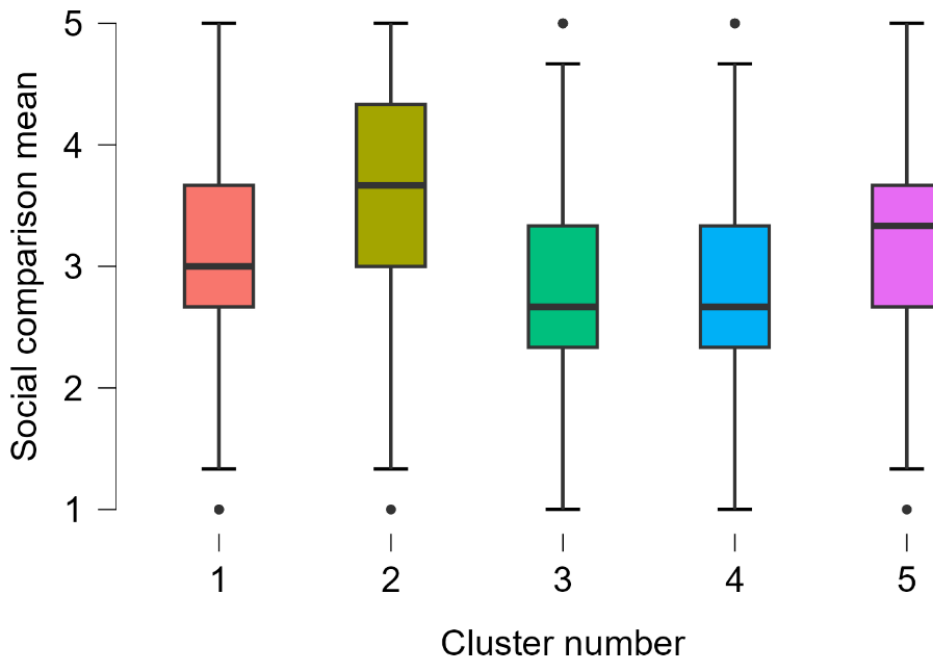
Social Comparison Orientation

A one-way ANOVA was conducted to assess cluster differences in social comparison orientation. I hypothesized that clusters with a stronger focus on mastery goal structures show less social comparison orientation, compared to clusters that also empathize performance approach and performance avoidance classroom goal structures. I therefore expected the *mastery CGS cluster* (C3) and the *low performance CGS cluster* (C4) to show less social comparison orientation than the *approach CGS cluster* (C1), the *high all CGS cluster* (C2), and the *average all CGS cluster* (C5). Assumptions were checked. Levene's Test for equality of variances was not significant ($F(4,1757) = 2.16, p = .07$). Shapiro-Wilk Test for normality revealed no normal distribution in all five groups ($W = 0.98$ (C1), 0.96 (C2), 0.97 (C3), 0.98 (C4), 0.98 (C5), $p < .001$). The one-way ANOVA revealed significant differences between clusters in terms of social comparison orientation ($F(4,1757) = 37.55, p < .001, \eta^2 = 0.08$), with a medium effect size. The Kruskal-Wallis Test was also significant ($H(4) = 138.28, p < .001$), indicating a robust result of the ANOVA.

Contrasts were conducted with the *mastery CGS cluster* and the *low performance CGS cluster*, respectively, as the reference group. The *mastery CGS cluster*, in which mastery classroom goal structures were more prominent than performance classroom goal structures, showed significantly less social comparison orientation ($M = 2.83, SD = 0.91$) than the *approach CGS cluster* ($M = 3.10, SD = 0.83$), in which only mastery and performance approach CGS were highly present ($t(1757) = -4.54, p < .001, d = -0.32$), than the *high all CGS cluster* ($M = 3.59, SD = 0.92$), in which mastery goal structures and both performance goal structures were highly present ($t(1757) = -10.57, p < .001, d = -0.84$) and the *average all CGS cluster* ($M = 3.25, SD = 0.84$), in which mastery goal structures and both performance goal structures were averagely present ($t(1757) = -7.08, p < .001, d = -0.49$). The *low performance CGS cluster*, in which mastery classroom goal structures were more prominent than performance classroom goal structures, showed significantly less social comparison ($M = 2.83, SD = 0.95$))

than the *approach CGS cluster* ($M = 3.10$, $SD = 0.83$), in which only mastery and performance approach CGS were highly present ($t(1757) = -3.96$, $p < .001$, $d = -0.31$), than the *high all CGS cluster* ($M = 3.59$, $SD = 0.92$), in which mastery goal structures and both performance goal structures were highly present ($t(1757) = -9.62$, $p < .001$, $d = -0.82$) and the *average all CGS cluster* ($M = 3.25$, $SD = 0.84$), in which mastery goal structures and both performance goal structures were averagely present ($t(1757) = -6.19$, $p < .001$, $d = -0.48$). Therefore, Hypothesis 2 is supported. Group differences can be seen in Figure 2.

Figure 2: Cluster differences in social comparison orientation



Note. Cluster 1: approach CGS cluster, cluster 2: high all CGS cluster, cluster 3: mastery CGS cluster, cluster 4: low performance CGS cluster, cluster 5: average all CGS cluster. Cluster 3 and 4 showed the lowest level of social comparison orientation, compared to cluster 1, 2, and 5.

Further, exploratory post hoc analysis using the Games-Howell test was conducted to examine any additional social comparison orientation differences between clusters. The Tukey correction was used. Results revealed a significant difference between the *approach CGS cluster* and the *high all CGS cluster* ($t(428.17) = -6.67$, $p < .001$), with the *approach CGS cluster* showing less social comparison orientation than the *high all CGS cluster*. The *high all CGS cluster* and the *average all CGS cluster* also showed statistically significant differences ($t(425.58) = 4.64$, $p < .001$).

.001), with the *high all CGS cluster* showing more social comparison orientation than the *average all CGS cluster*. The *approach CGS cluster* and the *average all CGS cluster* did not show statistically significant differences in social comparison orientation, $t(830.13) = -2.60, p = .07$. Furthermore, the difference between *mastery CGS cluster* and the *low performance CGS cluster* was also not statistically significant, $t(566.32) = -0.07, p = 1.00$.

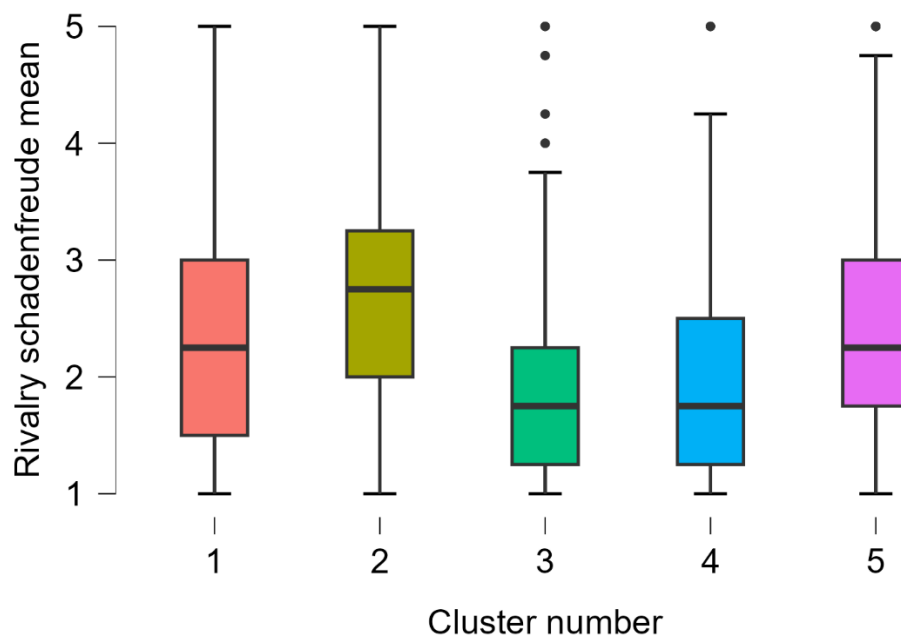
Rivalry Schadenfreude

A one-way ANOVA was conducted to assess cluster differences in rivalry schadenfreude. I hypothesized that clusters with a stronger focus on mastery goal structures show less rivalry schadenfreude, compared to clusters that also empathize performance approach and performance avoidance goal structures. I therefore expected that the *mastery CGS cluster* (C3) and the *low performance CGS cluster* (C4) show less rivalry schadenfreude than the *approach CGS cluster* (C1), the *high all CGS cluster* (C2), and the *average all CGS cluster* (C5). Assumptions were checked. Levene's Test for equality of variances was significant ($F(4,1753) = 5.30, p < .001$). Shapiro-Wilk Test for normality revealed no normally distributed data in all five groups ($W = 0.96$ (C1), 0.97 (C2), 0.90 (C3), 0.88 (C4), 0.96 (C5), $p < .001$). Therefore, the Welch homogeneity correction was used. The one-way ANOVA revealed significant differences between clusters in terms of rivalry schadenfreude ($F(4,778.08) = 42.84, p < .001, \eta^2 = 0.09$), with a medium effect size. The Kruskal-Wallis Test was also significant ($H(4) = 165.32, p < .001$), indicating a robust result of the ANOVA.

Contrasts were conducted with the *mastery CGS cluster* and the *low performance CGS cluster*, respectively, as the reference group. The *mastery CGS cluster*, in which mastery goal structures were more prominent than performance goal structures, showed significantly less rivalry schadenfreude ($M = 1.90, SD = 0.81$) than the *approach CGS cluster* ($M = 2.30, SD = 0.89$), in which performance avoidance CGS were less prominent ($t(1753) = -6.28, p < .001, d = -0.46$), than the *high all CGS cluster* ($M = 2.70, SD = 1.02$), in which mastery goal structures and both performance goal structures were highly present ($t(1753) = -10.78, p < .001, d = -0.90$) and the *average all CGS cluster* ($M = 2.43, SD = 0.95$), in which mastery goal structures and both performance goal structures were averagely present ($t(1753) = -8.53, p < .001, d = -0.60$). The *low performance CGS cluster*, in which mastery goal structures were more prominent than performance goal structures, showed significantly less rivalry

schadenfreude ($M = 1.91$, $SD = 0.87$) than the *approach CGS cluster* ($M = 2.30$, $SD = 0.89$), in which performance avoidance CGS were less prominent ($t(1753) = -5.51$, $p < .001$, $d = -0.44$), than the *high all CGS cluster* ($M = 2.70$, $SD = 1.02$), in which mastery goal structures and both performance goal structures were highly present ($t(1753) = -9.82$, $p < .001$, $d = -0.85$) and the *average all CGS cluster* ($M = 2.43$, $SD = 0.95$), in which mastery goal structures and both performance goal structures were averagely present ($t(1753) = -7.48$, $p < .001$, $d = -0.57$). Therefore, Hypothesis 3 is supported. Group differences can be seen in Figure 3.

Figure 3: Cluster differences in rivalry schadenfreude



Note. Cluster 1: approach CGS cluster, cluster 2: high all CGS cluster, cluster 3: mastery CGS cluster, cluster 4: low performance CGS cluster, cluster 5: average all CGS cluster. Cluster 3 and 4 showed the lowest level of rivalry schadenfreude, compared to cluster 1, 2, and 5.

Further, exploratory post hoc analysis using the Games-Howell test was conducted to examine any additional rivalry schadenfreude differences between clusters. The Tukey correction was used. Results revealed a statistically significant difference between the *approach CGS cluster* and the *high all CGS cluster* ($t(409.90) = -5.03$, $p < .001$), with the *approach CGS cluster* showing less rivalry schadenfreude than the *high all CGS cluster*. The *high all CGS cluster* and the *average all CGS cluster* also showed statistically significant differences ($t(429.82) = 3.32$, $p < .01$), with the *high all CGS cluster* showing more rivalry schadenfreude than the *average all CGS cluster*.

The *approach CGS cluster* and the *average all CGS cluster* did not show statistically significant differences in rivalry schadenfreude, $t(828.19) = -2.11, p = .22$. Furthermore, the difference between the *mastery CGS cluster* and the *low performance CGS cluster* was also not statistically significant, $t(553.70) = -0.06, p = 1.00$.

Discussion

Students' perceptions of the classroom learning climate have a variety of implications for their cognitive-emotional experiences (e.g., Olivier et al., 2024). The aim of the thesis was to identify different configurations, or clusters, of students' perceptions of classroom goal structures (mastery, performance approach, and performance avoidance) and investigate how these different configurations vary in regard to social-psychological phenomena, more specifically social comparison orientation and rivalry schadenfreude. The results revealed the five-cluster solution to best summarize students' different configurations of classroom goal structures. The following clusters were found: high all CGS cluster (12.9% of students), average all CGS cluster (24.1% of students), approach CGS cluster (23.1% of students), mastery CGS cluster (24.2% of students), and low performance CGS cluster (15.3% of students). These results provide evidence for Hypothesis 1a, stating that clusters would differ in regard to their goal pursuit and valence, and Hypothesis 1b, stating that indifferent clusters would emerge. Moreover, the results indicated that clusters differed in terms of social comparison orientation. Clusters, which showed average to high levels of mastery goal structures and generally low levels of performance goal structures (mastery CGS, low performance CGS), showed significantly less social comparison orientation than clusters that expressed higher levels of performance goal structures (high all CGS, average all CGS, approach CGS), supporting Hypothesis 2. The same pattern was found for rivalry schadenfreude. Clusters, which showed average to high levels of mastery goal structures and generally low levels of performance goal structures (mastery CGS, low performance CGS), showed significantly less rivalry schadenfreude than clusters that expressed higher levels of performance goal structures (high all CGS, average all CGS, approach CGS), supporting Hypothesis 3.

Clusters of Classroom Goal Structures

Students attending secondary school level described their classroom learning climate with five distinct clusters. As expected, I found clusters that show qualitatively

indifferent profiles. In the *high all classroom goal structure cluster* and *average all classroom goal structure cluster*, students perceived their learning climate as being highly, respectively, averagely focused on knowledge transfer, as well as on attaining high performance, good grades, and not performing worse than others. This finding is consistent with previous studies (Olivier et al., 2024; Jaakkola et al., 2015), which have shown that multiple goal structures can be perceived in a classroom at the same time. Furthermore, it aligns with the multiple goal perspective, which states that mastery and performance goal structures are not mutually exclusive, but rather can exist simultaneously (Darnon et al., 2010). However, it contradicts the claim that classroom goal structures either vary in terms of goal pursuit or valence (Bardach et al., 2020). One possible explanation for the simultaneous presence of mastery approach goal structures and performance avoidance goal structures is the presence of all three goal structures within these clusters. In regard to goal pursuit, performance approach and performance avoidance goal structures are said to be associated, while performance approach and mastery approach goal structures are said to be associated in terms of valence. Therefore, performance approach goal structures might make the perception of all three goal structures possible, serving as the link connecting mastery approach and performance avoidance goal structures.

The *approach classroom goal structure cluster* was characterized by students perceiving the learning climate as focused on gaining new knowledge, understanding learning material, as well as performing well in comparison to others. This finding is in line with previous findings (Gallo et al., 2022) and consistent with the achievement goal theory, as goal structures vary in terms of valence; in other words, mastery approach and performance approach goal structures are often present simultaneously. As already mentioned above, this cluster also combines multiple goal structures indicating that teachers do not necessarily emphasize only one type of goal structure (Wormington & Linnenbrink-Garcia, 2017).

In the *high mastery and low performance goal structure cluster* students perceived their teachers to highly or averagely value developing competence and understanding learning material, while focusing very little on achievement and grades. These clusters are in line with the expectation that clusters would differ in terms of goal pursuit, as students perceived mastery approach goal structures to be present, while hardly perceiving any performance goal structures. They have also been reported in previous studies (Gallo et al., 2022; Olivier et al., 2024). As mastery goal structures

are generally associated with positive and performance goal structures with negative outcomes (e.g., Tharaldsen et al., 2023; Wang, 2009), it is encouraging that almost forty percent of students perceive their classroom learning climate as primarily focused on competence development.

Previous studies (Gallo et al., 2022; Olivier et al., 2024) have found profiles in which students perceive the classroom as endorsing low levels of mastery goal structures, independently of their perception of performance goal structures. Such a configuration of goal structures (either low all goal structures or low mastery, high performance goal structure) was not found in the present study. This suggests that teachers of the present sample generally showed teaching practices that stress skill improvement, knowledge development, and evaluating individual effort (Ames, 1992). This could be due to the schools involved in the sample, as they were mostly academic secondary schools, which generally set high standards for knowledge and skill improvement (Radetić-Paić, 2020). An alternative explanation is that older students are more likely to be classified into profiles that are characterized by individual mastery goals (Bardach et al., 2023) and, therefore, possibly also perceive the classroom goal structure as more mastery-oriented. As students of the present study were all attending secondary school, they could have generally perceived the learning climate as endorsing strong mastery goal structures. However, this contrasts with the findings of variable-centered approaches, which found younger students (grades 1 to 4) to show more mastery goals, compared to older students (grades 5 to 9) who endorse stronger performance goals (Bong et al., 2009). Further investigation is needed to fully understand the role of age in the perception of classroom goal structures. Overall, the absence of a low mastery goal structure cluster can be seen as a positive finding, as mastery goal structures are associated with more positive consequences (compared to performance goal structures), like better academic achievement (Rolland, 2012) and lower academic stress (Tharaldsen et al., 2023).

Overall, the clusters found in this study demonstrate that some students perceive only one type of goal structure to be present within a classroom (e.g., mastery CGS cluster). Meanwhile, other students perceive more than one goal structure to be relevant (e.g., approach CGS cluster), suggesting that multiple goal structures are indeed part of the learning climate. However, it is not endorsed by all teachers and, respectively, perceived by all students. Furthermore, the clusters found in this study coincide with the five most frequent profiles of personal achievement goals identified

by a review on personal achievement goals (Wormington & Linnenbrink-Garcia, 2017). This further validates the clusters found in the present study and is not unexpected, as students often adopt classroom goal structures that are stressed within the classroom (Bardach et al., 2020).

Relations to Social Comparison Orientation

Students reported different levels of social comparison orientation, depending on their configuration of perceived classroom goal structures. As expected, students in the *mastery goal structure cluster* and in the *low performance goal structure cluster* showed the lowest levels of social comparison orientation, compared to the *high all*, *average all* and *approach goal structure clusters*. In other words, students who perceive their learning climate as primarily focused on competence development and knowledge acquisition are less likely to compare themselves with other classmates as opposed to students who perceive the learning climate, besides others, to be focused on competition and performance evaluation. Furthermore, the results suggest that students' perception of a mastery endorsing goal structure in class did not differentiate between clusters with regard to social comparison orientation. Whether students perceived the mastery goal structures as relatively high or average within the classroom made no difference to their social comparison orientation, as long as the performance goal structures were perceived as equally weak. In clusters where students perceived the classroom climate as valuing outperforming others, they also reported focusing more on social comparison processes. It seems that primarily the presence or absence of performance goal structures added to the cluster difference in social comparison orientation, and mastery goal structures play a less significant role.

Even though not explicitly expected, the *high all CGS cluster* showed the highest level of social comparison orientation. Besides the expected differences, the *high all CGS cluster* was also found to show higher levels of social comparison orientation than the *average all CGS cluster* and the *approach CGS cluster*. These results lead to two suggestions. First, students who generally perceive classroom goal structures as high, show higher levels of social comparison orientation than students who generally perceive classroom goal structures as being average. It remains unclear whether the combination of all classroom goal structures is relevant for the cluster difference identified or whether performance goal structures are sufficient to differentiate between clusters. However, considering the previously mentioned cluster differences, it seems

that the latter is the case. Second, it implies that the simultaneous high presence of all classroom goal structures is associated with higher levels of social comparison orientation, compared to when performance avoidance goal structures are perceived as being only averagely present (approach CGS cluster). This suggests that students' stronger (vs. weaker) perception of performance avoidance goal structure added to the difference in social comparison orientation.

These findings are consistent with achievement goal theory (Dweck, 1986). Within a mastery-oriented learning climate, students' competence is evaluated based on their prior competence and, respectively, on their ability to master a specific task or skill (Elliot & McGregor, 2001). Therefore, students who perceive mostly mastery goal structures to be present in their classroom are less concerned with how they are doing compared to others (i.e., less social comparison orientation) because it does not provide relevant information for their own learning process. In contrast, within a (normative) performance-oriented learning climate, students' competence is evaluated based on their performance relative to others (Elliot & McGregor, 2001). Therefore, when students feel that performance and competition are highly valued within their classroom, they focus more on social comparison to obtain information on their position relative to their classmates.

These findings not only align with theory but also with previous empirical evidence in the area of personal achievement goals. Studies (Darnon et al., 2010; Régner et al., 2007) have found that not only are performance goals associated with social comparison, but mastery goals are also linked to this construct. However, the latter association was found to depend on the level of performance goals students endorsed simultaneously. In other words, mastery goals were only associated with social comparison when performance goals were high. The results of the present study fit well into this picture. Some clusters (i.e., average all, high all, and approach CGS cluster) perceived mastery goal structures and performance goal structures to be present within a class. Students within these clusters showed generally high levels of social comparison orientation. This means that even though students perceived mastery goal structures to be present, they still reported higher levels of social comparison, due to the simultaneous presence of performance goal structures. Furthermore, in this study, social comparison orientation was assessed based on ability and not opinion. The results, therefore, also align with the findings of Chun (2024), which showed ability-based social comparison to be associated with performance

goals, and not with mastery goals. Therefore, when students perceive performance goal structures to be present within a classroom, they are more concerned with comparing their ability, which is reflected in academic achievement, to those of classmates, compared to when they mainly perceive mastery goal structures to be present. The results also expand on previous research in that they show that not only are personal achievement goals associated with social comparison processes, but the perceived learning climate in a classroom is also related to the extent to which students tend to compare themselves with others (e.g., Ding et al., 2022).

Relations to Rivalry Schadenfreude

Similar to the findings of social comparison orientation, students reported different levels of rivalry schadenfreude, depending on their configuration of perceived classroom goal structures. As expected, students in the *mastery goal structure cluster* and in the *low performance goal structure cluster* showed the lowest levels of rivalry schadenfreude, compared to the *high all goal structure cluster*, *average all goal structure cluster* and *approach goal structure cluster*. In other words, students who perceive the learning climate to be mainly focused on understanding learning material and improving one's skills show less rivalry schadenfreude compared to students who perceive the learning climate to value, besides others, competition, outperforming others, and not performing worse than others.

Even though not explicitly expected, the *high all CGS cluster* generally showed the highest level of rivalry schadenfreude, and therefore also demonstrated a higher level of rivalry schadenfreude than the *approach CGS* and the *average all CGS cluster*. It seems that the simultaneous high perception of mastery goal structures within a highly performance-oriented classroom climate is linked to higher levels of rivalry schadenfreude, compared to when all classroom goal structures are only perceived as being averagely present. As with social comparison orientation, it is unclear whether all classroom goal structures are relevant for the cluster difference, or whether individual classroom goal structures (such as performance goal structures) are already sufficient. Additionally, looking at the differences between the *high all CGS cluster* and the *approach CGS cluster*, one finds that they only differ in terms of their level of performance avoidance goal structure. The two clusters showed significantly different levels of rivalry schadenfreude, suggesting that when all classroom goal structures are perceived as being highly valued, they are linked to higher levels of rivalry

schadenfreude, compared to when performance avoidance goal structures are perceived as being only averagely valued. This implies that the perception of performance avoidance goal structures added to differences in rivalry schadenfreude.

The appraisal theory of emotion can be used to explain the underlying mechanism that potentially led to these results. The theory states that an event does not automatically elicit an emotion, but rather it is one's appraisal of the event that leads to the experience of a specific emotion (Scherer, 2009). Within the *high all CGS cluster*, *average all CGS cluster* and *approach CGS clusters*, grades and other indicators of achievement are perceived as being relevant within the classroom (Meece et al., 2006). Therefore, a misfortune happening to another classmate, which is related to achievement (e.g., another student receives a worse grade than oneself), is relevant to the present goal structure and, therefore, students focus their attention on this situation. The consequences of the misfortune are perceived as positive, as the misfortune elevates one's own position, regarding grades, within the classroom. Furthermore, it could reduce academic stress (Tharaldsen et al., 2023), as one gained a competition advantage. Given the relevance of the misfortune and the positive consequences that go along with it, it is reasonable that students corresponding to these clusters show higher levels of rivalry schadenfreude. Within the *mastery CGS cluster* and *low performance CGS cluster*, a misfortune befalling another classmate is less relevant to the perceived goal structure within the classroom, as competition regarding achievement is less likely (Fülöp et al., 2025). Additionally, the consequences of the misfortune are not inherently positive or negative, as the situation is generally perceived as irrelevant to the perceived classroom goal structure. Therefore, students who correspond to clusters characterized by low performance goal structures experience lower levels of rivalry schadenfreude.

This finding matches and expands on previous empirical research. Competitive environments, as is the case within performance-oriented classrooms (Fülöp et al., 2025), have been linked to higher levels of schadenfreude (Brambilla & Riva, 2017). Furthermore, Yu & Chun (2024) have shown that students who correspond to profiles with high levels of performance goals reported more schadenfreude than students corresponding to profiles with lower levels of performance goals. This suggests that students who perceive their learning climate as valuing performing better or not worse than others experience more schadenfreude when a classmate experiences a misfortune. The classmate's loss (i.e., drop down in class ranking) becomes the gain

of the person experiencing *schadenfreude* (i.e., move up in the class ranking). While these studies focused on a variable-centered approach and, respectively, on profiles of personal achievement goals, the present findings illustrate a similar pattern for clusters of classroom goal structures. Thus, it is not only students' individual goal pursuit that shapes emotional experiences, but also the learning environment has the potential to do so.

Learning Climate and Social-Emotional Associations

The cluster differences for social comparison orientation and rivalry *schadenfreude* have shown similar patterns. Applying the theories of classroom goal structures (Meece et al., 2006) and social comparison (Festinger, 1954), these findings can be linked with one another. Students corresponding to the *high all CGS cluster*, *average all CGS cluster*, and *approach CGS cluster* showed average to high levels of performance approach and performance avoidance goal structures. They perceived the learning climate as focusing on obtaining superiority and/or avoiding inferiority compared to other classmates (Midgley & Urdan, 2001). Their comparison targets were therefore dissimilar to themselves; i.e., better off (upward social comparison) or worse off (downward social comparison). These comparison processes to dissimilar others could have led to the experience of contrast emotions (Yu & Chun, 2024). In the case of rivalry *schadenfreude*, students within these clusters engaged in downward comparison to a dissimilar classmate. In other words, they compared themselves to classmates who performed (far) worse than themselves, leading to feelings of *schadenfreude*. In contrast, within the *mastery CGS cluster* and the *low performance CGS cluster*, students perceived the learning environment as being focused on gaining new knowledge and skill improvement (Meece et al., 2006). Hence, these students did not engage in comparison processes focused on ability (Chun, 2024), as the mere comparison of ability does not inform students about their intrapersonal skill development. Therefore, these clusters showed lower levels of social contrast emotions (rivalry *schadenfreude*), as they were less likely to compare themselves to dissimilar classmates (Yu & Chun, 2024). To sum up, the overall findings of the present study suggest that teachers have the potential to shape students' social-emotional experiences in school through establishing a specific learning climate within the classroom.

Limitations and Future Directions

A few limitations should be taken into consideration when interpreting the results. First, in this thesis, only classroom goal structures were used for clustering students into groups of different learning climates. However, the learning environment does not only comprise classroom goal structures. For example, the student-teacher relationship (Gallo et al., 2022) and the classroom social climate (Olivier et al., 2024) are additional relevant factors within the learning environment. Considering these factors would also draw a more realistic picture of the reality of the classroom learning environment and help to better understand its associations with social and emotional variables.

Second, this study assessed social comparison orientation as a general variable, focusing on students' overall tendency to compare themselves to others. It was not further differentiated between upward and downward social comparison, nor whether the comparison target was perceived as similar or dissimilar to oneself (identification or contrast). However, different combinations of these categories can lead to different emotions. For example, in regard to *schadenfreude*, one must participate in downward social comparison with a dissimilar comparison target (contrast). In contrast, comparing downward with someone one perceives to be similar to oneself (identification), will not lead to *schadenfreude*, but to worry or fear (Buunk et al., 2005). Future research should differentiate between different types of social comparison orientations to better understand the exact social comparison processes that are involved in classroom goal structures and in the experience of *schadenfreude*.

Third, the association between social comparison orientation and rivalry *schadenfreude* was not explicitly tested. The association does seem plausible, as rivalry *schadenfreude* inherently relies on comparison between one's own status and the status of the person who has suffered misfortune (Wang et al., 2019), making social comparison processes necessary for the experience of that emotion. Additionally, the findings illustrate that both variables show a similar pattern of cluster differences in terms of social comparison orientation and rivalry *schadenfreude*. This suggests that social comparison orientation and rivalry *schadenfreude* are associated. However, directly assessing the association could demonstrate a clearer picture of how these variables are connected.

Furthermore, the reliability of social comparison orientation proved to be rather questionable ($\alpha = .62$). The short version of the INCOM scale has been validated before. However, as also found in this study, the reverse-coded item had the lowest level of reliability (Schneider & Schupp, 2014). Additionally, the content of the remaining two items used in this study was rather heterogeneous, with one item focusing on comparison in terms of social abilities and the other item assessing general tendencies towards social comparison. It should also be considered that the total number of items assessing social comparison orientation was low (three items), and Cronbach's alpha is susceptible to the number of items, with fewer items showing lower reliability scores (Gäde et al., 2020). These factors could have contributed to the rather low internal consistency.

Finally, classroom goal structures were assessed in regard to students' math classes. The generalizability of other school subjects is therefore limited. However, Olivier et al. (2024) identified profiles of classroom goal structures in English and math classes and neither found differences in profile configurations nor in their associations with different outcomes. This suggests that generally similar clusters exist within different subjects. Additionally, while classroom goal structures are related to students' math class, the other two measures (i.e. social comparison orientation and rivalry schadenfreude) focus on the general everyday school life. Therefore, there was a mismatch of the level at which these variables were assessed (specific vs. general). Bigger effect sizes could have potentially been found if all variables were measured at the same level (Brunswik, 1955).

An interesting topic for future research would be to consider the role of envy in the association of classroom goal structures, social comparison orientation, and rivalry schadenfreude. Envy often appears in competitive learning environments (i.e., performance goal-oriented classrooms) (Sung et al., 2024; Yu & Chun, 2024) and is elicited by upward social comparison (Diel et al., 2025; Niu et al., 2024). In addition, research has described (malicious) envy as an antecedent of schadenfreude (van Dijk et al., 2015; Smith et al., 2009). If one envies another person and that person then suffers a misfortune, this can lead to feelings of relief or joy (i.e., schadenfreude). Therefore, future research should consider envy as a possible mediator between classroom goal structures, social comparison orientation, and schadenfreude.

Implications

This study shows several insights into classroom goal structures and their associations with social comparison orientation and rivalry schadenfreude, and sheds light on the association between the learning environment and students' social-emotional experiences. At a theoretical level, the study's outcomes highlight the potential benefits of studying classroom goal structures from a person-centered perspective (Wormington & Linnenbrink-Garcia, 2017). First, the results showed that students perceive multiple classroom goal structures to be present within a classroom. Students reported classroom goal structures to vary in terms of their general level of expression (i.e., high all CGS cluster, average all CGS cluster), and in terms of their composition of individual classroom goal structures (i.e., approach CGS cluster, mastery CGS cluster, low performance CGS cluster). Second, clusters have been found to differ in terms of social comparison orientation and rivalry schadenfreude. This implies that studying social-emotional variables using a cluster analytic approach captures meaningful differences in students' experiences. Based on the findings, future studies should consider using a person-centered perspective when studying classroom goal structures, as they capture the complexity of the learning environment and its interplay in regard to students' outcomes.

At a practical level, the findings highlight that the learning environment not only relates to students' achievements and related outcomes (Rolland, 2012) but is also associated with students' social-emotional experiences. By implementing specific teaching practices, teachers have the potential to shape students' everyday school life, more specifically, how much students tend to compare themselves to others and how they react to misfortunes befalling other classmates. In this regard, the findings demonstrate that students who perceive their learning environment as not focusing on achievement and outperforming others show the lowest level of social comparison orientation and rivalry schadenfreude. As both variables have been linked to more negative consequences (Cabrera-Vázquez et al., 2025; Yu et al., 2024), teachers should consider adopting teaching practices that foster mastery classroom goal structures, while avoiding those that encourage performance classroom goal structures. These practices, besides others, involve designing tasks to foster curiosity and active involvement, involve students in the decision-making process of choosing an exercise, and encourage heterogeneous group work (Ames, 1992; Lüftenegger et al., 2017). Teaching practices, which should be avoided, as they encourage

competition and performance-oriented classroom environments, involve public comparison between students, such as giving feedback in front of the entire class, emphasizing grades, and focusing on normative standards instead of valuing individual progress (Daumiller et al., 2025; Retelsdorf & Günther, 2011).

Conclusion

In conclusion, this thesis aimed to identify clusters of classroom goal structures and to examine differences between clusters in terms of social comparison orientation and rivalry schadenfreude. Five clusters were found: high all CGS cluster, average all CGS cluster, approach CGS cluster, mastery CGS cluster, and low performance CGS cluster. Clusters characterized by low levels of performance goal structures showed lower levels of social comparison and rivalry schadenfreude than clusters that generally showed average to high levels of classroom goal structures. The findings demonstrate that students' perceived learning climate relates to their tendency to engage in social comparison and to their experience of schadenfreude when misfortune befalls another classmate.

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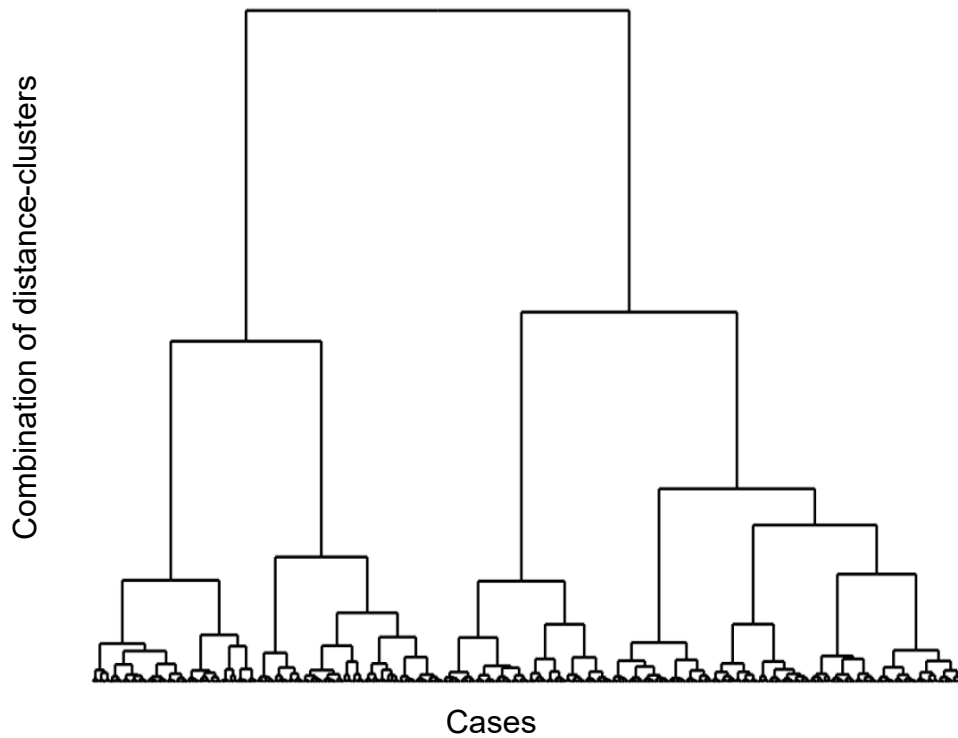
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Appendix

Figure A: *Dendrogram of hierarchical cluster analysis*



Note. This figure shows the dendrogram of the hierarchical cluster analysis. Each line indicates the merging of two clusters. The length of the line indicates the distance at which two clusters were merged.

Table A: *Cluster centers of initial 3-cluster solution*

	Cluster means		
	1	2	3
Mastery CGS	4.75	5.00	1.75
Performance approach CGS	1.00	5.00	1.33
Performance avoidance CGS	1.00	4.00	5.00

Note. CGS = classroom goal structure

Table B: *Cluster centers of initial 5-cluster solution*

	Cluster means				
	1	2	3	4	5
Mastery CGS	3.00	5.00	5.00	1.00	1.75
Performance approach CGS	5.00	5.00	1.00	1.00	1.33
Performance avoidance CGS	1.25	5.00	2.25	1.00	5.00

Note. CGS = classroom goal structure

Table C: *Items used for analyses*

<i>Classroom goal structures</i>
Mastery classroom goal structure
1. In unserem Matheunterricht geht es darum, dass wir neue Ideen bekommen.
2. In unserem Matheunterricht geht es darum, etwas Interessantes zu lernen.
3. In unserem Matheunterricht geht es darum, komplexe Aufgaben zu verstehen.
4. In unserem Matheunterricht geht es darum, dass das Lernen für uns Sinn macht.
Performance-approach classroom goal structure
1. In unserem Matheunterricht geht es darum, Aufgaben besser zu erledigen als andere Mitschüler:innen.
2. In unserem Matheunterricht geht es darum, bessere Noten als andere Mitschüler:innen zu bekommen.
3. In unserem Matheunterricht geht es darum, eine bessere Leistung als andere Mitschüler:innen zu erbringen.
Performance-avoidance classroom goal structure
1. In unserem Matheunterricht geht es darum, es nicht zu zeigen, wenn man weniger klug als andere Mitschüler:innen ist.
2. In unserem Matheunterricht geht es darum, es zu verbergen, wenn man weniger weiß als andere.
3. In unserem Matheunterricht geht es darum, es sich nicht anmerken zu lassen, wenn einem eine bestimmte Aufgabe schwerer fällt als anderen Mitschüler:innen.
4. In unserem Matheunterricht geht es darum, Aufgaben nicht schlechter als andere zu erledigen.
<i>Social comparison orientation</i>

1. Ich achte immer sehr stark darauf, wie ich Dinge im Vergleich zu anderen mache.

2. Ich vergleiche häufig meine sozialen Fähigkeiten und meine Beliebtheit mit denen anderer Personen.
 3. Ich bin nicht der Typ Mensch, der sich oft mit anderen vergleicht. (R)
-

Rivalry schadenfreude

1. Meine Laune verbessert sich, wenn ein:e beliebte:r Mitschüler:in Geburtstag feiert und dann viel weniger Leute als zu meiner eigenen Geburtstagsfeier kommen.
2. Meine Laune verbessert sich, wenn der:die Einserschüler:in mal eine schlechte Note schreibt.
3. Meine Laune verbessert sich, wenn der:die beste Sportler:in unserer Klasse auch mal einen Fehler macht.
4. Meine Laune verbessert sich, wenn ein:e beliebte:r Mitschüler:in einen Witz macht und ihn niemand lustig findet.

Abstract (Deutsch)

Schüler:innen sind in der Schule oft mit einem kompetitiven Lernumfeld konfrontiert. Wie Schüler:innen mit diesem Umfeld umgehen, hängt jedoch nicht nur von ihrer Motivation und ihren Leistungen ab, sondern kann auch ihre sozialen und emotionalen Erfahrungen prägen. Aufbauend auf verschiedenen theoretischen Ansätzen, befasst sich die vorliegende Arbeit damit, wie das Lernklima mit den sozial-emotionalen Aspekten der Schule zusammenhängt, insbesondere mit der sozialen Vergleichsorientierung und Rivalitätsschadenfreude (eine Form von Schadenfreude, definiert als Freude über das Unglück eines:einer Rivalen:Rivalin). Das Hauptziel bestand darin, Cluster von Klassenzielstrukturen (Annäherungslernziel, Annäherungsleistungsziel, Vermeidungsleistungsziel) zu identifizieren und zu untersuchen, wie sich diese Cluster hinsichtlich der sozialen Vergleichsorientierung und der Rivalitätsschadenfreude unterscheiden. Die Daten wurden im Oktober und November 2023 an sechs österreichischen Schulen mittels Fragebögen erhoben. Die Stichprobe umfasste 1868 Schüler:innen der Sekundarstufe (7. bis 10. Schulstufe) aus 98 Klassen ($M_{\text{Alter}} = 14,0$; 52,2 % weiblich). Die Clusteranalyse identifizierte fünf unterschiedliche Klassenzielstrukturen-Cluster: alle hoch Cluster, alle durchschnittlich Cluster, Annäherungscluster, Lernziel Cluster und niedrige Leistungsziele Cluster. Das Lernziel und das niedrige Leistungsziele Cluster zeigten im Vergleich zum alle hoch, alle durchschnittlich und Annäherungs-Cluster die niedrigsten Werte für soziale Vergleichsorientierung und Rivalitätsschadenfreude. Die Ergebnisse der Arbeit zeigen, dass die Wahrnehmung der Klassenlernumgebung von Schüler:innen mit ihren sozial-emotionalen Erfahrungen im Unterricht zusammenhängt. Angesichts des Potenzials von Lehrkräften, das Lernumfeld mitzugestalten, können sie bei diesen Erfahrungen eine entscheidende Rolle spielen. Limitationen und Richtungen für zukünftige Forschung werden diskutiert.