The Predictive Value of Educational and Learning Capital in a Two-Step Approach for Gifted Identification

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1 Introduction

It is important to ensure that each student, including gifted students, is provided support based on his/her specific needs. Many educational institutions and even countries are known to prioritize these goals as part of their educational policies (e.g., Aljughaiman & Grigorenko, 2013; Ziegler et al., 2013). In this context, the Council of Europe (Parliamentary Assembly, 1994) emphasized the special educational needs of gifted students.

> Gifted children should be able to benefit from appropriate educational conditions that would allow them to develop fully their abilities, for their own benefit and for the benefit of society as a whole. No country can indeed afford to waste talents and it would be a waste of human resources not to identify in good time any intellectual or other potentialities. Adequate tools are needed for this purpose (para. 3).

Moreover, the USA's Federal law recognizes that gifted students have special needs that are not typically addressed in traditional classrooms (National Association for Gifted Children, n.d.), something that has also been reiterated in empirical studies (Freeman, 2005; Gallagher et al., 1997; Mönks & Katzko, 2005; Özdemir & Işiksal Bostan, 2021; Westberg et al., 1997). Typically, classes are organized based on the students' age, regardless of their abilities and needs, resulting in classes with students that are homogenous in age but differ in their learning development and educational needs (Mönks & Katzko, 2005). Furthermore, classrooms are tailored to middle level-learners in order to accommodate the majority of students (VanTassel-Baska & Stambaugh, 2005). Due to this, the pace of learning is often too slow for gifted students, who also often find the depth of curriculum to be unchallenging (Coleman et al., 2015; Reis & Purcell, 1993; Reis & Renzulli, 2010). Consequently, schools tend to become repetitive, unchallenging, monotonous, and easy for gifted students, impelling them to become bored, indifferent, and unambitious (Coleman et al., 2015; Gallagher et al., 1997; Sisk, 1988; Winsor & Mueller, 2020).

Against this backdrop, schools must provide gifted students with an education that is tailored to their needs if they are to harness their latent potential (European Education and

Culture Executive Agency & Eurydice, 2012; Robinson, 2005). In a review of research conducted by Reis and Renzulli (2010), gifted identification and programs have been found to benefit gifted students in different domains. As a case in point, identifying gifted students helps them obtain more advanced degrees (Lubinski et al., 2001). Several scholarly studies have also documented positive effects of gifted programs such as enrichment (Kim, 2016) and acceleration (Steenbergen-Hu & Moon, 2011) on the academic achievement of gifted students (e.g., Field, 2009; Gavin et al., 2007; Tieso, 2005). These programs have also been shown to enhance gifted students' career plans, motivation levels, creativity (e.g., Delcourt, 1993; Taylor, 1992), and social development (Moon et al., 1994). Moreover, gifted education is necessary not only for the sake of gifted children but also for the sake of the society in which they live (Delcourt, 1993; Persson, 2014; Yakavets, 2014).

However, gifted students first need to be identified in order to provide them with access to gifted programs. Current identification procedures use multiple-criteria assessments, which often include standardized achievement tests, IQ tests, and teacher ratings (Hernández-Torrano & Tursunbayeva, 2016; McBee et al., 2014; National Association for Gifted Children, 2015). Given that it is infeasible to test all students in schools or to individually diagnose all potentially gifted students, most countries, as a standard practice, nominate potentially gifted students who require further evaluation (Hernández-Torrano & Tursunbayeva, 2016; McBee et al., 2016; National Association for Gifted Children, 2015). However, there is a lack of information on the predictors of whether students get nominated (McBee et al., 2016; Zavala & Torre, 2019) and whether these predictors also relate to results in the assessment of gifted identification during the subsequent step. Thus, this dissertation seeks to investigate the two-step gifted identification process adopted by many countries: nomination to gifted identification and results in a gifted identification assessment.

This dissertation consists of six chapters starting with theoretical background and existing research in Chapter 2, which will focus on three main topics: gifted education, the educational and learning capital approach, and gifted identification in Saudi Arabia, the coun-

try in which this study was conducted. The gifted identification section provides a short introduction to the history of the concept of giftedness and of gifted identification. This will be followed by an explanation and discussion of empirical results on the two-step gifted identification approach that many countries use. Also, the chapter outlines the first step, nomination, and provides more details and empirical studies about its most common forms of teacher nomination and parent nomination. Then the second step, the assessment of giftedness, will be discussed and details about the most commonly used tests will be provided: cognitive abilities tests and standardized academic achievement tests. In addition, it outlines the gaps in the research on each step.

In the section about the educational and learning capital approach, the ten types of educational and learning capital are defined and empirical research about the importance of each of the capitals for students' talent development will be reported. This will be followed by an explanation of why the approach can be expected to predict the two steps of gifted identification.

Finally, in the last section, Saudi Arabia's identification process will be introduced as a suitable context to address the research questions. Information about the country's two-step gifted identification approach will be provided (teacher and parent nomination as first step and the giftedness assessment in the second step). It also presents some examples of the giftedness assessment that is used for identifying gifted students in Saudi Arabia.

In Chapter 3 (the current study), the research topic and the main research gaps in the previous literature review will be introduced. This will be followed by an explanation of how the research gaps will be addressed in the dissertation. This chapter also will include a summary of the three dissertation objectives, with the associated research questions and some predictions based on theory and existing research.

The dissertation objectives will be addressed in Chapter 4, 5, and 6. Chapter 4 validates the Saudi Arabian version of the capital questionnaire for students and parents and contains two validation studies, one for the student questionnaire and one for the parent questionnaire. Chapter 5 discusses the role of educational and learning capital for nomination and

Chapter 6 addresses the role of educational and learning capital for performance in the giftedness assessment. Each chapter will include an introduction to its topic, along with some research questions, and will explain the research methodology and design used in each case, detailing how the chosen methodology, samples, and measures were implemented in an attempt to address the research questions. Each chapter will include information about measurements, study procedure and data analysis methods, along with details about data collection and participant identification. It will also present the findings of each study and will conclude each chapter with a short summary and discussion of the aim of the chapter and the main results.

The general discussion of the findings of the dissertation will be presented in Chapter 7. It will address how they connect to the literature, whether they corroborate or contradict the existing body of knowledge, and how contradictions can be explained. Furthermore, it will discuss limitations and ideas for future research as well as practical implications of the results of the dissertation. The dissertation with conclude with a restatement of the objectives, a short summary of the main findings, and a final recommendation.

2 Theoretical Background and Existing Research

2.1 Gifted Identification

Although gifted identification remains one of the most frequently discussed topics in the context of gifted education (Acar et al., 2016; Brown et al., 2005; Dai et al., 2011; Newman, 2018; Silverman, 2018; Ziegler & Raul, 2000), there is still no consensus on how gifted students should be identified (Dai, 2018; McBee et al., 2014; Mcclain & Pfeiffer, 2012; Pfeiffer, 2003) When it comes to identifying gifted students, researchers generally focus on two key questions: (a) What is the purpose of the identification? and (b) What is the definition of giftedness? (Alhusaini & Maker, 2018; Brown et al., 2005; El Khoury & Al-Hroub, 2018a; Zavala & Torre, 2019).

Initially, the manner in which gifted students are identified is predicated on the purpose of programs being provided (Zavala & Torre, 2019; Ziegler & Stoeger, 2004). The purpose of identification is guided by (a) the domain of giftedness to which the identification is targeted and (b) the gifted education provisions that are offered to those who are gifted (Ziegler & Stoeger, 2004).The domain of giftedness can include academic subjects such as math and science and non-academic subjects such as arts and music, whereas gifted education provisions can include all the different types of educational interventions that are designed for gifted students, such as enrichment, acceleration, and mentoring (Reis & Renzulli, 2010). Both areas (the domain of giftedness and the gifted education provisions) require different measures and, therefore, should be considered when identifying gifted students. For example, if the purpose of this identification is to find musically gifted students (music domain) to enroll them in a mentoring program (educational services), then the assessment would focus on their musical competence as well as their level of motivation and commitment which have been shown to be important predictors for success in mentoring programs (Bisland, 2001). Likewise, if the purpose of the identification is to find academically gifted students to determine if they can be accelerated (e.g., skip grade from third to fifth), then the assessment will focus on students' academic learning skills (due to the focus on the academic domain), as well

as their social and emotional development, because skipping a grade also requires social competencies (Colangelo & Assouline, 2009). Accordingly, the purpose of the gifted identification determines the types (e.g. students' cognitive abilities or social skills) and sources (i.e., from one or more resources such as IQ tests and teachers' rating) of information to be collected during the identification process (Ziegler & Stoeger, 2004). Therefore, the focus of the identification process should be to identify the most suitable students for the specific program to ensure that the targeted students benefit from the program offered to them (Silverman, 2018).

Furthermore, gifted identification depends on the underlying definition of giftedness. Several approaches have been used to define giftedness and each approach defines and measures the concept differently (see, e.g., Dai, 2018; Davidson, 2009; Kaufman & Sternberg, 2018; Stoeger, 2009; Stoeger et al., 2018). As there are many approaches to defining giftedness (Dai, 2018; Kaufman & Sternberg, 2018), I will introduce the most commonly used approaches that have clear identification guidelines and have been examined in numerous empirical studies, which are the psychometric approach, the traits-oriented approach, and the developmental approach.

One of the early approaches to studying giftedness was the psychometric approach that has associated giftedness with intelligence for a long time; therefore, a gifted person was defined as someone with high intelligence (e.g., Dai, 2018; Sternberg & Kaufman, 2018). Because giftedness is defined as intelligence, intelligence tests are necessary for identification. Along with the expansion of intelligence theories, the concept and measurement of giftedness in the psychometric approach also have been expanded. Initially, intelligence was viewed as a domain-general and considered a fixed ability (Sternberg & Kaufman, 2018). The assumption was that gifted students remain gifted throughout their lives, and they are viewed as a homogenous group (Dai, 2018). This approach can be seen, for example, in Terman's studies of giftedness (Terman & Oden, 1947), where he adapted Binet's test of intelligence leading to the Stanford-Binet Intelligence Scale in order to identify gifted students. He based his identification on students' general intelligence, in which a student with an IQ higher than 135 was

identified as a gifted student (Terman, 1925). As theories of intelligence developed, how intelligence was viewed has shifted from domain-general to domain-specific (Dai, 2018; Sternberg & Kaufman, 2018). Accordingly, the concept of intelligence has evolved from one dimensional to multidimensional views that encompass other components such as working memory, verbal comprehension, and spatial relations. For example, the Three-Stratum Theory developed by Carroll (1993), consisted of several different cognitive abilities such as general intelligence, fluid intelligence, general memory, and processing speed. The development also covered the evolution from a fixed entity (i.e., a person's intelligence is fixed and cannot be changed) to a more complex and dynamic system that made it possible for a person's intelligence to change when environmental conditions change (Davidson, 2009). However, in this approach, the focus on psychometric tests to define giftedness remained, and, thus, often only intelligence tests are utilized to identify giftedness (tests based on the underlying model of intelligence).

Next, the traits-oriented approach led to the multidimensional model of giftedness, in which the concept of giftedness has been expanded to include personality traits besides intelligence such as creativity and motivation. This approach viewed giftedness as a product of an interaction among different abilities, and sees cognitive abilities alone as not sufficient to produce the gifted behavior (Stoeger et al., 2018). This approach can be seen, for example, in Renzulli's (1986) Three Rings Theory, where he posits that gifted behavior is developed by the interaction among three individual traits: above-average ability, high level of creativity, and task commitment/motivation. Thus, the identification procedure based on this approach includes multiple assessments that measure students' cognitive abilities (which is generally done via intelligence test) as well as their personality traits (which is generally done via questionnaire). An example of a scale based on this approach is Renzulli and Hartman's (1971) Scale for Rating Behavioral Characteristics of Superior Students. The scale assesses students' characteristics in four areas: learning, motivation, creativity, and leadership.

Finally, the developmental approach took into account the evolving nature of giftedness. It, therefore, extended the concept of giftedness to take into account environmental

factors and their interaction with individual factors to achieve excellence (Sternberg & Kaufman, 2018). This approach differs from the trait-oriented approach in that the focus shifted from the internal factors to the developmental processes that lead to excellence in a specific domain (an action-oriented approach). Moreover, in this approach, environmental factors are assumed to have a significant impact on the development of giftedness and excellence. From a developmental perspective, giftedness can be viewed as an emerging aspect of person-environment interactions that develops as one grows, facing different challenges and possibilities, thereby becoming more distinct over the individual's lifetime (Dai, 2018). This approach can be seen, for example, in the Actiotope Model of Giftedness (Ziegler, 2005), which is concerned with the resources of the individuals, and whether individuals will be able to achieve excellence in a specific domain as opposed to solely focusing on the current abilities that individuals may possess (Ziegler & Vialle, 2017). Moreover, the model explains how it is possible to attain excellence by a step-by-step expansion of one's action repertoire (i.e., all the possible actions that a person is able to perform in the respective talent domain; Ziegler & Phillipson, 2012). The process of expanding the action repertoire requires environmental resources (i.e., exogenous resources located in the environment) and individual resources (i.e., endogenous resources located in the individual; Ziegler & Baker, 2013; Ziegler et al., 2017). An example of an identification model based on the developmental approach is the ENTER identification model (Ziegler & Stoeger, 2004), which is based on the Actiotope Model of Giftedness (Ziegler, 2005). ENTER considers not only the students' current status (individual and environmental aspect of the students), but also integrates the students' developmental needs into the identification process. In this approach, the identification comprises five stages: Explore, narrow, test, evaluate, and review. Explore, the first stage, aims to collect information about the individuals and their interaction with their environment, such as students' performance at school and their home and school environment (assessing students' individual and environmental aspects). Narrow, the second stage, aims to identify a specific talent for the individuals, such as academic or musical talent. The third stage, test, refers to the actions a person can perform in the specific domain, which aims to identify the learning path of the individual. The fourth

stage, evaluate, aims to assess whether the goal of the identification was accomplished. Review, the last stage, aims to assess whether the goal of the identification was most appropriate for the selected individuals to support their development toward excellence. The first three stages focus on collecting data on the students, whereas the last two pertain to whether the correct decision has been made for the learning path of the students. Moreover, the last two steps of the identification take into account that giftedness can change and develop over time, therefore the individuals' learning pathway should be adapted to this development accordingly.

Nevertheless, there is often a disconnect between theory and practice in most identification programs. Despite the emergence of contemporary conceptions of giftedness (which have become increasingly multifaceted and systemic; e.g., Dai, 2018; Davidson, 2009; Kaufman & Sternberg, 2018), and the comprehensive identification procedures (that are based on these concepts; see, Kaufman & Sternberg, 2018), most identification programs rely on simpler identification procedures. In practice, standardized tests, especially cognitive ability tests and academic achievement tests, continue to dominate the practice in most gifted identification procedures (e.g., Kaufman & Sternberg, 2018; Ritchotte et al., 2016). Although gifted programs in schools might adopt multidimensional or developmental approaches of giftedness, the majority of them use intelligence tests and standardized academic achievement tests to identify gifted students. Kaufman and Sternberg (2018) justify this broad trend in gifted identification, which relies on intelligence tests, by alluding to their affordability, reliability, and validity. More importantly, these measures are based on theories that have become widely accepted by psychological researchers such as the Cattell–Horn–Carroll theory (CHC; Horn & Cattell, 1966). Moreover, based on a national survey of how different states in the USA define and identify gifted students, Mcclain and Pfeiffer (2012) found that 90% of the state definitions include intelligence, whereas 78% of the state definitions involve high academic achievement as the criteria of giftedness. Another national research conducted by The National Research Center on the Gifted and Talented that included more than 3,000 teachers (Archambault et al., 1993), found that 79% of public schools used achievement tests, followed

by 72% of schools using cognitive tests, as the primary modes of identification. In a review of empirical studies encompassing 90 articles, Ziegler and Raul (2000) found that the most frequent primary criteria used for identifying gifted students were academic achievement (22%), followed by cognitive tests (19%).

Even though most gifted identification procedures mainly use cognitive ability tests and academic achievement (e.g., Mcclain & Pfeiffer, 2012; National Association for Gifted Children, 2015; Ritchotte et al., 2016; Ziegler & Raul, 2000), schools cannot assess all their potentially gifted students; therefore, most countries adopt a two-step gifted identification approach as a standard practice. This consists of two steps (a) nomination for gifted identification (i.e., nominating potentially gifted students who require further evaluation; Biber et al., 2021; Hernández-Torrano & Tursunbayeva, 2016; Hunsaker et al., 1997; McBee et al., 2016; National Association for Gifted Children, 2015) and (b) gifted identification assessment (e.g., ability tests, creativity tests).

2.1.1 Step 1 in Identification: Nomination

Nomination of potentially gifted students for further evaluation is an important procedure for several reasons (e.g., McBee, 2006, McBee et al., 2016). Regardless of the conception of giftedness adopted in the identification procedure (e.g., the Theory of Multiple Intelligences; Gardner, 1993 or the Actiotope Model of Giftedness; Ziegler, 2005), nomination often is the first step toward entering gifted programs (Biber et al., 2021; McBee, 2006; Ottwein, 2020). This step is critical because students who are excluded at this stage are denied the educational advantages offered to gifted students (McBee et al., 2016), such as enrichment and acceleration, which have been shown to help gifted students harness their latent potential (e.g., Kim, 2016; Reis & Renzulli, 2010; Steenbergen-Hu & Moon, 2011). Nomination is also an especially important procedure for reducing the number of students evaluated in gifted identification programs (McBee et al., 2016). Accordingly, resources are conserved rather than spent on students who are not likely to qualify as gifted and would not benefit from gifted programs. Put succinctly, nomination helps schools save time, money, and human resources (McBee et al., 2016).

Different types of nominations can be employed in gifted identification: teacher nomination, parent nomination, peer nomination, and self-nomination (Acar et al., 2016; McBee et al., 2016). Nominations can also take the form of query (i.e., by asking teachers to nominate students they believe might be gifted), checklists or questionnaires (i.e., by using a formal scale to assess students abilities; Ashman & Vukelich, 1983; McBee et al., 2016). Of these nomination types, peer nomination and self-nomination are rarely used in gifted identification (Cao et al., 2017) due to their lack of objectivity (El Khoury & Al-Hroub, 2018b; Neber, 2004). In contrast, teacher and parent nomination are, by far, the most commonly used procedures in identification (McBee et al., 2016). For example, in the United States, teacher and parent nominations are used in the majority of states (National Association for Gifted Children, 2015); whereas teacher nominations are more commonly used in Spain (Hernández-Torrano et al., 2013) and Turkey (Biber et al., 2021). Also, both teacher and parent nominations are employed in Saudi Arabia (Aljughaiman et al., 2016). Although both types of nomination have been widely used in many gifted identification procedures, most of the exiting research studies have focused on teacher nomination (Biber et al., 2021; Chan, 2000; Endepohls-Ulpe & Ruf, 2005; Foreman & Gubbins, 2015; Hernández-Torrano et al., 2013; Hernández-Torrano & Tursunbayeva, 2016; Kornmann et al., 2015; Neber, 2004; Siegle et al., 2010; Siegle & Powell, 2004) and very few have examined parent nomination (e.g., Chan, 2000; Ciha et al., 1974; Lee & Olszewski-Kubilius, 2006; Li et al., 2008).

2.1.1.1 Teacher Nomination

Classroom teachers are a valuable source of information when assessing students' potential; thus, they are the most frequently approached persons to nominate students for the purpose of gifted identification (e.g., Biber et al., 2021; Foreman & Gubbins, 2015 Hernández-Torrano & Tursunbayeva, 2016). This is because teachers can see and interact with their students in different learning situations (Siegle & Powell, 2004). They also have the opportunity to compare the abilities of students with their peers in the same age group (Kornmann et al., 2015). Therefore, teachers are qualified to identify whether or not a student has abilities that are

greater than those found in students of a similar age. Moreover, teachers can give more comprehensive assessments than some psychometric tests (Ricciardi et al., 2020) especially, when assessing personality traits and behaviors associated with gifted individuals. Psychometric tests (e.g., intelligence tests) cannot provide key pieces of information, such as students' interests and students' motivation (Barber & Torney-Purta, 2008), which have been proven to be important for success in gifted programs (e.g., Greene, 2006; Maltese & Tai, 2010; Scruggs et al., 1985). However, when it comes to assessing students' cognitive abilities, studies show that psychometric tests (e.g., intelligence tests) are more accurate than teachers' observations (Biber et al., 2021; Gear, 1976; McBee et al., 2016; Neber, 2004). Therefore, teachers are, in most cases, advantageously placed to recognize some students' characteristics—which tend to be overlooked by traditional measures—that contribute to their success in gifted education (Foreman & Gubbins, 2015). Teachers are also a valuable source of information not just for identifying gifted students but also for finding the most suitable programs to match their needs (Biber et al., 2021; Siegle et al., 2010).

Nevertheless, several studies have raised concerns about the use of teacher nomination in gifted identification (Hernández-Torrano et al., 2013; Neber, 2004; Siegle et al., 2010). For example, teachers make biased judgments about students based on their feelings and beliefs (Hernández-Torrano et al., 2013; Lee, 2002; Siegle et al., 2010). More specifically, studies have shown that teachers prefer good-looking students (Babad et al., 1982) and obedient students (Zee et al., 2013). Additionally, students who don't complete their homework are less likely to be nominated by their teachers (Siegle & Powell, 2004). Also, teachers seem to focus on students' grades when nominating and tend to ignore other important aspects of giftedness such as creativity and leadership (Aljughaiman & Ayoub, 2017; Hunsaker et al., 1997; Neber, 2004). Neber (2004) pointed out another area of concern about teacher nomination, stating that teachers tend to overgeneralize students' academic achievement to other cognitive and non-cognitive characteristics. Similarly, a study by Rothenbusch et al. (2018) found that teachers' assessments of students were affected by halo effects (e.g., that teachers assessment of students' mathematical abilities is influenced by their assessment of students'

cognitive abilities.). It is also problematic that some teachers have misconceptions about giftedness. For example, they think that gifted students must have high levels of achievement or that gifted students should be gifted in all the subjects (Subotnik et al., 2011), which results in excluding underachieving students whose academic achievements don't match their abilities. Consequently, several researchers have suggested that teachers should use rating scales to assess students on different aspects such as learning behavior or math skills to enhance the quality of their nomination (Acar et al., 2016; McBee et al., 2016). For example, rating scales have been shown to help teachers to focus on those aspects that are used by schools or the ministry to define giftedness instead of basing their nominations on their beliefs about what characteristics gifted students have (Ashman & Vukelich, 1983; Chan, 2000; Waters & Clausen, 1983). However, several studies suggest that even when using such a rating scale, teachers still focus on students' grades when they are asked to nominate (Hunsaker et al., 1997; Neber, 2004).

However, despite the criticisms directed towards teacher nomination (e.g., biased; Aljughaiman & Ayoub, 2017; McBee, 2006, not sufficient; Biber et al., 2021; Neber, 2004), it continues to be extensively used across several countries (e.g., Turkey; Biber et al., 2021, United States; National Association for Gifted Children, 2015, Saudi Arabia; Aljughaiman et al., 2016, Kazakhstan; Hernández-Torrano & Tursunbayeva, 2016). Because the alternative would be to test every student, which would be costly in many countries, teacher nomination—despite its flaws—is still considered the most suitable option and is employed in many programs (e.g., Biber et al., 2021; Neber, 2004). However, the line of inquiry in teacher nomination has moved from the quality of nomination to a different direction, such as the indicators teachers use when they nominate their students (Foreman & Gubbins, 2015). Further, studying the predictors of teacher nomination would lead to an improved understanding of the nomination process.

Predictors of Teacher Nomination

Despite the importance of teacher nomination, the predictors of whether students are nominated by teachers have not been well investigated (McBee et al., 2016; Rothenbusch et al.,

2018). First, instead of using a comprehensive approach that covers most of the predictors that should play a role, studies of individual predictors (i.e., relevant characteristics of the learner) of teacher nomination have typically examined only a few predictors simultaneously. To the best of my knowledge, only three studies exist that have directly examined student characteristics that predict teacher nomination. The study by Kornmann et al. (2015) found that working memory and intelligence predict teacher nomination. In a similar study conducted by Rothenbusch et al. (2016), intelligence predicted teacher nomination even after controlling for students' age, gender, and socioeconomic status. Barber and Torney-Purta (2008) found that high academic achievement students are more likely to nominated by their teacher if they exhibit strong motivation for success. However, other studies did not directly predict teacher nomination; instead, they investigated teachers' beliefs about potentially gifted students. Researchers in these studies asked teachers to read brief descriptions of fictional students such as a male student with math problem-solving skills who did not complete his schoolwork. Then teachers were asked how likely it was that they would nominate each student for gifted identification. For example, a study by Aljughaiman and Ayoub (2017) with students from Saudi Arabia found that teachers exclude students with high mental abilities if they also exhibited low academic achievement. Also, a study by Siegle and Powell (2004) showed that teachers are more likely to nominate students who complete their homework.

However, evidence that intelligence and academic achievement (the concepts most studies focus on; Barber & Torney-Purta, 2008; Kornmann et al., 2015; Rothenbusch et al., 2016) predict teacher nomination does not indicate whether other individual characteristics of students also play a role in nomination, such as learning strategies and previous knowledge. This highlights the need to adopt a comprehensive and differentiated approach instead of only considering intelligence and academic achievement or other isolated individual variables when investigating predictors of nomination (as most studies have done so far).

In addition, the environmental factors that predict teacher nomination have received little scholarly attention. This is particularly astounding as a growing body of research

has documented the impact of the environment on giftedness such as the importance of parents' appreciation of learning and teachers' qualifications (Marks et al., 2006), parental expectations and social support (van Ewijk & Sleegers, 2010), having mentors (Lehmann & Kristensen, 2014), and living in a community that offers positive cultural and social support for learning (Kostenko & Merrotsy, 2009).

The few existing studies on environmental factors have primarily focused on students' socioeconomic status as a predictor for teacher nomination. For example, McBee (2006) examined 705,074 students and found that the lower the students' socioeconomic status, the less likely they were to be nominated by their teacher for gifted identification. In a study by Siegle et al. (2010), a series of profiles that describe different students' characteristics were used to determine the indicators teachers believe are important for students to be nominated as gifted. Results showed that students' socioeconomic status was a prominent factor for teachers when nominating students. However, to the best of my knowledge, no study has analyzed environmental predictors of teacher nomination in a more differentiated manner. Yet, since teachers tend to believe that gifted students have stimulating home environments, many books at home, supportive parents, and good teachers (Moon & Brighton, 2008; Shaughnessy & Stockard, 1996) it can be inferred that teachers might also consider such aspects when it comes to nominating students for gifted identification. Consequently, there is a need for a more comprehensive and differentiated approach to ascertain whether other environmental factors play a role in the nomination process besides students' socioeconomic status.

2.1.1.2 Parent Nomination

Parents can also serve as a valuable source of information when assessing students' abilities (Chan, 2000; Gross, 1999). First of all, parents have the privilege to be part of a child's development and growth from an early age; thus, they are often the first ones to notice their children's talent (Olszewski-Kubilius et al., 2014; Siegle et al., 2016). Therefore, it has been suggested that they should be involved in the identification of gifted children (Gross, 1999). Par-

ents also have a deep knowledge of their children's strengths and weaknesses in both academic and non-academic fields (Chan, 2000; Lee & Olszewski-Kubilius, 2006). Moreover, they have key insights into students' abilities that teachers may overlook, especially in features that do not easily manifest in academic situations, such as creativity and leadership (Chan, 2000; Li et al., 2008; Silverman, 2018). In a major study by Lee and Olszewski-Kubilius (2006) that included 26,564 students, parent nominations were able to successfully identify groups of students who scored well on the assessment of giftedness in the second step of gifted identification; groups (e.g., not native English speakers) that standardized achievement tests often failed to identify.

Despite this, studies indicate that parental nomination should be used with caution because parents are not always objective in their assessment (El Khoury & Al-Hroub, 2018b). For example, there are studies that show that parents tend to overestimate or underestimate their children's true potential (Miller, 1986; Silverman et al., 1986; Wirthwein et al., 2019; Zippert & Ramani, 2017). Such problems can be explained by the absence of criteria for comparing children of the same age, as teachers usually do when they compare the nominated student's ability to that of other students of the same age.

Predictors of Parent Nomination

There is a similar research gap for predictors of parent nomination as there is for predictors of teacher nomination. Especially, there is a lack of studies that cover both individual and environmental predictors. First, it remains unclear what individual factors predict parents' nomination of their children, that is, what characteristics are considered by parents when deciding whether their child might be gifted. However, to the best of my knowledge, no studies have investigated which student characteristics (e.g., students' motivation) affect parents' nomination. Yet, because it is known that parents tend to believe that gifted students have high interest, motivation, and good study skills (Shaughnessy & Stockard, 1996), it can be inferred that parents might also consider such aspects when it comes to nominating their children for gifted identification. Consequently, it is important to examine what individual characteristics of students play a role when it comes to parents' nomination.

Second, as for teacher nomination, there is little research about which environmental factors predict parent nomination. Previous studies have mainly focused on the relationship between students' socioeconomic status and parent nomination (Lee & Olszewski-Kubilius, 2006; McBee, 2006; Siegle et al., 2010). However, to the best of my knowledge, no studies have analyzed environmental predictors of nomination in a more differentiated way. The finding that parents tend to believe that gifted students tend to be surrounded by stimulating environments, access to books at home, and support from parents and teachers (Shaughnessy & Stockard, 1996) suggests that parents might also take into account such aspects when deciding whether to nominate their child for gifted identification. For this reason, it is important to find out whether other environmental factors besides students' socioeconomic status predict nomination.

2.1.2 Step 2 in Identification: Assessment of Giftedness

The second step after students are nominated is assessment of giftedness, which refers to all measures that are used to determine whether a student is gifted or not (Cao et al., 2017). Several types of measures have been used to identify gifted students (e.g., Cao et al., 2017; Newman, 2018; Pfeiffer & Blei, 2008) including performance-based measures (e.g., standardized ability tests, achievement tests, and creativity tests) and measures not based on performance (e.g., self-assessment of motivational characteristics and parent- or teacher-assessed behavioral characteristics of students; Acar et al., 2016; Cao et al., 2017). Such measures provide information about students' current abilities and potential, helping to decide whether the student should be allowed to participate in a gifted education program and which program would be suitable for this specific student (Ziegler & Stoeger, 2004).

Typically, the concept of giftedness determines the type of assessment that is used in this second step of gifted identification (Alhusaini & Maker, 2018; Brown et al., 2005; El Khoury & Al-Hroub, 2018a; Stoeger et al., 2018; Zavala & Torre, 2019). For example, if the underlying definition of giftedness includes creativity, then creativity measures would be part of the assessment of giftedness. Creativity assessments include different types of both perfor-

mance-based measures and measures not based on performance: self-report scales that assess creativity, product assessments, and process/cognitive assessments. Personality assessments measure the personality traits and behaviors associated with creative individuals (i.e., traits related to the creativity such as originality, curiosity, artistic sense). This assessment is usually derived from self-reports and/or reports of others. Product assessments are those creative products rated (e.g., assessing the drawings of art students) by teachers, parents, or expert judges. Process/cognitive assessments measure the processes that are associated with creativity (i.e., assessment of the creative components of the students' work such as fluency and divergent thinking; Makel & Plucker, 2018).

However, among the different types of assessments of giftedness, (a) cognitive ability tests (including traditional ability tests, group ability tests, and nonverbal ability tests) and (b) academic achievement tests (such as norm-referenced achievement and above-level tests) are the most commonly used in gifted identification (Gentry et al., 2021; Newman, 2018; Ritchotte et al., 2016) to assess students' intelligence and academic ability (Gentry et al., 2021; Mcclain & Pfeiffer, 2012; National Association for Gifted Children, 2015), which is why they are the main focus of this dissertation. Several studies have found that cognitive ability tests and achievement tests are good predictors of various academic outcomes. One of these studies determined that they predicted future school grades of students (Ryan & French, 1976). Also, in a study by Foreman and Gubbins (2015), students' cognitive test scores predicted students' performance in mathematics enrichment classes. Similarly, standardized academic achievement test scores for 26,564 students predicted their performance in the scholastic aptitude test and American college testing program (Lee & Olszewski-Kubilius, 2006). Moreover, the work of Terman (1925) is one of the best examples of the ability of cognitive tests to predict the future success of gifted students. The results of his study, which included a sample of 1,528 gifted children, indicated that IQ scores (whether children reached an IQ value of 130 or higher on the Stanford–Binet test) predicted their future success (higher levels of education, higher incomes, and more prestigious careers, Terman, 1954).

2.1.2.1 Cognitive Ability Tests

Cognitive ability tests are the type of tests most commonly used to identify gifted students (e.g., Cao et al., 2017; Carman et al., 2018; Gentry et al., 2021). These tests are supposed to measure students' intellectual competence or learning potential (Newman, 2018). These tests were developed based on different theories of intelligence. There are three theories that play a major role in gifted identification and on which most cognitive tests are based (Davidson, 2009; Gentry et al., 2021). The first one is the Cattell–Horn–Carroll (CHC) theory of intelligence, which is by far, the most commonly used theory for developing cognitive abilities tests (Gentry et al., 2021; Valler et al., 2017). The CHC explains intelligence in the shape of a pyramid, with general intelligence (g) on the top (Stratum III). Underneath that (Stratum II) lie eight broader abilities listed in order of how greatly they are assumed to be influenced by general intelligence: fluid intelligence, crystallized intelligence, general memory and learning, broad visual perception, broad auditory perception, broad retrieval ability, broad cognitive speediness, and processing speed. At the bottom of the pyramid is an even narrower range of cognitive abilities (Stratum I), that includes, for example, deductive and inductive reasoning. Each of the abilities in Stratum I is related to one of the eight abilities in Stratum II (Carroll, 1993). The second theory is Gardner's (1993) theory of multiple intelligences, which suggests that there are eight different types of intelligence, can be clearly distinguished and that are highly valued in many different cultures: linguistic, logical/mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalist intelligence. Also, according to Gardner, linguistic and logical-mathematical intelligence are the ones most valued by schools and society. Each type of intelligence comes into play when applied to specific contexts, domains, and disciplines. Therefore, there is no such thing as pure spatial intelligence: it can manifest itself in puzzle solutions, block building, or passing a basketball. The third theory is the triarchic theory of successful intelligence by Sternberg, 1985. According to this theory, intelligence is a result of three interacting factors. The first of these is analytical intelligence, which is necessary for evaluating, judging, criticizing, and analyzing information. The second one, practical intelligence, enables one to maximize one's skills' efficacy in an external environment (how to

apply new ideas in the real world). The third aspect is creative intelligence, which is the ability to apply experience to develop new ideas and find solutions to complex problems.

Although many types of cognitive ability tests are available that vary in terms of the area they focus on, the age groups they target, and how the test is administered (Gentry et al., 2021), they can be categorized into three types (Cao et al., 2017):

Traditional ability tests: Traditional ability tests are administered individually (Mcclain & Pfeiffer, 2012). In addition to providing a total score denoting general cognitive ability, it also allows the examiner to assess other behavioral traits of the examinee, such as the level of attention and the use of problem-solving strategies (Cao et al., 2017). The Stanford–Binet Intelligence Scale is a very well-known example of this type of test (Roid, 2003).

Group ability tests: Group ability tests can be simultaneously administered to a large group of students. The most important advantage of this test is that it helps save both money and time (Cao et al., 2017). A popular example for this type of test is the Cognitive Abilities Test (CogAT; Lohman, 2012).

Nonverbal ability tests: Nonverbal ability tests require students to solve tasks that are neither verbal nor mathematical in nature (Cao et al., 2017). Instead, students have to solve problems based on images, for example deciding which shape would logically complete a given figure. The most important feature of this test is that it is assumed to be free from the influence of language and culture. A popular example for this type of test are Raven's Progressive Matrices (RPM; John, 2003).

2.1.2.2 Academic Achievement Tests

Academic achievement tests are another common type of giftedness assessment that is widely used to identify gifted students (Mcclain & Pfeiffer, 2012; Ritchotte et al., 2016; Ziegler & Raul, 2000). These tests are designed to measure what students already know about school subjects as compared to either other students the same age (norm-referenced achievement) or to older students (above-level tests). For example, a student's achievement level in mathematics could be assessed through questions about algebra and functions. The most common

categories of academic achievement tests that used when identify gifted students are (Cao et al., 2017):

Above-level tests: Above-level tests involve administering an achievement test designed for an older age group to gifted students of a younger age group. One example is using the Scholastic Aptitude Test, which was originally designed for college students, for students in grade 9 (Cao et al., 2017; Lee & Olszewski-Kubilius, 2006).

Norm-referenced achievement tests: Norm-referenced achievement tests are based on comparing the student's performance in the academic achievement test with the performance of other students of the same age group. One commonly used instance of this type of test is the Stanford Achievement Test–10 (Test, 2002).

Nominated Students' Performance in Giftedness Assessment

As the assessment of giftedness is typically the next step after nomination, it is of interest whether students nominated by different agents perform differently on giftedness assessments. Previous studies on the performance of teacher- and parent-nominated students yield contradictory results. In some studies, teacher's nomination was not a good predictor of students' performance in ability tests; instead, teachers overestimated their students' abilities (Kornmann et al., 2015; Neber, 2004). In other studies, teacher's nomination was a powerful predictor of students' scores in cognitive ability tests (Biber et al., 2021), even after controlling for their ability test scores (Foreman & Gubbins, 2015). A study on parent nomination involving students from grades six to nine found parent nomination to be unrelated to student performance in academic ability tests (Lee & Olszewski-Kubilius, 2006). Yet, in other studies parents have been shown to be even more successful in identifying gifted kindergarten-age children (Silverman et al., 1986) than teachers (Ciha et al., 1974). However, to compare the two types of nominations a large study by McBee (2006) compared parent and teacher nomination by investigating 705,074 students from first to fifth grades. The results suggest that teacher-nominated students are more successful than parent-nominated students in passing the assessment of giftedness.

Predictors of Success During the Second Step of Gifted Identification

Of equal importance as examining predictors of nomination is examining predictors of performance on giftedness assessment, the next step after nomination. There is a similar research gap for assessment of giftedness as there is for nomination, that is, a paucity of studies that cover both individual and environmental predictors. Because cognitive abilities tests and standardized academic achievement tests are employed most widely during the second step of gifted identification (e.g., Ritchotte et al., 2016; Ziegler & Raul, 2000), they are the main focus of empirical studies investigating the predictors of students' performance on giftedness assessment. However, there is some overlap between cognitive abilities tests and standardized academic achievement tests (Worrell et al., 2012), and both types of tests are highly correlated (e.g., r = .78; Lohman & Gambrell, 2012). There is even a debate on whether the two types of tests can be distinguished (Lohman, 2006). In this sense, the predictors of both cognitive abilities tests and standardized academic achievement can be expected to be similar.

Investigating predictors of performance on such tests necessitates a comprehensive and differentiated approach. Previous studies show that individual factors (e.g., learning strategies; Zimmerman & Pons, 1986, previous knowledge; Uesaka & Manalo, 2006, physical activities; Rasberry et al., 2011), and environmental factors (e.g., students' socioeconomic status; Johnson et al., 1993, teachers' qualifications; Hill et al., 2005, money spent on education; Organisation for Economic Co-operation and Development, 2001) predict performance on giftedness assessment operationalized by standardized achievement and ability tests. However, to the best of my knowledge, no study has examined both individual and environmental predictors of students' performance on the second step of gifted identification in a more comprehensive and differentiated way.

Thus, there is a need for a more differentiated approach covering key individual and environmental factors that might predict both the first and the second step of gifted identification. The present dissertation addresses this evidentiary lacuna by using the educational and learning capital approach, which offers a comprehensive taxonomy of the individual and environmental aspects relevant for talent development (Paz-Baruch, 2019; Stoeger et al., 2017; Ziegler et al.,

2017; Ziegler et al., 2019; Ziegler & Baker, 2013). In particular, this dissertation analyzes whether educational and learning capital play a role in whether students get nominated for gifted identification and the results on the assessment of giftedness used for gifted identification, which signifies the subsequent step after nomination.

2.2 The Educational and Learning Capital Approach

The educational and learning capital approach, a resource-oriented framework used to predict academic success and excellent performance in various talent domains, might contribute to address these research gaps in predicting gifted identification (Ziegler et al., 2019; Ziegler & Stoeger, 2016). The approach introduces a comprehensive taxonomy for the types of resources necessary for talent development. These resources are referred to as educational and learning capital. Educational capital denotes exogenous resources in the environment, and learning capital denotes endogenous resources in the individual. The approach defines five types of educational capital (economic, cultural, infrastructural, social, and didactic educational capital) and five types of learning capital (organismic, actional, telic, episodic, and attentional learning capital; see Table 1 for definitions).

It is assumed in the theory that each of these capital types assists in predicting and encouraging an individual's development towards excellence in a talent domain (Ziegler & Baker, 2013). However, there is no study in which educational and learning capital were systematically and comprehensively assessed and used to predict either nomination or performance on giftedness assessment. Yet, from a theoretical perspective, educational and learning capital can be expected to predict whether students are identified as gifted or not. In numerous studies, scholars have confirmed the importance of the educational and learning capital approach for academic achievement and success in different talent domains. For example, researchers found that the capitals predicted high academic achievement (Harder et al., 2018; Leana-Tascilar, 2015c, 2015a; Paz-Baruch, 2019; Vladut et al., 2013; Vladut et al., 2015; Ziegler et al., 2019). Ziegler et al. (2019) found that the capitals predicted whether women are successful in science, technology, engineering, and mathematics (STEM), and whether athletes succeed in strenuous sports, such as long-distance running. Paz-Baruch (2019) found a greater amount of capitals

in mathematically skilled students compared to students with low mathematical ability. Veas et al. (2018) showed that high-achieving students have more educational and learning capital than underachievers. In a study by Stoeger et al. (2017), students enrolled in the high-achiever track were found to have greater economic and didactic educational capital and organismic learning capital than students in the other track; in the same study, the researchers found actional learning capital was a predictor of participation in extracurricular STEM programs.

Table1.

Definitions of the Ten Types of Educational and Learning Capital From Ziegler and Baker (2013)

Types of ELC	Definition
Economic	"Every kind of wealth, possession, money or valuables that can be invested in the initiation and maintenance of educational and learning processes" (p. 27)
Cultural	"Value systems, thinking patterns, models and the like, which can facilitate—or hinder—the attainment of learning and educational goals" (p. 27)
Infrastructural	"Materially implemented possibilities for actions that permit learning and education to take place" (p. 28)
Social	"All persons and social institutions that can directly or indirectly contribute to the success of learning and educational processes" (p. 28)
Didactic	"The assembled know-how involved in the design and improvement of educational and learning processes" (p. 29)
Organismic	"The physiological and constitutional resources of a person" (p. 29)
Actional	"The action repertoire of a person—the totality of actions they are capable of performing" (p. 30)
Telic	"The totality of a person's anticipated goal states that offer possibilities for satisfying their needs" (p. 30)
Episodic	"The simultaneous goal—and situation—relevant action patterns that are accessible to a person" (p. 31)
Attentional	"The quantitative and qualitative attentional resources that a person can apply to learning" (p. 30)

Note. ELC = educational and learning capital.

2.2.1 The Five Types of Educational Capital

Cultural educational capital is a term that refers to the belief systems, values, and attitudes that can affect the achievement of educational and learning goals (Ziegler & Baker, 2013).

Numerous studies have indicated that familial and societal values and attitudes toward learning have sizable impacts on students' learning and achievement (e.g., Jæger, 2011; Pinquart & Ebeling, 2020). For example, parents' expectations for their children's education, which are an indicator of cultural capital at the family level, correlate with students' academic achievement in several meta-analyses (Danişman, 2017; Jeynes, 2005; Pinquart & Ebeling, 2020). In the most recent meta-analysis by Pinquart and Ebeling (2020), which included 169 studies, the authors identified small to moderate bivariate cross-sectional (r = .30) and longitudinal associations (r = .28) of parental expectations with academic achievement. Parental expectations were also found to be correlated positively with other academic outcomes, such as adolescent academic self-efficacy (Cross et al., 2019). This correlation holds for other indicators of cultural capital as well. For example, students' visits to museums with their families and discussions of TV programs with family members which can also be seen as indicators of valuing learning were also found to be linked to math and reading achievement (Todd & Wolpin, 2007). Also, societal attitudes toward learning and education predict very high academic achievement and exceptional performance in different domains as well (Phillipson et al., 2013). For example, East Asian culture greatly values learning and emphasizes the importance of academic achievement (Ho, 2009), which is considered one of the factors behind the outstanding achievement of East Asian students in the Trends in the International Mathematics and Science Study (Ho, 2009; Leung, 2002). The relationship between cultural capital and high performance has also been documented in other talent domains (Davidson et al., 1996). For example, in the domain of sports, the popularity of soccer in a team's country's culture predicted that team's performance in the FIFA World Cup (Torgler, 2004).

Infrastructural educational capital includes all materials that can be used to facilitate learning and that allow education to occur (Ziegler & Baker, 2013). Those students who have sufficient learning materials at home as well as school evince higher achievement levels than students without such materials (Marks et al., 2006). For example, having computer access at home has been associated with higher mathematics and reading test scores (Attewell

& Battle, 1999). Also, the number of books in the household has been found to predict students' academic achievement (Marks et al., 2006; Todd & Wolpin, 2007). Similarly, at the school level, Bajaj (2017) demonstrated that students' use of school laboratories is positively related to their science grades. The Association of College and Research Libraries (2007) found that students' use of school libraries predicts their overall academic success. Moreover, a systematic review showed a positive correlation between students' academic performance and the accessibility of school textbooks and other instructional materials (Fuller, 1986).

Social educational capital includes all individuals and social institutions that can influence educational and learning processes (Ziegler & Baker, 2013). The social support that families, schools, and societies provide has a sizable impact on students' learning development (Elias & Haynes, 2008; Jeynes, 2005; Lassen et al., 2006; Pomerantz et al., 2007). For example, in a meta-analysis that included 41 studies, parental social support for students' learning, such as checking homework and going to school events, was positively correlated not only with students' school grades but also with standardized academic test scorers and teachers' ratings of students' performance (Jeynes, 2005). Research has also shown that the importance of social support transcends parents' circles to include all the social networks that surround a student (Dagys, 2013; Gonzales et al., 1996). In a study by Pajoluk (2013), older siblings' academic support (e.g., encouragement, academic engagement, and goal setting) was positively related to younger siblings' academic performance. In addition to sibling relationships, positive peer relationships have also been consistently associated with better academic performance (Wentzel, 2017). Peer social support (Gonzales et al., 1996) and having a friend who shares similar interests (Goguen et al., 2010) have been found to predict positive school achievement as well.

Didactic educational capital refers to the knowledge and expertise that can be used for the design and enhancement of learning processes (Ziegler & Baker, 2013). The quality of learning and teaching that students receive affects their schools achievement (Darling-Hammond, 2000; Saxe et al., 2001). Theoretically, student learning development can be influenced

by the quality of learning they are exposed to in schools, especially given that they spend substantial time there. In the US, for instance, the average academic year constitutes 180 days (Silva, 2007). As a result, students' learning outcomes are affected by the quality of the curriculum they are taught in school (Saxe et al., 2001; Stecker et al., 2005), as well as the by the quality of the instructions they are given in the classroom (Goddard et al., 2007). As might be expected, teachers' knowledge and expertise have a positive influence on students' success in learning. Previous studies have found that teachers' qualifications are positively related to students' performance (Darling-Hammond, 2000; Hill et al., 2005). Similarly, teachers' professional development has a positive impact on students' learning and academic achievement (Angrist & Lavy, 2001; Valiandes & Neophytou, 2018). Educational institutions have realized the importance of didactic educational capital for improving students' learning and performance, and therefore, research is still continuing to develop teachers (Baecher et al., 2018; Valiandes & Neophytou, 2018), curricula (Roschelle et al., 2010), and teaching methods (Stockard et al., 2018).

Economic educational capital includes all kinds of wealth that can be invested in learning processes (Ziegler & Baker, 2013). An investment in education helps create a stimulating learning environment. For example, money can buy educational toys, provide a qualified tutor and also pay school fees. The link between spending money on education and developing high academic performance is well documented, and several meta-analyses have confirmed the effect of socioeconomic status on students' learning development (Letourneau et al., 2013; Liu et al., 2020; Sirin, 2005). A meta-analysis by Sirin (2005) that included 58 studies involving 101,157 students revealed a medium to strong correlation between socioeconomic status and students' academic achievement. Countries' wealth is as important as families' wealth for students' learning (Gamazo & Martínez-Abad, 2020). For example, the data from the PISA 2018 test (which measures the quality of education in countries and students' learning outcomes) show a positive correlation between country-level socioeconomic and education expenditure in countries and students' scores in PISA (Gamazo & Martínez-Abad, 2020).

As an additional example, most Nobel Prize winners in mathematics, physics, and medicine have been from countries with strong economies (All Nobel Prizes, n.d.).

Among the educational capital types, economic educational capital holds a unique position in that it can provide students with access to other types of educational capital (Ziegler et al., 2017; Ziegler et al., 2019). For example, financially secure parents (who have economic educational capital) can afford a private tutor who can support a student's learning (social educational capital) and act as a role model (cultural educational capital). This tutor can provide the student with learning materials (infrastructural educational capital) and is likely highly qualified to teach (didactic educational capital).

2.2.2 The Five Types of Learning Capital

Actional learning capital includes all the possible actions a person is able to perform (Ziegler & Baker, 2013). This form of capital includes all actions including the individual's cognitive activities and knowledge (Ziegler et al., 2017). The link between a student's actional capital (e.g., language skills, mathematical ability) and developing high academic performance is well documented. For instance, reading competency is positively correlated with students' performance in mathematics and science (Akbaşlı et al., 2016). Similarly, mathematical competency predicts students' achievement in math (MacDonald & Carmichael, 2018). Also, students' ability to master strategies and self-regulate their learning is essential to their academic success (e.g., Zimmerman & Kitsantas, 2014; Zimmerman & Risemberg, 1997).

Telic learning capital refers to the entirety of a person's expected goal states, that present promises for fulfilling their needs (Ziegler & Baker, 2013). Students' goal setting influences their academic performance (Martin & Elliot, 2016). It has been found to enhance students' academic achievement (Martin & Elliot, 2016; Schippers et al., 2020), and learning motivation (Martin et al., 2014). One explanation for the connection between goal setting and student learning development is that when students set goals for themselves, they tend to achieve them, which enhances their confidence in improving their skills (Schunk, 1990). Additionally, long-term goals can have a major influence on students' future learning because such goals motivate and encourage them to participate in academic activities (Andriessen et al.,

2006). For example, Schutz and Lanehart (1994) found having long-term educational goals (e.g., earning a master's degree) predicts greater academic achievement.

Episodic learning capital refers to the action patterns that are accessible to a person to execute in a specific situation to meet a functional goal (Ziegler & Baker, 2013). Students' previous knowledge and experiences are important for their accomplishments (Baldwin et al., 1985; Ericsson, 2006; Ziegler et al., 2017). Whereas actional learning capital is about the competence of an individual to execute an action, episodic learning capital is about knowing from experience what action is most effective for achieving a specific goal (Ziegler et al., 2017). Therefore, knowing learning strategies (actional capital) is important for learning altogether, but knowing under which conditions to best use those strategies is even more important (i.e., when and where; Pintrich, 2002). This dynamic, and the importance of episodic learning for students' learning development, is what the expertise approach in talent development focuses on (Ericsson, 2006). Deliberate practice helps students to enhance their episodic learning capital by accumulating the experience required to be academically outstanding. Solving a complex mathematical equation, for instance, might be difficult for a student the first time, but with practice, their performance will improve week by week. This is why a study by Urhahne et al. (2012) found participation in a previous International Chemistry Olympiad was the strongest predictor of success in the qualifying round—such participation was an indicator of previous experiences.

Attentional learning capital refers to the quality and quantity of the attention one can invest in learning situations (Ziegler & Baker, 2013). The quality and quantity of attention students pay to academics affects their learning and achievement (Caldwell et al., 1982). By contrast, spending insufficient time studying has a negative correlation with achievement (Gettinger, 1985). Failing to avoid distractions has a negative impact on students' performance, as demonstrated by Dietz and Henrich (2014), who found that students who text-messaged during classes received lower grades than those who did not. The quality of attention is just as important as the quantity; for example, Hayes (1989) noted political scientist Herbert

Simon had worked approximately 100 hours per week for many years before he received the Nobel Prize in economics.

Organismic learning capital refers to a person's mental and physical health, which helps them to achieve learning goals (Ziegler & Baker, 2013). Students' physical health is important to their learning development (Bellisle, 2004; Ziegler et al., 2017). Physical fitness (e.g., cardiovascular endurance, flexibility, strength; Chomitz et al., 2009) and physical activities (Hillman et al., 2008) are positively corelated with students' learning and academic performance. By contrast, physical illness (Basch, 2011) and poor mental health (e.g., suicidal ideation; Allen et al., 2008) have been found to hinder academic performance.

Organismic learning capital is unique as an enabler of other learning capital types (Ziegler et al., 2017; Ziegler et al., 2019). A person must be both mentally and physically healthy to participate in many learning activities. Mental and physical health might affect a student's performance while playing a sport (actional learning capital) where their goal is to participate in an international swimming competition (telic learning capital), for instance. Moreover, the student's organismic capital affects their experience from previous participation in such activities (episodic learning capital) and the amount of time they can practice daily without getting tired (attentional learning capital). Therefore, one can deem organismic learning capital and economic educational capital proto capitals (Ziegler et al., 2017) because they do not contribute directly to learning development, but they do act as converters that support the other types of capital (Reutlinger et al., 2020).

2.2.3 The Capitals and Nomination

Both educational capital and learning capital are important factors that should be considered when predicting whether students are nominated for gifted identification, the first step in most gifted identification procedures. Based on the assumption that teachers and parents who are at least somewhat familiar with the concept of giftedness and the criteria for identifying it, usually nominate students (McBee et al., 2016; Petersen & Margolin, 1997; Silverman, 2018). They seem more likely to use this knowledge when deciding whether to nominate students. Moreover, in the cases when rating scales are used to judge students in giftedness-related aspects via parents'

scales in parent nomination (the Gifted Rating Scales–School Form [GRS-S]; Li et al., 2008), teachers' scales in teacher nomination (The Gifted Rating Scales–School Form; Pfeiffer & Jarosewich, 2007), peers' scales in peer nomination (Guess Who: Peer Nomination Form; Kaya, 2013), or students' scales in self-nomination (Self-Nomination Inventory for Gifted and Talented Adolescents; Zavala & Torre, 2019), those nominating would consider giftedness-related individual and environmental characteristics that are usually part of the rating scale. For example, students with significant cultural educational capital (e.g., whose parents value learning) and actional and telic learning capital (e.g., who have outstanding mathematical ability and set goals to win mathematics competitions) seem more likely to be nominated for gifted identification by teachers, parents, peers, or themselves.

Moreover, evidence from nomination research has suggested educational capital and learning capital may predict nomination. For example, in terms of teacher nomination, Moon and Brighton (2008) found that when teachers nominate potentially gifted students, they seem to use indicators related to educational capital; the study also indicated teachers considered students' home environment (infrastructural educational capital), the number of books in their homes (cultural educational capital), and how much their parents supported their learning (social educational capital). Additionally, teachers tended to look at indicators resembling learning capital; they considered students' prior knowledge (episodic learning capital), learning speed and competencies (actional learning capital), attention and effort (attentional learning capital), and motivation level and interests (telic learning capital) to determine whether the student was potentially gifted and thus should be nominated for gifted identification (Moon & Brighton, 2008). One can assume teachers' conceptions of giftedness also influence their nominations (e.g., Ford et al., 2008; Petersen & Margolin, 1997; Rohrer, 1995). According to Petersen and Margolin (1997), students are more likely to be nominated as gifted if they are from a wealthy family (economic educational capital), have well-educated parents (cultural educational capital), have specific goals and are motivated (telic learning capital), and work diligently in school (attentional learning capital).

Similarly, when parents nominate their children, they might use indicators based on their beliefs about the factors contributing to giftedness. For example, parents who nominate

their children might be more likely to emphasize education (cultural educational capital), to invest in their children's learning (economic educational capital), and to support their children's learning (social educational capital) because they believe these factors are important for giftedness (Shaughnessy & Stockard, 1996). Parents also might look at indicators resembling learning capital when they nominate. Thus, parents might nominate their children when they exhibit exceptional physical aptitude (organismic learning capital), good study skills (episodic learning capital), impressive test results (actional learning capital), consistent effort (attentional learning capital), and high motivation and interest (telic learning capital; Shaughnessy & Stockard, 1996).

Moreover, factors related to educational and learning capital could affect peer and self-nomination. In their nominations, peers and students might use indicators reflecting their understanding of the factors contributing to giftedness. They might consider family values (cultural educational capital), skilled teachers (didactic educational capital), students' interest (telic learning capital), study skills (episodic learning capital), diligence and effort (attentional learning capital), and high test scores (actional learning capital; Shaughnessy & Stockard, 1996). In their study, Stoeger et al. (2017) found that actional learning capital predicts student participation in extracurricular STEM programs, which could be considered a type of self-nomination. Neber (2004) found that summer school (for highly gifted) participants who nominated themselves were intensely motivated (telic learning capital) and used higher levels of self-regulated learning (actional learning capital) than those who did not self-nominate.

In addition to establishing links between educational and learning capital and teacher as well as parent nomination, it is of interest to note whether teacher or parent nomination has the most educational and learning capital. Because teachers' and parents' perceptions of giftedness differ (Solow, 2001), I expect teachers and parents will differ when considering whether to nominate a student for gifted identification; the differences may lie in which factors are most important to them and play the greatest roles in their nomination. To the best of my knowledge, no researcher has yet investigated such differences among the nomination types in terms of predictive factors.

2.2.4 The Capitals and Performance in Assessments of Giftedness

Both educational capital and learning capital are important factors that one should consider when predicting a student's performance on the giftedness assessment in the second step of gifted identification. First, one can assume educational and learning capital will help students perform better on the giftedness assessment (e.g., on cognitive ability tests and standardized academic achievement tests) because these two groups of capital constitute resources that help students prepare for the test as well as competencies that usually result in higher performance. For example, one might expect that students who have private tutors (didactic educational capital) will perform better on standardized academic achievement tests, and those who practice creative writing daily (attentional learning capital) will perform better on performance-based tests.

Second, related research has suggested that educational capital and learning capital may predict performance in giftedness assessment. For example, studies have shown that educational capital and learning capital predict students' grades in school (Harder et al., 2018; Leana-Tascilar, 2015a; Paz-Baruch, 2019; Ziegler et al., 2019). Educational capital and learning capital also are highly correlated with intelligence (Paz-Baruch, 2019; Ziegler et al., 2019) and thus might predict performance on the cognitive ability section of a giftedness assessment.

Third, although the educational and learning capital approach assumes having a large amount of these capitals implies giftedness (Ziegler et al., 2017; Ziegler & Baker, 2013), no researcher to date has used the capital approach to predict whether students get nominated for gifted identification and how they will perform on giftedness assessments. Therefore, to address the research gap regarding predictors of two-step gifted identification by using a comprehensive and differentiated approach that covers both environmental and individual factors relevant to talent development (e.g., Ziegler et al., 2017; Ziegler et al., 2019; Ziegler & Baker, 2013), an identification approach that employs these typical steps was chosen, namely the Saudi Arabia's gifted identification procedure.

2.3 Gifted Identification in Saudi Arabia

Saudi Arabia is a suitable location for this research because the two typical steps (i.e., teachers' or parents' nomination as the first step and cognitive and standardized academic achievement tests as the second step) are used to identify gifted students across the nation. Furthermore, the Saudi government has stressed identifying gifted students in the past decade (Aljughaiman & Ayoub, 2017). As of 2020, more than 133,000 students were identified as gifted. Starting with 27 schools that offered a gifted program in 2004 (Aljughaiman & Grigorenko, 2013) and reaching 107 schools offering such programs in 2020, the number of schools is nearly doubling yearly. There is a unified procedure across Saudi Arabia to identify gifted students per the National Program for Gifted Identification, and all students are subject to this procedure without exception. The procedure has two main steps (Aljughaiman et al., 2016; Mawhiba, n.d.–a):

2.3.1 Step 1 of Identification in Saudi Arabia: Nomination

All students in the target grades (third, fourth, sixth, and ninth grades) are eligible to be nominated through two different channels: (a) teacher nomination, with teachers nominating the most promising students in their class and (b) parent nomination, available to all parents wishing to nominate their children. Also, students can be nominated by both teachers and parents simultaneously, which results in three different nomination types.

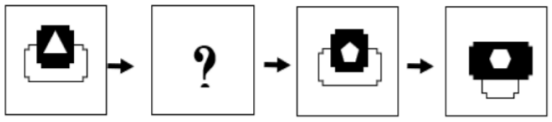
2.3.2 Step 2 of Identification in Saudi Arabia: Giftedness Assessment

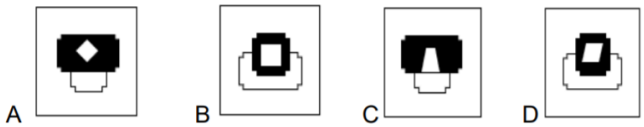
After students have been nominated, they are qualified to take the Mawhiba Multiple Cognitive Aptitude Test. The test, which is a mixture of cognitive abilities test and the standardized academic achievement test, measures students' academic abilities in language, mathematics, science, and some aspects of creativity. A scientific committee prepared the giftedness assessment under the supervision of Mawhiba (i.e., non-profit foundation for giftedness and creativity in Saudi Arabia), while the National Center for Assessment in the country has the task of applying the test throughout the country. Furthermore, the giftedness assessment is provided

in both Arabic and English according to the student's preference. The giftedness assessment consists of four sections (Mawhiba, n.d.–a):

Creativity (mental flexibility): This measures students' abilities to produce a variety of ideas, and to modify and diversify ways of thinking to handle problems and situations by analyzing their challenges and factoring them into solutions as required. An example item of this section is:

What shape should replace the question mark in the following pattern?





Verbal reasoning and reading comprehension: This measures students' abilities to (a) employ language in processing available information or facts, (b) apply linguistic rules and use them in dealing with written contents as a means to extract, reorganize and benefit from them. An example item of this section:

Choose the pair of words that shows the same relationship as that of the pair of words in BOLD.

MONEY: GOODS

A) sea: ship

B) key: knob

C) wood: saw

D) ticket: travel

Mathematical and spatial reasoning: This measures students' abilities to (a) utilize mathematical skills and logical thinking to achieve solutions through specific strategies and (b) to be able to establish if something is logically related, similar, congruent, or different. An example item of the mathematical reasoning section is:

The product of two numbers is 900. Their sum is greater than their difference by 30.

What is the largest number?

A) 15

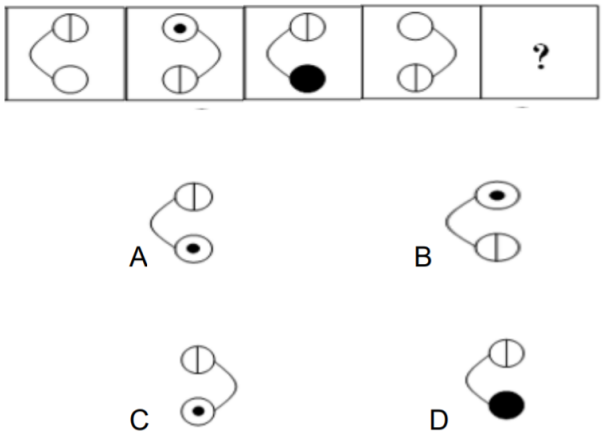
B) 30

C) 40

D) 60

An example item of the spatial reasoning section is:

What shape should replace the question mark in the following pattern?



Scientific and mechanical reasoning: This measures students' abilities to (a) utilize accessible facts and data in a logical and reasoning fashion and to (b) draw conclusions, logically, based on inferences and evidence. An example item of the scientific reasoning is:

Which of the following represents a periodic change?

A) the growth of a child

B) earthquakes

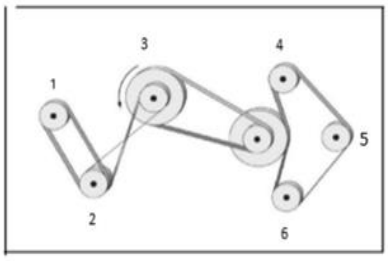
C) storms

D) sea waves

An example item of the mechanical reasoning is:

If pulley (3) moves in the direction of the arrow (anticlockwise) as shown below, how many pulleys will rotate in the opposite direction (clockwise)?

A 3
B 4
C 5
D 6



Because information about the reliability and validity of the giftedness assessment (Mawhiba multiple cognitive ability assessments) was not available to me, I report its psychometric properties based on previous studies that have focused on the giftedness assessment. In a study by Mourgues et al. (2016), comprised of 4368 students from grade 3 to grade 11 (whereas my dissertation focused on the tests for grade 9, in contrast, this study combined tests for grades 3, 6, 9, and 11), the average Cronbach's α for mental flexibility scale was .79, for verbal reasoning and reading comprehension .80, for scientific and mechanical reasoning .70, and for mathematical and spatial reasoning .58. In another study, Suleiman and Al-Jasser (2019) tested the predictive validity of the Mawhiba multiple cognitive ability assessments. They found that the results of the multiple cognitive ability assessments predicted students' performance on the Naglieri Nonverbal Ability Test ($r = .25$, $p < .001$).

Three standard grade levels have been adopted for the giftedness assessment, with the first level of students in the third grade and the fourth grade. The second level includes the sixth-grade students, and finally, the third level includes the students of the ninth grade. Importantly, the giftedness assessment is the key to assess students' abilities and acceptances in all programs and activities related to the National Project for Gifted Identification since 2011. Students are eligible to enter gifted programs if their giftedness assessment score is among the top 7% of students who participated in the test during the given year. Students are entitled to participate in more than one program if they meet the requirements and criteria for these programs under the condition that the time of implementation of these programs

does not conflict with another. There is a variety of gifted programs offered to qualified students such as the Mawhiba Advanced Program for Science and Math and the Mawhiba After School Enrichment Program.

3 Current Study

Despite the importance of gifted identification for gifted students themselves and for society as a whole (e.g., Kim, 2016; Lubinski et al., 2001; Steenbergen-Hu & Moon, 2011), the predictors of whether students are identified as gifted are insufficiently investigated (McBee, 2006; Zavala & Torre, 2019). Whereas there are several different theories about how gifted individuals should be identified (see Dai, 2018; Davidson, 2009; Sternberg & Kaufman, 2018; Stoeger, 2009), most identification procedures use a two-step approach (Hernández-Torrano & Tursunbayeva, 2016; McBee et al., 2016; Mun et al., 2021; National Association for Gifted Children, 2015). Because it is not feasible to test all potentially gifted students, most gifted identification procedures use nomination for further testing as the first step to reduce the number of potentially gifted students (McBee et al., 2016). Then, the second step in most gifted identification procedures, involves standardized gifted identification tests (e.g., Cao et al., 2017; Gentry et al., 2021). These two steps are the main focus of this dissertation.

Because Saudi Arabia is one of the countries that uses nomination as the first step in identifying gifted students, before using a standardized giftedness assessment as the second step that consists of cognitive ability tests and academic achievement tests (Aljughaiman et al., 2016), this research took place in Saudi Arabia. Though different countries employ different methods of nomination, Saudi Arabia employs the two most common types, that is, teacher and parent nomination (Aljughaiman et al., 2016), thus, students can also be simultaneously nominated by teachers and parents. Therefore, this dissertation investigates three types of nomination: by teachers, by parents, and by both teachers and parents simultaneously.

Although nomination is a crucial first step that will grant or deny students access to gifted education programs, the predictors for whether students are nominated have not been sufficiently investigated (McBee et al., 2016; Zavala & Torre, 2019). First, most of the existing research on the factors that explain nomination have focused on teacher nomination (Ayoub & Ibrahim, 2013; Barber & Torney-Purta, 2008; Endepohls-Ulpe & Ruf, 2005; Hernández-Torrano et al., 2013; Hernández-Torrano & Tursunbayeva, 2016; Kornmann et al., 2015; McBee, 2006; Siegle et al., 2010; Siegle & Powell, 2004), and very few have tried to investigate parent nomination

(Hodge & Kemp, 2000; Lee & Olszewski-Kubilius, 2006; McBee, 2006). Moreover, I am not aware of any studies that have investigated predictors for students being nominated by both teachers and parents simultaneously. My dissertation addresses this gap by focusing on these three types in the investigation.

Second, it is unclear which characteristics of students predict nomination–that is, what individual predictors (i.e., relevant characteristics of the learner) teachers and parents consider when deciding whether students might be gifted. Previous studies on teacher nomination have typically examined only a few such predictors at a time and focused mainly on the predictive power of academic achievement and intelligence for nomination (Barber & Torney-Purta, 2008; Hernández-Torrano et al., 2013; Kornmann et al., 2015; Rothenbusch et al., 2016; Siegle & Powell, 2004). In addition, I am aware of no studies that have investigated the individual factors that predict parent nomination.

Finally, environmental predictors of nomination have received even less attention than individual predictors. This is particularly noteworthy as a growing body of research has documented the central importance of the environment on talent development (e.g., Kostenko & Merrotsy, 2009; Lehmann & Kristensen, 2014; Marks et al., 2006; van Ewijk & Sleegers, 2010; Ziegler et al., 2019). Previous studies about environmental predictors of both teacher and parent nomination have mainly focused on students' socioeconomic status (Barber & Torney-Purta, 2008; Hernández-Torrano & Tursunbayeva, 2016; McBee, 2006; Siegle et al., 2010; Siegle & Powell, 2004). However, to the best of my knowledge, no studies have analyzed environmental predictors of nomination in a more differentiated way.

In summary, there is direct and indirect evidence suggesting that both teachers and parents might take into consideration several different individual and environmental aspects related to giftedness when judging whether a student is likely to be gifted (Moon & Brighton, 2008; Shaughnessy & Stockard, 1996). Previous studies about individual and environmental predictors either use undifferentiated predictors or only a few predictors at a time; thus, the need for an approach that assesses both individual and environmental aspects in a more comprehensive and differentiated way.

Equally important as examining predictors of nomination is examining predictors of students' performance in the giftedness assessment, the next step after nomination. Such giftedness assessments usually contain standardized cognitive abilities tests and academic achievement tests (e.g., Gentry et al., 2021; Mcclain & Pfeiffer, 2012; National Association for Gifted Children, 2015; Ritchotte et al., 2016), which is also the case in Saudi Arabia (Mawhiba, n.d.–b).

There is a similar research gap for this second step of gifted identification as there is for the first step of nomination: The performance on such giftedness assessments determines whether the students in question are eligible to participate in gifted education programs. Though these are important for realizing the student's potential, a comprehensive and differentiated approach is required for studying the predictors of performance on such tests.

Previous studies on predictors of students' performance in the giftedness assessment either mainly focus on less informative predictors such as school grade (Roth et al., 2015) and the students socioeconomic status (e.g., Johnson et al., 1993) or they study only a few of different predictors at a time. For example, different studies predict standardized achievement test scores with individual aspects (e.g., learning strategies; Zimmerman & Pons, 1986, previous knowledge; Uesaka & Manalo, 2006, physical activities; Rasberry et al., 2011) and environmental aspects (e.g., students' socioeconomic status; Johnson et al., 1993, teachers' qualifications; Hill et al., 2005, money spent on education; Organisation for Economic Co-operation and Development, 2001). However, to the best of my knowledge, no study has examined individual and environmental predictors of giftedness assessment's performance in a more comprehensive and differentiated way.

Therefore, the main aim of my dissertation is to address these research gaps regarding predictors of the two steps of gifted identification by using the educational and learning capital approach. This approach offers a comprehensive taxonomy of individual and environmental aspects that predict academic success and excellent performance in several domains (e.g., Reutlinger et al., 2020; Ziegler et al., 2017; Ziegler et al., 2019). This approach distinguishes two categories of resources that are necessary for talent development: educational and learning capital. Educational capital refers to exogenous resources in the environment and learning capital

refers to endogenous resources in the individual. The approach encompasses five types of educational capital (economic, cultural, infrastructural, social, and didactic capital) and five types of learning capital (organismic, actional, telic, episodic, and attentional capital). Also, the theory assumes that great amounts of both educational capital and learning capital are required for developing one's potential (Veas et al., 2018). Hence, one can expect an interaction effect between educational capital and learning capital, which means the effect of learning capital on talent development is stronger when students have a larger amount of educational capital.

The educational and learning capital approach assumes that having a large amount of these capitals implies giftedness (Ziegler et al., 2017; Ziegler & Baker, 2013). Though this is allegiant with the most current gifted identification theories that assume several individual and environmental aspects determine whether a student can be classified as gifted (e.g., Gagné, 2005; Heller et al., 2005; Ziegler & Stoeger, 2004), no study has used the capital approach to predict the two steps of gifted identification. Therefore, this dissertation makes an important contribution to the educational and learning capital literature. As with other approaches to predicting gifted identification, it has yet to be shown that the capital approach adds predictive power above and beyond academic achievement and students' socioeconomic status, which are the most frequently used predictors of gifted identification (Hamilton et al., 2018; Johnson et al., 1993; Olszewski-Kubilius & Corwith, 2018; Ricciardi et al., 2020; Siegle et al., 2010; Siegle & Powell, 2004).

For this dissertation, I collected both students' and parents' assessments of students' educational capital and learning capital. This approach was selected due to evidence that students might be better at judging some individual aspects (Gagné & Père, 2001) and environmental aspects related to giftedness (Paulson, 1994), and that parents might be better at judging others (Gagné & Père, 2001). However, because this dissertation focuses on middle school students, I did not collect teacher assessments of students' educational capital and learning capital. Middle school teachers might have a rough idea of their students' amount of educational and learning capital, but because they have heavy workloads (Issa, 2020) and spend less time with each student than in primary school teachers, it cannot be expected that their assessments of specific types of educational capital and learning capital are nearly as good as those of parents and children.

It also seems worthwhile to examine the difference between the three types of nomination (only teacher-nominated, only parent-nominated, and nominated by both teachers and parents simultaneously). I am aware of only two studies that have done so by investigating the differences between teacher nomination and parent nomination regarding identifying gifted kindergarten students (Ciha et al., 1974; Gross, 1999) and elementary school students (McBee, 2006). Because teachers' and parents' perceptions of giftedness differ (Solow, 2001), I also expect differences in the individual and environmental aspects related to giftedness they take into consideration when determining whether to nominate a student for the giftedness assessment. Therefore, students nominated only by teachers, only by parents, and by both teacher and parent simultaneously might differ regarding their educational and learning capital.

I also expect students from these three nomination groups to differ regarding their performance in the giftedness assessment. Previous studies on the performance of teacher- and parent-nominated students have yielded contradictory results. Although teacher-nominated students tend to perform better in gifted programs than students who were not teacher-nominated (Foreman & Gubbins, 2015), teacher nomination has been shown to miss several gifted students (Biber et al., 2021; McBee et al., 2016). Whereas Lee and Olszewski-Kubilius (2006) showed that parent nominations did not predict student performance in academic ability tests, Gross (1999) and Silverman et al. (1986) showed that parents were successful in identifying gifted young children. In contrast, when comparing the two types of nominations, McBee (2006) showed that teacher-nominated students are more successful than parent-nominated students in passing the giftedness assessment. Accordingly, these mixed findings suggest that further research is needed to determine which type of nomination yields the students who perform best on giftedness assessments.

In this context, my dissertation has three objectives. Because the study took place in Saudi Arabia, for which the educational and learning capital questionnaires have not yet been validated, the first objective was to validate the Student Educational and Learning Capital Questionnaire (Vladut et al., 2013) and the Parent Educational and Learning Capital Questionnaire (Ziegler & Stoeger, 2016). The second and most important objective was to investigate (a) if educational

capital and learning capital (as assessed with the Student and the Parent ELCQ) can predict nomination above and beyond the most commonly used predictors–namely, academic achievement and socioeconomic status–and (b) whether the three nomination groups (only teacher-nominated, only parent-nominated, and nominated by both teachers and parents simultaneously) differ regarding their amounts of educational capital and learning capital. The third objective was to investigate (a) if educational capital and learning capital (as assessed with the Student and the Parent ELCQ) can predict students' performance in the giftedness assessment above and beyond the most commonly used predictors of academic achievement and socioeconomic status, and (b) whether the three nomination groups differ regarding their performance in the giftedness assessment.

3.1 Validating the Saudi Arabia Versions of the Student ELCQ and the Parent ELCQ

The first objective of this dissertation–the validation of the Student and Parent Educational and Learning Capital Questionnaires (ELCQ)–was achieved by examining a number of test quality criteria for the two questionnaires. More specifically, I examined their (a) factorial validity, using confirmatory factor analysis; (b) concurrent validity, by examining their relationships to external variables, which represent constructs that should be related to educational capital and learning capital; (c) predictive and incremental validity, by testing whether the ELCQ can predict academic achievement above and beyond socioeconomic status, which is one of the most commonly used predictors of academic achievement (Blums et al., 2017; Sirin, 2005); and (d) reliability, by calculating Cronbach's alpha.

3.2 Educational and Learning Capital and Nomination

The second objective of this dissertation–to investigate the role of students' educational capital and learning capital for nomination–was achieved by addressing two research questions. The first question relates to whether educational capital and learning capital predict if students are nominated by (a) teachers, (b) parents, and (c) both teachers and parents simultaneously. For each type of nomination, I examined the predictive power of (a) the Student ELCQ

(students' assessment of their educational capital, learning capital, and the interaction of educational capital and learning capital) and (b) of the Parent ELCQ (parents' assessment of students' educational capital, learning capital, and their interaction). Finally, to test if using both the Student ELCQ and the Parent ELCQ simultaneously further enhances predictive power, I used (c) the combination of both the Student and the Parent ELCQ. In this context, academic achievement and socioeconomic status were also included in the regression models to test whether educational capital and learning capital have predictive power above and beyond these two commonly used predictors of nomination.

My prediction is that students with greater amounts of educational capital and learning capital are more likely to be nominated by their teachers, by their parents, and by both simultaneously. This prediction is based on two arguments. First, it is based on the assumption that gifted students are usually nominated by teachers and parents who are familiar with giftedness and identification (McBee et al., 2016; Silverman, 2018), so when considering a nomination, they would consider individual and environmental characteristics related to giftedness. Therefore, students with great amounts of educational capital (e.g., with parents who value learning) and learning capital (e.g., with large amounts of ability and motivation) seem more likely to be nominated by teachers and parents. Second, indirect evidence suggests that teachers and parents might use indicators that relate to educational and learning capital (Moon & Brighton, 2008; Shaughnessy & Stockard, 1996) when deciding whether to nominate a student.

However, because of the lack of relevant studies, I am not entirely sure whether I would expect students' or parents' assessments of educational capital and learning capital to be more predictive of nomination. However, because students might be better at judging some resources and parents might be better at judging others (Gagné & Père, 2001; Paulson, 1994), I included both assessments. Also, I expect that simultaneously using the Student and the Parent ELCQ will enhance predictive power, as their combination should provide a more accurate assessment of educational capital and learning capital.

The second question is which nomination group has more educational capital and learning capital as assessed by the Student and the Parent ELCQ. For these analyses, I distinguished between the three nomination groups: Those students only nominated by teachers, those only nominated by parents, and those nominated by both teachers and parents simultaneously.

I predict that students who were nominated by both teachers and parents should have larger amounts of both educational capital and learning capital compared to the other two nomination groups because this group consists of students whom teachers and parents agree that they might be gifted. Also, I predict that students nominated by teachers should have more learning capital compared to students nominated by parents, because teachers can be expected to have better insights into students' individual resources, such as their competencies in the respective subject, than their parents. However, I predict that students nominated by parents should have more educational capital compared to students nominated by teachers, because parents can be expected to have better insights into students' environmental resources, such as how much money is spent on their education, than their teachers (Ostrander, 1996) and those with more educational capital are more likely to be nominated by parents.

3.3 Educational and Learning Capital and Performance in the Giftedness Assessment

The third objective of this dissertation–to investigate the predictive power of educational capital and learning capital for students' performance in the giftedness assessment –as achieved by addressing two research questions. The first question is whether students' performance in the giftedness assessment could be predicted with (a) the Student ELCQ (students' assessment of their educational capital, learning capital, and their interaction), (b) the Parent ELCQ (parents' assessment of students' educational capital, learning capital and their interaction), and (c) the Student and the Parent ELCQ combined. In addition to these predictors, academic achievement and socioeconomic status were also included in the models to test whether educational capital and learning capital have predictive power above and beyond these two commonly used predictors of giftedness assessment performance.

I predict that students with greater amounts of educational capital and learning capital will score higher in the giftedness assessment. This prediction is based on two arguments. First, it can be assumed that educational and learning capital should help students achieve better performance on the giftedness assessment because these two categories of capital encompass resources that help students prepare for the test, as well as competencies that should result in better performance. Second, related research suggests that educational capital and learning capital may predict performance in the giftedness assessment. For example, several studies show that educational and learning capital predict students' school grades (Harder et al., 2018; Leana-Tascilar, 2015a; Paz-Baruch, 2019; Ziegler et al., 2019). Also, educational capital and learning capital correlate highly with intelligence (Paz-Baruch, 2019; Ziegler et al., 2019) and thus might also predict performance on those parts of the giftedness assessment that assess cognitive abilities.

However, I am not entirely sure whether I would expect students' or parents' capital assessment to be the better predictor of performance in the giftedness assessment. For this reason, I included both students' and parents' assessments in these analyses. I also expect that using both the Student ELCQ and the Parent ELCQ will enhance predictive power because each questionnaire should, to some degree, compensate for areas where the other questionnaire has weaknesses regarding its ability to accurately assess the respective type of capital.

The second question is which of the three nomination groups (only by teachers, only by parents, or by both teachers and parents simultaneously) obtained the highest scores in the giftedness assessment. I predict that students nominated only by teachers will score higher in the giftedness assessment than students nominated only by parents because teachers' judgments of their students' abilities tend to be more accurate than parents' judgments (McBee, 2006). Due to the lack of studies about the performance of students nominated by both teachers and parents simultaneously, I am not entirely sure what to expect for this group. However, because teachers and parents agree that these students might be gifted, I expect them to do better in the giftedness assessment than both students nominated only by teachers and students nominated only by parents.

4 Validating the Saudi Arabia Versions of the Capital Questionnaires (First Objective)

4.1 Theoretical Background

4.1.1 The Educational and Learning Capital Approach

Parents' assessment of educational and learning capital was included in this dissertation due to the critical role parents play in their children's talent development and academic excellence (e.g., Colangelo & Dettmann, 1983; Eccles, 2005; Pomerantz et al., 2007). Few researchers have examined parents' assessments of their children's abilities in spite of their importance, particularly when identifying gifted children (Mun et al., 2021). Several studies have shown that parents' assessment of their children's educational capital is positively correlated with their children's academic success. For example, parents' assessment of how much they value their children's learning (aspects of cultural educational capital; Paulson, 1994), how much they support their children's learning (aspects of social educational capital; Pomerantz et al., 2007), and how much they contribute financially to their children's education (aspects of economic educational capital; Kornrich & Furstenberg, 2013) positively contribute to student performance. Research also has shown that parents' assessment of their children's learning capital is positively correlated with their children's academic success, including parents' assessment of their expectations of their children's abilities (aspects of actional learning capital; Eccles, 2005) and their assessment of their children's motivation level (aspects of telic learning capital; Gagné & Père, 2001).

Furthermore, student's assessment was included as they are considered a valuable source of information in terms of assessing their educational capital and learning capital, especially because gifted education services are targeted primarily at them. A growing body of research has documented the positive link between students' assessment of educational capital-related aspects and academic success. For example, parental educational aspirations (aspects of cultural educational capital; Paulson, 1994) and parental support of children's learning (social educational capital; Paulson, 1994) were positively correlated with student performance

when students completed the assessments. Similarly, researchers have documented the positive link between students' assessment of learning capital-related aspects and academic success. For example, students' use of learning strategies (aspects of actional learning capital; Zimmerman & Kitsantas, 2014) and their goals and interests (aspects of telic learning capital; Gagné & Père, 2001) were positively correlated with academic achievement when assessed by students.

However, evidence has suggested that students might be better at judging some individual and environmental factors and that parents might be better at judging others. For example, researchers have shown that students are better than their parents at judging their goals and interests (aspects of telic learning capital; Gagné & Père, 2001). In addition, how much parents value learning (aspects of cultural educational capital) and how much they support learning (aspects of social educational capital) are more predictive of academic achievement when assessed by students than by parents (Paulson, 1994). This result might be explained by the finding of Robinson (1978). Parents are influenced by the social desirability when they assess their parenting involvement, therefore presenting a more positive image (Schwarz et al., 1985). Conversely, compared to students' assessment, parents' assessment of students' motivation (aspects of telic learning capital) appears to be a better predictor of academic achievement (Gagné & Père, 2001). Therefore, using both students' and parents' assessments should enhance the predictive power of educational and learning capital because their combination should produce a more precise assessment than either used alone (Epstein, 1986; Fogarty et al., 2014).

Because middle school students were the focus of this dissertation, teacher assessments of students' educational capital and learning capital were not collected. Research has shown that teachers are skilled at judging aspects related to students' educational and learning capital (e.g., teachers' assessments of students' learning characteristics tend to predict their intelligence; Chan, 2000), but this is not true for all student cohorts. Elementary school teachers are a particularly valuable source of information because of the amount of time they spend with students each day (Randall & Engelhard, 2009), and only one or two teachers are accountable for all school subjects in most cases (Gerretson et al., 2008). This allows them to

assess students across a range of learning situations and subjects, whereas middle and high school teachers might have an idea of students' educational and learning capital, but one cannot expect their judgment to be as sound as that of parents and children. This is true for several reasons. First, beginning in middle and high schools, a separate teacher covers each subject, so individual teachers spend less time with each student than they do in primary school. Second, middle and high school teachers have a heavy workload, often teaching 24 lessons per week and averaging 27 students per classroom (Al-Dahas, 2021.13.03). For example, a mathematics teacher might teach up to 135 students (Issa, 2020), so they do not have sufficient time or information to thoroughly evaluate each student's educational and learning capital. Thus, middle and high school teachers may be able to recognize a student's potential in the subject they teach but may be unable to identify the factors contributing to the student's high performance. For example, teachers may not know whether the student performs well because they have a tutor (didactic educational capital) or practice often (attentional learning capital). Thus, in the middle and high school contexts, teachers' assessments of students' educational and learning capital might not be as informative as students' and parents' assessments.

4.1.2 Assessment of Educational and Learning Capital

To assess the students' educational capital (EC) and learning capital (LC), the first instrument was developed in 2013 (Vladut et al., 2013). Seeking a cross-culture validation, the sample included 503 students from China, Germany, and Turkey (*M* age = 13.25 years, *SD* = 0.41). In order to validate the questionnaire, two methods of validity assessments were employed. First, factorial validity of the questionnaire was conducted using confirmatory factor (CFA) analysis, in which a two-factor CFA model was specified with economic EC, cultural EC, social EC, infrastructural EC, and didactic EC loading onto the latent variable EC, and organismic LC, actional LC, telic LC, episodic LC, and attentional LC loading onto the latent variable LC. The fit indices indicated a good fit, $\chi^2(26) = 493.78$, $p < .001$, CFI = .97, TLI = .95, RMSEA = .08 (90% CI = .08–.09), SRMR = .03. Second, the concurrent validity of the questionnaire was tested by calculating the correlations of each of the ten types of educational and learning capital with the following relevant external criteria: (a) students' confidence in their scholastic abilities, (b) modifiability and stability

beliefs, (c) failure coping, and (d) academic achievement. Further studies have confirmed the two-factor model for the assessment of Turkish (Leana-Tascilar, 2015c) and Mexican (Coronela et al., 2021) students. Also, the reliability of the questionnaire was tested, and the result suggested that the scale has internal consistency reliability. In sum, the previous studies confirm that the educational and learning capital questionnaire demonstrates acceptable psychometric properties in terms of reliability and validity. Because the previous studies were conducted in several different countries but not in Saudi Arabia, the first objective of this study is to validate both the Student ELCQ and the Parent ELCQ for use in Saudi Arabia.

In order to achieve my first objective, first, the Student ELCQ (Vladut et al., 2013; Ziegler & Stoeger, 2016) will be validated, initially, by evaluating (a) the factorial validity (using confirmatory factor analysis), (b) concurrent validity (establishing correlations with external variables, which measure constructs that are theoretically related to EC and LC), (c) predictive and incremental validity (testing whether the ELCQ can predict students' academic achievement above and beyond parents' socioeconomic status, which is one of the most used factors to predict academic achievement; Blums et al., 2017), and (d) the reliability (using Cronbach's alpha) of the Student ELCQ. Second, the Parent ELCQ will be validated using the same procedure.

4.2 Validation of the Student Educational and Learning Capital Questionnaire

4.2.1 Procedure

Before data collection, ethics approval was obtained, and a sampling procedure was chosen. First, the approval for the data collection procedure and the instruments of the study were sought from the Ethics Committee of King Faisal University. Then, the Ministry of Education was contacted in order to gain access to the schools and to acquire demographic information. Because of the large number of schools (112 schools) in Al-Ahsa, including all the schools was not feasible. Consequently, a mix of stratified random sampling and convenience non-random sampling was utilized. The first step in sampling was to divide the schools into two subgroups based on the students' gender (in Saudi Arabia schools are separated by gender). Next, these

two subgroups were divided further into four subgroups; one based on the school location (urban, rural) and the other was based in the type of school (private, public). Then a random sample was taken from each stratum (boys-private school, boys-public school, boys- urban school, boys-rural school, girls-private school, girls-public school, girls- urban school, girls-rural school).

The data was collected from February to April 2019, using the student questionnaire. For cultural reasons, I conducted the data collection for the girls' schools while a male research assistant visited boys' schools to help facilitate the implementation of the questionnaire. It was not possible for us to personally supervise the whole sample implementation; therefore, many teachers were enlisted to supervise students while they completed the questionnaire.

4.2.2 Sample

Participants were 2685 ninth-grade students from 55 schools in Al-Ahsa. All students were either 15 or 16 years old (M = 14.05, SD = 0.27), among whom 60% were female; 67% were from urban areas while the rest were from rural areas. 14% of students reported that their parents' highest educational attainment was less than high school, 28% reported high school, 44% diploma/bachelor, 9% master, and 5% PhD.

4.2.3 Measures

Almost all of the scales in this section were translated from German to Arabic (except for the ELCQ because an Arabic version already exists for this scale; Ziegler & Stoeger, 2016). To ensure a high-quality translation, back translation was utilized, which is the most recommended procedure for verifying translation for cross-cultural studies (Hulin, 1987). For this purpose, a three step procedure was utilized for the back translation method (Maxwell, 1996): First, the scales were translated from German to English by a psychologist who is fluent in both languages. Then, a different translator, who is a bilingual researcher and not familiar with the scales, did the translation from German to English. Finally, in order to ensure that the items in the English version reflected the same content as the German version (Beaton et al., 2000), a

third translator (a bilingual researcher) compared the original scales with the back translation version and synthesized the results. Afterward, the scales were translated from English to Arabic using the same back translation method. The three previous steps were replicated when translating the scales from English to Arabic by a bilingual researcher, a professional translation agency, and another bilingual researcher. In order to check the clarity of the items, two ninth-grade students from Saudi Arabia read the scales and gave their feedback. Accordingly, some minor adjustments were made to improve the items.

4.2.3.1 Students' Assessment of Their Educational Capital

Students reported their educational capital by responding to the 20 educational capital items from the Arabic version (Ziegler & Stoeger, 2016) of the Questionnaire for Educational and Learning Capital (Vladut et al., 2013). The items are divided into five 4-item subscales, measuring five types of educational capital: economic educational capital, cultural educational capital, social educational capital, infrastructural educational capital, and didactic educational capital. Students answered these items on a six-point Likert-type scale (1 = *not at all true*; 2 = *not true*; 3 = *rather not true*; 4 = *rather true*; 5 = *true*; 6 = *absolutely true*). A sample item for each of the five types of learning capital subscales is shown in Table 2. The Cronbach's alpha of the scale was .85.

4.2.3.2 Students' Assessment of Their Learning Capital

Students reported their learning capital by answering the 20 learning capital items from the Arabic version (Ziegler & Stoeger, 2016) of the QELC (Vladut et al., 2013). The items are divided into five 4-item subscales, which measuring five types of learning capital: organismic learning capital, actional learning capital, telic learning capital, episodic learning capital, and attentional learning capital. These items were answered on the same scale as those for educational capital. A sample item for each of the five types of learning capital subscales is shown in Table 2. The Cronbach's alpha of the scale was .90.

Table 2

Sample Items from the Ten Educational and Learning Capital Subscales of the Student ELCQ

Subscale	Sample item
Economic EC	My family has enough money to support the development of my academic skills.
Cultural EC	I know many people who think that learning and studying are very important.
Social EC	I always know where I can find support and advice for learning and studying.
Infrastructural EC	My learning and studying conditions are well suited to school.
Didactic EC	I have very good classroom instruction in all my subjects.
Organismic LC	I am so physically fit that I can learn and study for school for long periods of time without getting tired.
Actional LC	My excellent previous knowledge helps me with my learning and studying for school.
Telic LC	I always know precisely what my next learning or studying goal is.
Episodic LC	I know from experience how I can learn and study most effectively.
Attentional LC	I focus on my learning and studying for school.

Note. EC = educational capital; LC = learning capital.

4.2.3.3 Students' Confidence in Their Scholastic Abilities Scale

Students' confidence in their scholastic abilities was assessed with a scale developed by Dweck and Henderson (1988), comprised of 4-item pairs, with each pair containing two opposing statements. Students were asked which of the two statements applied more to them and how strongly. Examples of these two anchors of a 6-point answer scale are, "I do not have a lot of confidence in my abilities for school." and "I have complete confidence in my abilities for school.". The Cronbach's alpha of the scale was .62 after deleting one item that had the lower correlation (r = .23) with the rest of the scale whereas the rest of the items had better correlations ($r \geq .35$).

4.2.3.4 Students' Modifiability Beliefs Scale

Students' modifiability beliefs were assessed with a modified version of the 6-item scale developed by Ziegler and Stoeger (2010). The original items, which referred to the subject of mathematics, were modified to refer to all school subjects. All the items share the same stem:

"With regard to school subjects…" A sample item read, "it is in my hands to improve my abilities." Items are rated on a Likert scale from 1 (*not at all true)* to 6 (*absolutely true)*; a higher score reflects a higher level of students' belief that they can expand their action repertoire. The Cronbach's alpha of the scale was .67.

4.2.3.5 Failure Coping Scale

How effectively students deal with failure was assessed with a 5-item scale from Schober (2002) that evaluates the degree to which a student reacts adaptively after encountering a setback. Items are answered on a 6-point Likert scale ranging from 1 (*not at all true)* to 6 (*absolutely true)*. An example of items is, "If I say something wrong, it spoils the whole lesson for me." The Cronbach's alpha of the scale was .74.

4.2.3.6 Students' Academic Achievement

Students' academic achievement was assessed in the form of their grade point average (GPA). It was provided by students by answering the question, "What is your GPA from your last half-year report?" Students' GPA includes students' grades in the following subjects: mathematics, Arabic language, science, English language, social studies, religion, computer science, and family education. GPA can range from 0 (lowest possible grade) to 100 (highest possible grade).

4.2.3.7 Students' Socioeconomic Status

The socioeconomic status SES variable was computed from parents' level of education and family book ownership (this operationalization of SES is also used in PISA; see Rutkowski & Rutkowski, 2013). To obtain a single score that represents SES, parents' level of education and family book ownership scores were first standardized and, afterwards, the mean scores were calculated.

Parents' level of education was collected from the students in the same way as in the PISA study (OECD, 2017). Students answered two items, "What is the highest level of education of your father?" and "What is the highest level of education of your mother?" Students' answers on these items were constructed and coded into the following categories: 1

(Less than high school), 2 (High school), 3 (Diploma/ Bachelor), 4 (Master), 5 (PhD). As in the PISA studies (OECD, 2017), parents' level of education score was calculated as the highest educational attainment of both parents.

Family book ownership was measured with a scale from the PISA studies (OECD, 2017) that assesses the number of books in a household. Students were asked: "How many books are there in your home?" Response options were (1 = *0–10 books*, 2 = *11–25 books*, 3 = *26–100 books*, 4 = *101–200 books*, 5 = *201–500 books*, and 6 = *more than 500 books*.)

4.2.4 Data Analysis

The Student ELCQ was evaluated by replicating the steps from the validation study for the Chinese, German and Turkish versions of the ELCQ (Vladut et al., 2013). Therefore, first, descriptive statistics for each of the ten capitals and the correlations for each pair of them were calculated.

Second, the factorial validity of the Student ELCQ was tested by using confirmatory factor analysis (CFA). Such analysis was determined based on the theoretical assumptions about the structure of the scale (Vladut et al., 2013), which is a suggested approach by Fabrigar et al. (1999). The CFA was conducted using Mplus 6.0 (Muthén & Muthén, 2010). The maximum-likelihood (ML) method was used to estimate the model. To evaluate the model fit, the goodness-of-fit indicators suggested by Schermelleh-Engel et al. (2003) were used: (a) $\chi 2/$df, which refers to the ratio of the chi-square value and the number of degrees of freedom, for which the acceptable range is between 2 and 3, whereas values under 2 indicate good fit; (b) (CFI) which refers to the comparative fit index, for which values greater than .97 indicate good fit and values within .97 and .95 indicate acceptable fit; (c) (TLI) which refers to the Tucker–Lewis index, for which values greater than .97 indicate good fit and values within .97 and .95 indicate acceptable fit; (d) (RMSEA) which refers to the root mean square error of approximation, for which values less than .05 indicate good fit and values between .05 and .08 indicate acceptable fit; (e) (SRMR) which refers to the standardized root mean square residual, for which values below .05 indicate good fit and values less than .10 indicate acceptable fit.

Third, the concurrent validity of the Student ELCQ was tested by calculating its correlations with external variables, which measure constructs that are theoretically related to educational capital and learning capital (students' confidence in their scholastic abilities, students' modifiability beliefs, failure coping, and students' academic achievement) and each type of the ten capitals of the Student ELCQ.

Fourth, the predictive and incremental validity for predicting academic achievement was investigated through a three-step regression to find out whether educational capital and learning capital predict and provide additional predictive value above and beyond the commonly used predictor, namely, socioeconomic status. Socioeconomic status was entered in Step 1 of the regressions. Educational capital entered in Step 2 before learning capital, in accordance with a previous finding that the effect of educational capital on academic achievement is mediated by learning capital (Paz-Baruch, 2019). In the last Step, learning capital was entered in Step 3. Finally, the internal consistency reliability of the Student ELCQ was calculated by estimating the Cronbach's scale for educational capital, learning capital, and each of the ten subscales for the Student ELCQ.

4.2.5 Results

4.2.5.1 Preliminary Analyses

Before carrying out the analyses, the sample size and the amount of missing data were examined. The sample size was adequate for the purpose of a CFA as the ratio between parameters (31) and the number of students who filled out the scale (2688) is one to 86.7 (the recommendation number in CFA is 10 per estimated parameter; see Schreiber et al., 2006). Because only 0.44% of the data for student-reported educational and learning capital was missing, only complete cases were considered (Graham, 2009).

Mean and standard deviation of the ten educational and learning capital subscales are shown in Table 3. On average, students reported high levels of all types of educational and learning capital. Afterward, the assumption of the normality of the distribution in the current sample was analyzed using the estimates of skewness and kurtosis (see Table 3). Skewness

indices ranged from –0.96 for cultural educational capital to –0.51 for didactic educational capital while Kurtosis values ranged from –0.04 for organismic learning capital to 0.98 for actional learning capital, which are within the acceptable range (Hair et al., 2017).

Table 3

Psychometric Properties of All the Ten Educational and Learning Capital Subscales of the Student ELCQ

Subscale	*M*	*SD*	Skewness	Kurtosis
Economic educational capital	4.54	1.12	–0.71	–0.03
Cultural educational capital	4.86	0.89	–0.96	0.96
Social educational capital	4.70	0.96	–0.90	0.81
Infrastructural educational capital	4.72	0.96	–0.85	0.60
Didactic educational capital	4.21	0.99	–0.51	0.09
Organismic learning capital	4.41	1.10	–0.65	–0.04
Actional learning capital	4.82	0.86	–0.92	0.98
Telic learning capital	4.82	0.91	–0.89	0.78
Episodic learning capital	4.63	0.90	–0.60	0.21
Attentional learning capital	4.65	0.92	–0.70	0.34
Educational capital	4.60	0.78	–0.66	0.38
Learning capital	4.66	0.80	–0.70	0.53

Next, the correlation for the ten types of capitals was calculated. Table 4 presented the zero-order correlations for the subscales of the educational and learning capital. Finally, boys and girls were compared. Girls reported significantly higher levels of all the ten types of educational and learning capital, with one exception: didactic educational capital. However, these group differences between boys and girls had small effect sizes $d < .$ (Cohen, 1988). Means and standard deviations of the student's subscales are shown for boys and girls in Table 5.

Table 4

Zero-Order Correlations of the Ten ELC Subscales of the Student ELCQ

Subscale	1	2	3	4	5	6	7	8	9	10
1. Economic EC	—									
2. Cultural EC	.50	—								
3. Social EC	.48	.65	—							
4. Infrastructural EC	.62	.55	.61	—						
5. Didactic EC	.38	.42	.51	.60	—					
6. Organismic LC	.39	.38	.42	.54	.51	—				
7. Actional LC	.45	.49	.51	.62	.54	.61	—			
8. Telic LC	.43	.46	.52	.57	.50	.55	.70	—		
9. Episodic LC	.47	.48	.54	.61	.54	.55	.73	.72	—	
10. Attentional LC	.50	.49	.53	.65	.58	.58	.70	.72	.73	—

Note. EC = educational capital; LC = learning capital. All coefficients are significant at $p < .001$.

Table 5

t-Tests for Comparison Between Girls and Boys Regarding Scores on the Subscales of the Student ELCQ

Subscale	Girls		Boys		*t*	*p*	Cohen's
	M	*SD*	*M*	*SD*			
Economic educational capital	4.60	1.11	4.44	1.13	3.51	.000	0.14
Cultural educational capital	4.90	0.86	4.80	0.94	2.70	.007	0.11
Social educational capital	4.75	0.92	4.61	1.03	3.75	.000	0.14
Infrastructural educational capital	4.80	0.93	4.59	1.00	5.24	.000	0.22
Didactic educational capital	4.23	0.96	4.17	1.05	1.43	.154	0.06
Organismic learning capital	4.55	1.04	4.19	1.15	8.19	.000	0.33
Actional learning capital	4.91	0.80	4.69	0.95	6.23	.000	0.25
Telic learning capital	4.89	0.84	4.70	0.99	5.19	.000	0.21
Episodic learning capital	4.69	0.86	4.54	0.96	4.03	.000	0.16
Attentional learning capital	4.70	0.89	4.57	0.97	3.67	.000	0.14
Educational capital	4.65	0.75	4.52	0.82	4.15	.000	0.17
Learning capital	4.75	0.75	4.54	0.85	6.55	.000	0.26

4.2.5.2 Confirmatory Factor Analysis

In order to establish the factorial validity of the Student ELCQ, a CFA was conducted. Premised on the theoretical assumptions (Ziegler & Baker, 2013) and on earlier empirical findings (Vladut et al., 2013; Vladut et al., 2015), a two-factor CFA model was calculated. In particular, one factor represented educational capital and one represented learning capital.

The model is shown in Figure 1. As assumed by the educational and learning capital approach, the model included a latent variable for educational capital with the five subscales economic educational capital, cultural educational capital, social educational capital, infrastructural educational capital, and didactic educational capital as indicators, and a second latent variable for learning capital with the five subscales organismic learning capital, actional learning capital, telic learning capital, episodic learning capital, and attentional learning capital as indicators.

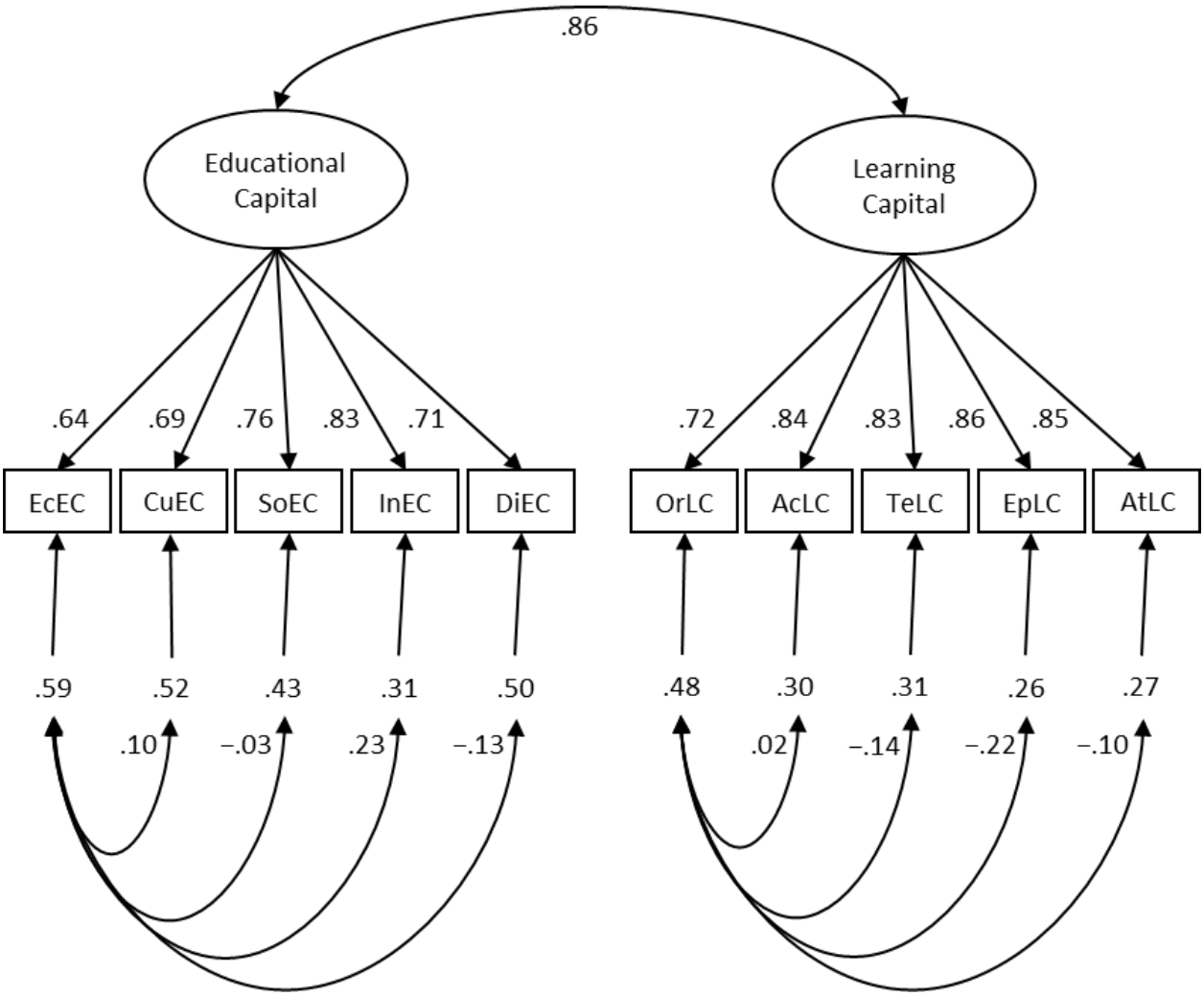
Because the amounts of educational capital and learning capital are assumed to be highly correlated, the corresponding latent variables in the model were also allowed to be correlated. Additionally, (in accordance with the previous validation study; see Vladut et al., 2013; Vladut et al., 2015), residual correlations between economic educational capital and cultural, social, infrastructural, as well as didactic educational capital, were permitted. Also, residual correlations between organismic learning capital and actional, telic, episodic, as well attentional learning capital were permitted, because economic educational capital and organismic learning capital hold a unique position in that they can provide students with access to other types of educational and learning capital (Ziegler et al., 2017; Ziegler et al., 2019).

The fit indices implied that the two-factor CFA model fit the data fairly well, $\chi^2(26) = 493.78$, $p < .001$, CFI = .97, TLI = .95, RMSEA = .08 (90% CI = .08–.09), SRMR = .03. As can be seen in Figure 1., factor loading estimates showed that virtually all indicators were firmly related to their supposed latent factors (range of R^2s = 0.41 – 0.74).

As expected, from the two-factor CFA solution, a strong positive relationship was found between educational and learning capital (r = .86; see Figure 1). Furthermore, the residual correlations between the indicators for the individual capital types indicated low unique relationships between economic educational capital and cultural (.10), social (−.03), infrastructural (.23), as well as didactic educational capital (−.13), respectively. Also, the residual correlations indicated low unique relationships between organismic learning capital and actional (.02), telic (−.14), episodic (−.22), as well as attentional learning capital (−.10), respectively.

Figure 1

Standardized Parameter Estimates From the Two-Factor CFA Model for the Student ELCQ



Note. EcEC = economic educational capital; CuEC = cultural educational capital; SoEC = social educational capital; InEC = infrastructural educational capital; DiEC = didactic educational capital; OrLC = organismic learning capital; AcLC = actional learning capital; TeLC = telic learning capital; EpLC = episodic learning capital; AtLC = attentional learning capital.

4.2.5.3 Concurrent Validity

The concurrent validly of the Student ELCQ was tested by correlating each of the ten capital types with students' confidence in their scholastic abilities, modifiability beliefs, failure coping,

and academic achievement. Table 6 presents all correlations. As expected, both educational capital (r = .33, p < .001) and learning capital (r = .43, p < .001) related to greater confidence in one's scholastic abilities. Both educational capital (r = .49, p < .001) and learning capital (r = .58, p < .001) related to greater effectiveness when dealing with failure. Educational capital (r = .47, p < .001) and learning capital (r = .59, p < .001) related to having more modifiability beliefs. Educational capital (r = .30, p < .001) and learning capital (r = .34, p < .001) related to higher academic achievement. The correlations between each of the ten capital types and students' confidence in their scholastic abilities ranged between r = .24 (p < .001) for social educational capital and r = .41 (p < .001) for episodic learning capital and attentional learning capital. The correlations between each of the ten capital types and failure coping ranged between r = .35 (p < .001) for economic educational capital and r = .53 (p < .001) for episodic learning capital. The correlations between each of the ten capital types and students' modifiability beliefs ranged between r = .31 (p < .001) for didactic educational capital and r = .55 (p < .001) for actional learning capital. The correlations between each of the ten capital types and students' academic achievement ranged between r = .31 (p < .001) for social educational capital and didactic educational capital and r = .34 (p < .001) for attentional learning capital.

Table 6

Correlations of the Ten Educational and Learning Capital Subscales of the Student ELCQ With the External Variables

Subscale	Confidence in scholastic abilities	Failure coping	Modifiability beliefs	Academic achievement
Economic EC	.28	.35	.38	.30
Cultural EC	.25	.38	.34	.25
Social EC	.24	.40	.36	.17
Infrastructural EC	.34	.46	.47	.33
Didactic EC	.24	.37	.31	.17
Organismic LC	.29	.43	.45	.21
Actional LC	.40	.51	.55	.34
Telic LC	.35	.51	.49	.28
Episodic LC	.41	.53	.54	.29
Attentional LC	.41	.50	.52	.34
Educational capital	.33	.49	.47	.30
Learning capital	.43	.58	.59	.34

Note. EC = educational capital; LC = learning capital. All coefficients are significant at $p < .001$.

4.2.5.4 Predictive and Incremental Validity

In order to test the predictive and incremental validity of the Student ELCQ for predicting academic achievement, a three-step hierarchical multiple regression was conducted. Prior to calculating the regression models, it was investigated whether the requirements for this analysis (Osborne & Waters, 2002) were fulfilled. Residual and scatter plots indicated that the assumptions of normality, linearity and homoscedasticity were all met.

The regression results revealed (see Table 7) that in Step 1, as expected, the higher the students' socioeconomic status, the higher their academic achievement ($\beta = .31$, $p < .001$), and 10% of the variation in academic achievement was explained. As expected, adding educational capital explained an additional 6% of variation in academic achievement; the higher

students' educational capital, the higher their academic achievement (β = .24, $p < .001$). Finally, adding learning capital to the regression model explained an additional 3% of the variation in academic achievement; the higher students' learning capital, the higher their academic achievement was (β = .26, $p < .001$). This confirmed that learning capital adds predictive power to the prediction of academic achievement. However, unexpectedly, when learning capital was entered into the model, educational capital was no longer a significant predictor (β = .05, $p = .098$).

Table 7

Hierarchical Regression Models Predicting Students' Academic Achievement With the Student ELCQ

Predictor	*B*	95% CI for *B*	*SE B*	β	R^2	ΔR^2
Step 1					.10	.10***
Constant	89.22***	[88.86, 89.59]	0.19			
Socioeconomic status	3.73***	[3.29, 4.19]	0.23	.31***		
Step 2					.15	.06***
Constant	74.98***	[72.79, 77.17]	1.12			
Socioeconomic status	3.02***	[2.57, 3.47]	0.23	.25***		
Educational capital	3.09***	[2.62, 2.56]	0.24	.24***		
Step 3						
Constant	71.46***	[69.19, 73.73]	1.16		.18	.03***
Socioeconomic status	3.07***	[2.63, 3.51]	0.22	.25***		
Educational capital	0.58	[–0.11, 1.27]	0.35	.05		
Learning capital	3.22***	[2.56, 3.88]	0.34	.26***		

Note. CI = confidence interval.

***$p < .001$.

4.2.5.5 Internal Consistency

Cronbach's α values and sample items for each of the ten educational and learning capital subscales are presented in Table 8. The reliability of the ten educational and learning capital

subscales were within an acceptable range. They varied between α = .67 (which is somewhat low, but acceptable see Nunnally, 1967; Taber, 2018) for cultural educational capital and α = .79 for economic educational capital. These values are slightly higher than the reliability in the questionnaire in the original language (αs between .49 and .86 in Vladut et al., 2013; αs between .62 and .85 in Vladut et al., 2015). The reliability of the scale that consists of all items that assessed educational capital combined (20 items; α = .85) and the students' learning capital items combined (20 items; α = .90) of the Student ELCQ, were good (see Nunnally, 1967; Taber, 2018).

Table 8

Reliabilities and Sample Items for the Ten Subscales of the Student ELCQ

Subscale	Cronbach's α	Sample item
Economic EC	.79	My family has enough money to support the development of my academic skills.
Cultural EC	.67	I know many people who think that learning and studying are very important.
Social EC	.72	I always know where I can find support and advice for learning and studying.
Infrastructural EC	.76	My learning and studying conditions are well suited to school.
Didactic EC	.73	I have very good classroom instruction in all my subjects.
Organismic LC	.75	I am so physically fit that I can learn and study for school for long periods of time without getting tired.
Actional LC	.69	My excellent previous knowledge helps me with my learning and studying for school.
Telic LC	.70	I always know precisely what my next learning or studying goal is.
Episodic LC	.74	I know from experience how I can learn and study most effectively.
Attentional LC	.73	I focus on my learning and studying for school.

Note. EC = educational capital; LC = learning capital

4.3 The Validation of the Parent Educational and Learning Capital Questionnaire

4.3.1 Procedure

To begin the data collection process of the study, first, ethical approval for all the scales was sought from the Ethics Committee of King Faisal University. Second, access to the schools was requested from the Ministry of Education in Al-Ahsa. The sample for the current study was drawn from a population of parents whose children were part of the student sample employed to validate the Student ELCQ. Students in the previous study received a copy of the parent's questionnaire, which they were asked to return after their parents had completed it.

4.3.2 Sample

Participants were 900 parents of ninth-grade students from 35 schools in Al-Ahsa (approximately, 45% of parents did return the questionnaire). Among 36% of parents reported that the person who filled out the study instrument was the father, 33% was the mother, 17% were both the father and the mother, and 9% reported the respondent as "other person". The sample consisted of 641 parents of female students and 258 parents of male students. Also, 46% of the parents were from urban areas, whereas 54% parents were from rural areas. Approximately ١8% of parents reported that their highest educational attainment was less than high school, 2٦% of parents had high school education, approximately ٤٨% of parents had diploma/bachelor, 5% of parents had master's level, and ٣% of parents had PhD.

4.3.3 Measures

All the scales in this section were translated from English to Arabic except the ELCQ due to the existing Arabic version of the scale (Ziegler & Stoeger, 2016). The same back translation procedure was used as for the students' scales.

4.3.3.1 Parents' Assessment of Students' Educational Capital

The parents' assessment of students' educational capital was assessed with a modified version of the 10-item scale by Ziegler and Stoeger (2016). The items were modified to reflect parent

assessment of their children's educational capital instead of teachers' assessment. It consisted of 10 items which are divided into ten 2-item subscales, with each measuring one of the five types of educational capital: Economic educational capital, cultural educational capital, social educational capital, infrastructural educational capital, and didactic educational capital. Parents answered these items on a six-point Likert-type scale (1 = *not at all true*, 2 = *not true*, 3 = *rather not true*, 4 =*rather true*, 5 = *true*, 6 = *absolutely true*). A sample item for each of the five educational capital subscales is shown in the Table 9. The Cronbach's alpha for the educational capital scale was .73.

4.3.3.2 Parents' Assessment of Students' Learning Capital

The parents' assessment of students' learning capital was assessed with a modified version of the 10-item scale by Ziegler and Stoeger (2016). The items were modified to reflect parents' assessment of their children's learning capital instead of teachers' assessment. It consisted of 10 items which are divided into ten 2-item subscales that measure each of the five types of learning capital: Organismic learning capital, actional learning capital, telic learning capital, episodic learning capital, and attentional learning capital. These items were answered on the same scale as those for educational capital. A sample item for each of the five learning capital subscales is shown in the Table 9. The Cronbach's alpha for the learning capital scale was .85.

4.3.3.3 Parents' Attitude Towards Parental Involvement

Parents' attitude towards parental involvement was assessed with a 12-item scale by Sheldon and Epstein (2007) which measures parents' beliefs and behaviors with respect to their responsibility for their son's/daughter's school success. All items share the same stem: "It is a parent's responsibility to…" An example of items is "contact the teacher as soon as academic problems arise" Items are scored on a 6-point Likert scale ranging from 1 (*not at all true*) to 6 (*absolutely true)*. The Cronbach's alpha of the scale was .80.

Table 9

Sample Items from the Ten Educational and Learning Capital Subscales of the Parent ELCQ

Subscale	Sample item
Economic EC	Our family is willing to make substantial financial investments in our son's/daughter's education.
Cultural EC	Our family places a strong emphasis on learning and education.
Social EC	Our family demonstrates a willingness to personally support our son's/daughter's learning development (e.g., parent–student learning activities; parents who, of their own volition, initiate conversations with their son's/daughter's teachers and mentors).
Infrastructural EC	Our son/daughter takes advantage of many extracurricular talent-development opportunities that are well suited to his/her talent profile (e.g., school clubs, mentoring, school groups that compete in academic competitions).
Didactic EC	The teachers at our son's/daughter's school attach great importance to providing our son/daughter with an educational experience in classroom that is a good fit for his/her abilities.
Organismic LC	Also due to his/her physical fitness, our son/daughter can endure very intensive processes of learning and studying.
Actional LC	Our son/daughter demonstrates an intellectual grasp that is far above average.
Telic LC	Our son/daughter sets learning goals that are personally challenging and is highly motivated.
Episodic LC	Our son/daughter has excellent learning and studying skills.
Attentional LC	Our son/daughter works in a highly concentrated manner and is not easily distracted.

Note. EC = educational capital; LC = learning capital.

4.3.3.4 Parents' Evaluation of Students' School

Parents' evaluation of students' school was assessed with a 4-item scale by Sheldon and Epstein (2007), which measures parents' perception about their son's/daughter's school quality. An example item is "this is a very good school." Items were answered on a 6-point Likert scale ranging from 1 (*not at all true*) to 6 (*absolutely true*). The Cronbach's alpha of the scale was .71.

4.3.3.5 Parental Involvement in School Activities

Parental involvement in school activities was assessed with a 13-item scale by Sheldon and Epstein (2007), which queries how often parents get involved in their son's/daughter's learning activities at school and at home. All items share the same stem: "How often do you…". An example of items is "ask your son/daughter how well he/she is doing in school." Answers are given on a Likert scale (1 = *Every day/Most Days*, 2 = *Once a Week*, 3 = *Once in a While*, 4 = *Never*.) The Cronbach's alpha of the scale was .79.

4.3.3.6 Parents' Values Regarding Achievement

Parents' values regarding achievement were assessed with the 8-item scale by Paulson (1994), which queries parents' values with respect to their son's/daughter's achievement. Items were answered on a 6-point Likert scale ranging from 1 (*not at all true*) to 6 (*absolutely true*); high scores reflect high levels of valuing achievement. An example of items is "I think my son/daughter should go to university." The Cronbach's alpha of the scale was .71.

4.3.3.7 Parents' Modifiability Beliefs

Parent' modifiability beliefs were assessed with a modified version of the 6-item scale by Ziegler and Stoeger (2010), which measures parents' beliefs about the extent to which their son/daughter can modify deficits regarding their school-related abilities. I modified the original items, which referred to the subject of mathematics, to refer to all school subjects. Also, I modified the scale to reflect parents' beliefs about their children's school-related abilities. All items share the same stem: "With regard to school subjects…." A sample item read "it is in my son's/daughter's hands to improve his/her abilities." Items were rated on a Likert scale from 1 *(not at all true)* to 6 *(absolutely true)*; a higher score reflects a higher level of believing that their son/daughter could expand his/her action repertoire. The Cronbach's alpha of the scale was .66.

4.3.3.8 Students' Academic Achievement

Students' academic achievement was assessed in the form of their grade point average in mathematics, Arabic, science, English language, social studies, religion, computer science, and family education. It was provided by the students.

4.3.3.9 Students' Socioeconomic Status

Students' socioeconomic status was computed from parents' level of education and family book ownership, based on the same procedure used to compute students' socioeconomic status for the validation of the Student ELCQ. Information on level of education and book ownership was provided by the students in the student questionnaire.

4.3.4 Data Analysis

In order to validate the Parent ELCQ, the same procedure as for the Student ELCQ was used: (a) the descriptive analysis and correlations for each of the ten capitals were calculated; (b) a CFA was conducted to evaluate factorial validity; (c) concurrent validity of the Parent ELCQ was tested by calculating the correlations between the external variables, which measure constructs that should be related to educational capital and learning capital based on theory (parents' modifiability beliefs, parents' evaluation of students' school, parental involvement in school activities, parents' values regarding achievement, and students' academic achievement); (d) hierarchical multiple regression was used to test the predictive and incremental validity for predicting academic achievement above and beyond the most commonly used predictor, socioeconomic status; (e) Cronbach's Alpha was calculated to assess internal consistency reliability for each of the ten subscales for the Parent ELCQ; and (f) the correlation of each of the ten capital types of the Student ELCQ with each of the ten capital types of the Parent ELCQ was calculated to determine whether to use the Student and the Parent ELCQ together or separately based on how strong the correlation is between them.

4.3.5 Results

4.3.5.1 Preliminary Analyses

Before carrying out the analyses, the sample size and the amount of missing data were examined. The sample size was adequate for the purpose of a CFA, as the ratio between parameters (31) and the number of parents who filled out the scale (900) was one to 29 (10 cases per estimated parameter are recommended; see Schreiber et al., 2006). Because only 2.3% of the data for parent-reported educational and learning capital was missing, only complete cases were considered (Graham, 2009).

Mean and standard deviation for the ten educational and learning capital subscales are shown in Table 10. On average, parents' assessment of students' educational and learning capital showed high levels of all types of educational and learning capital. Afterward, the assumption of the normality of the distribution in the current sample was analyzed using the estimates of skewness and kurtosis (see Table 10). Skewness indices ranged from –1.21 for cultural educational capital to –0.16 for economic educational capital, whereas Kurtosis values ranged from –0.96 for economic educational capital to 2.12 for cultural educational capital, which are within the acceptable range (Hair et al., 2017).

Table 10

Psychometric Properties of all the Ten Subscales of the Parent ELCQ

Subscale	*M*	*SD*	Skewness	Kurtosis
Economic educational capital	3.67	1.48	–0.16	–0.96
Cultural educational capital	5.12	0.80	–1.21	2.12
Social educational capital	4.40	1.09	–0.57	0.05
Infrastructural educational capital	4.21	1.11	–0.47	–0.12
Didactic educational capital	4.28	1.09	–0.57	0.19
Organismic learning capital	4.60	0.99	–0.56	–0.07
Actional learning capital	4.61	1.02	–0.58	0.02
Telic learning capital	4.65	0.94	–0.67	0.76
Episodic learning capital	4.83	0.96	–0.85	0.87
Attentional learning capital	4.51	1.06	–0.62	0.15
Educational capital	4.34	0.79	–0.30	0.25
Learning capital	4.63	0.80	–0.45	0.05

Next, the correlation for the ten types of capital was calculated. Table 11. presented the zero-order correlations for the subscales of the educational and learning capital. Finally, boys and girls were compared, there was no significant difference between them for all the ten types of educational and learning capital as assessed by parents. Means and standard deviations of the parent's subscales are shown for gender in Table 12.

Table 11

Zero-Order Correlations of the Ten ELC Subscales of the Parent ELCQ

Subscale	1	2	3	4	5	6	7	8	9	10
1. Economic EC	—									
2. Cultural EC	.28	—								
3. Social EC	.33	.42	—							
4. Infrastructural EC	.25	.33	.49	—						
5. Didactic EC	.19	.31	.51	.56	—					
6. Organismic LC	.25	.34	.40	.38	.37	—				
7. Actional LC	.26	.37	.36	.36	.26	.58	—			
8. Telic LC	.25	.38	.37	.38	.28	.55	.58	—		
9. Episodic LC	.27	.34	.36	.35	.29	.46	.57	.62	—	
10. Attentional LC	.22	.35	.37	.36	.33	.50	.56	.56	.54	—

Note. EC = educational capital. LC = learning capital. All coefficients are significant at $p < .001$.

Table 12

t-Tests for Comparison Between Girls and Boys Regarding Scores on the Subscales of the Parent ELCQ

Subscale	Girls		Boys		*t*	*p*	Cohen's
	M	*SD*	*M*	*SD*			
Economic educational capital	3.70	1.48	3.59	1.50	0.94	.959	0.07
Cultural educational capital	5.11	0.81	5.14	0.79	–0.54	.880	0.04
Social educational capital	4.37	1.11	4.48	1.04	–1.24	.324	0.10
Infrastructural educational capital	4.26	1.09	4.12	1.15	1.61	.864	0.12
Didactic educational capital	4.29	1.08	4.28	1.13	0.07	.278	0.01
Organismic learning capital	4.56	1.01	4.73	0.92	–2.33	.066	0.18
Actional learning capital	4.60	1.02	4.65	1.03	–0.71	.951	0.05
Telic learning capital	4.63	0.91	4.68	1.01	–.069	.178	0.05
Episodic learning capital	4.80	0.95	4.88	0.97	–1.14	.872	0.08
Attentional learning capital	4.56	1.04	4.40	1.10	1.93	.261	0.15
Educational capital	4.34	0.78	4.32	0.80	0.32	.534	0.03
Learning capital	4.62	0.80	4.65	0.81	–0.38	.879	0.04

4.3.5.2 Confirmatory Factor Analysis

In order to establish the factorial validity of the Parent ELCQ, a CFA was conducted. Premised on the theoretical assumptions (Ziegler & Baker, 2013) and on earlier empirical findings (Vladut et al., 2013; Vladut et al., 2015), a two-factor CFA model was calculated, with one factor representing educational capital and one representing learning capital.

The model is shown in Figure 2. As assumed by the educational and learning capital approach, the model included a latent variable for educational capital with the five subscales economic educational capital, cultural educational capital, social educational capital, infrastructural educational capital, and didactic educational capital, as indicators, and a second latent variable for learning capital with the five subscales organismic learning capital, actional learning capital, telic learning capital, episodic learning capital, and attentional learning capital, as indicators.

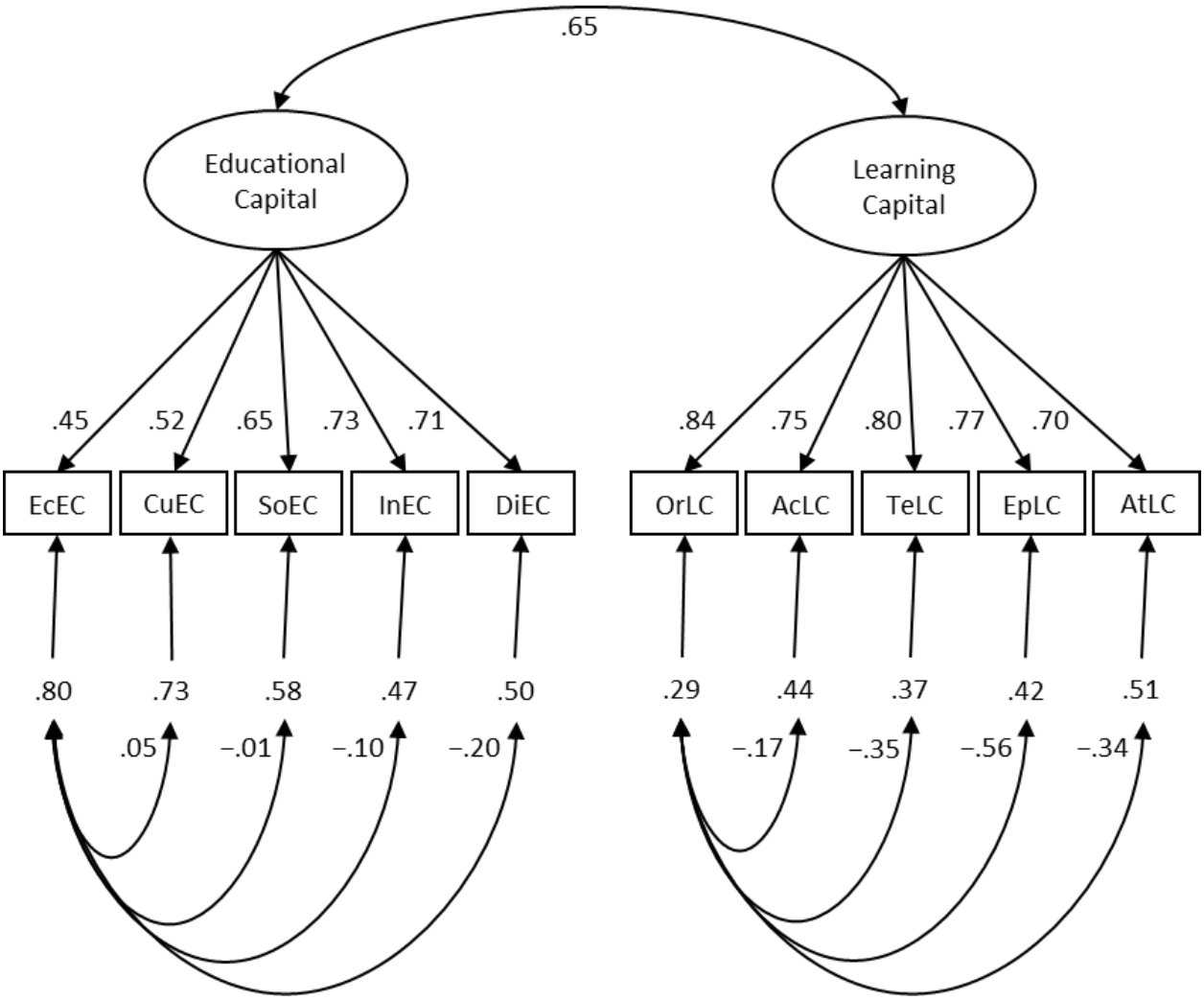
Because educational capital and learning capital are assumed to be highly correlated, the corresponding latent variables in the model were also allowed to be correlated. Additionally, (in accordance with the previous validation study; see Vladut et al., 2013; Vladut et al., 2015), residual correlations between economic educational capital and cultural, social, infrastructural, as well as didactic educational capital, were permitted. Also, residual correlations between organismic learning capital, and actional, telic, episodic, as well as attentional learning capital, were permitted. This was done because of the unique position economic educational capital and learning capital have with other capitals.

The fit indices implied that the two-factor CFA model fit the data fairly well, $\chi^2(26) = 94.56$, $p < .001$, CFI = .97, TLI = .96, RMSEA = .05 (90% CI = .04–.07), SRMR = .04. As can be seen in Figure 1., factor loading estimates showed that virtually all indicators were firmly related to their supposed latent factors (range of R^2s = 0.20 – 0.71).

As expected, from the two-factor CFA solution, there was a strong positive relationship between educational and learning capital (r = .65; see Figure 2). Furthermore, the residual correlations indicated low unique relationship between economic educational capital and cultural (.05), social (−.01), infrastructural (−.10), as well as didactic educational capital (−.20), respectively. Also, the residual correlations indicated low unique relationship between organismic learning capital and actional (−.17), telic (−.35), episodic (−.56), as well as attentional learning capital (−.34), respectively.

Figure 2

Standardized Parameter Estimates From the Two-Factor CFA Model for the Parent ELCQ



Note. EcEC = economic educational capital; CuEC = cultural educational capital; SoEC = social educational capital; InEC = infrastructural educational capital; DiEC = didactic educational capital; OrLC = organismic learning capital; AcLC = actional learning capital; TeLC = telic learning capital; EpLC = episodic learning capital; AtLC = attentional learning capital.

4.3.5.3 Concurrent Validity

Table 13 presents all correlations. The concurrent validly of the Parent ELCQ was tested by correlating each of the ten capital types with parental value regarding achievements, modifiability beliefs, school quality, attitude towards parental involvement, involvement in school activities, and students' academic achievement. As expected, both educational capital (r = .22, p < .001) and learning capital (r = .18, p < .001) related to greater involvement in children's activities. Both educational capital (r = .46, p < .001) and learning capital (r = .52, p < .001) related to greater positive attitude towards parental involvement. Both educational capital (r = .38, p < .001) and learning capital (r = .30, p < .001) related to positive evaluation of their children's school. Both educational capital (r = .27, p < .001) and learning capital (r = .46, p < .001) related to having more modifiability beliefs. Both educational capital (r = .29, p < .001) and learning capital (r = .42, p < .001) related to greater value regarding achievements. Finally, both educational capital (r = .20, p < .001) and learning capital (r = .39, p < .001) related to greater school achievement. The correlations between each of the ten capital types and parental value regarding achievements ranged between r = .15 (p < .001) for economic educational capital and r = .35 (p < .001) for actional learning capital and telic learning capital. The correlations between each of the ten capital types of parental educational and learning capital and parents' modifiability beliefs ranged between r = .14 (p < .001) for didactic educational capital and r = .38 (p < .001) for episodic learning capital. The correlations between each of the ten capital types and parents' evaluation of students' school quality ranged between r = .04 (p = .280) for economic educational capital and r = .45 (p < .001) for didactic educational capital. The correlations between each of the ten capital types and parents' attitude towards parental involvement ranged between r = .23 (p < .001) for economic educational capital and r = .44 (p < .001) for social educational capital. The correlations between each of the ten capital types and parental involvement in school activities ranged between r = .11 (p < .01) for cultural educational capital and r = .23 (p < .001) for social educational capital. The correlations between each of the ten capital types and academic achievement ranged between r = .08 (p <

.05) for infrastructural educational capital and didactic educational capital and r = .41 (p < .001) for episodic learning capital. Table 13 presents all correlations.

Table 13

Correlations of the Ten Educational and Learning Capital Subscales of the Parent ELCQ With the External Variables

Subscale	Parental value regarding achievements	Modifiability beliefs	School quality	Attitude towards parental involvement	Parental involvement in school activities	Academic achievement
Economic EC	.15***	.19***	.04	.23***	.14***	.21***
Cultural EC	.34***	.27***	.22***	.38***	.11**	.20***
Social EC	.25***	.20***	.32***	.44***	.23***	.16***
Infrastructural EC	.19***	.17***	.38***	.33***	.14***	.08*
Didactic EC	.14***	.14***	.45***	.29***	.14***	.08*
Organismic LC	.34***	.35***	.30***	.43***	.13***	.25***
Actional LC	.35***	.41***	.25***	.39***	.11**	.33***
Telic LC	.35***	.34***	.22***	.42***	.14***	.27***
Episodic LC	.33***	.38***	.25***	.41***	.12***	.41***
Attentional LC	.30***	.33***	.21***	.44***	.19***	.34***
Educational capital	.29***	.27***	.38***	.46***	.22***	.20***
Learning capital	.42***	46***	.30***	.52***	.18***	.39***

Note. EC = educational capital; LC = learning capital.

*p < .05. **p < .01. ***p < .001.

4.3.5.4 Predictive and Incremental Validity

In order to test the predictive and incremental validity of the Parent ELCQ for predicting academic achievement, a three-step regression was conducted. Prior to calculating the hierar-

chical multiple regression models, it was investigated whether the requirements for this analysis (Osborne & Waters, 2002) were fulfilled. Residual and scatter plots indicated that the assumptions of normality, linearity and homoscedasticity were all met.

Table 14

Hierarchical Regression Models Predicting Students' Academic Achievement with the Parent ELCQ

Predictor	*B*	95% CI for *B*	*SE B*	β	R^2	ΔR^2
Step 1					.14	.14***
Constant	90.39***	[89.77, 91.02]	0.32			
Socioeconomic status	4.62***	[3.83, 5.41]	0.40	.38***		
Step 2					.16	.02***
Constant	82.99***	[79.44, 86.54]	1.81			
Socioeconomic status	4.32***	[3.52, 5.11]	0.41	.35***		
Educational capital	1.70***	[0.90, 2.50]	0.41	.14***		
Step 3					.24	.08***
Constant	73.36***	[69.38, 77.34]	2.03			
Socioeconomic status	3.7٥***	[2.98, 4.52]	0.39	.31***		
Educational capital	–0.66	[–1.58, 0.26]	0.47	–.05		
Learning capital	4.25***	[3.33, 5.18]	0.47	.35***		

Note. CI = confidence interval.

***$p < .001$.

The regression results revealed (see Table 14) that in Step 1, as expected, the higher students' socioeconomic status, the higher their academic achievement (β = .3٨, $p < .001$), and ١٤% of the variation in academic achievement was explained. As expected, adding educational capital explained an additional 2% of variation in academic achievement; the higher students' educational capital, the higher their academic achievement (β = .14, $p < .001$). Finally, adding learning capital to the regression model explained an additional 8% of the variation in academic achievement; the higher students' learning capital, the higher their academic

achievement (β = .۳5, $p < .001$). This confirmed that learning capital adds predictive power to the prediction of academic achievement. However, unexpectedly, when learning capital was entered into the model, educational capital was no longer a significant predictor (β = –.05, $p = .162$).

4.3.5.5 Internal Consistency

Cronbach's α values and sample items for each of the ten educational and learning capital subscales are presented in Table 15. The reliability of the ten educational and learning capital subscales varied between α = .43 for infrastructural educational capital and α = .80 for actional educational capital (which were low, but to be expected for two item scales; see Eisinga et al., 2013). Because the focus in this dissertation is to assess students' overall amount of educational capital and learning capital not the individual types of the ten capitals, the reliability of the individual ten subscales is of less importance here. Cronbach's α values and sample items for each of the ten educational and learning capital subscales are presented in Table 15. The reliability of the scale that consists of all items that assessed educational capital combined (10 items; α = .73) and the parents' learning capital items combined (10 items; α = .85) of the Parent ELCQ were good (see Nunnally, 1967; Taber).

Table 15

Reliabilities and Sample Items for the Ten Subscales of the Parent ELCQ

Subscale	Cronbach's α	Sample item
Economic EC	.68	Our family is willing to make substantial financial investments in our son's/daughter's education.
Cultural EC	.45	Our family places a strong emphasis on learning and education.
Social EC	.53	Our family demonstrates a willingness to personally support our son's/daughter's learning development (e.g., parent–student learning activities; parents who, of their own volition, initiate conversations with their son's/daughter's teachers and mentors).
Infrastructural EC	.43	Our son/daughter takes advantage of many extracurricular talent-development opportunities that are well suited to his/her talent profile (e.g., school clubs, mentoring, school groups that compete in academic competitions).
Didactic EC	.72	The teachers at our son's/daughter's school attach great importance to providing our son/daughter with an educational experience in classroom that is a good fit for his/her abilities.
Organismic LC	.70	Also due to his/her physical fitness, our son/daughter can endure very intensive processes of learning and studying.
Actional LC	.80	Our son/daughter demonstrates an intellectual grasp that is far above average.
Telic LC	.46	Our son/daughter sets learning goals that are personally challenging and is highly motivated.
Episodic LC	.57	Our son/daughter has excellent learning and studying skills.
Attentional LC	.70	Our son/daughter works in a highly concentrated manner and is not easily distracted.

Note. EC = educational capital; LC = learning capital.

4.3.5.6 Correlation Between the Student ELCQ and the Parent ELCQ

Finally, the correlation of each of the ten capital types of the Student ELCQ with each of the ten capital types of the Parent ELCQ was calculated (see Table 16) in order to find out how much parents' and students' assessments of the different capital types agree. As expected, both student-assessed educational capital and learning capital, as well as the individual ten subscales, correlated positively with both parent-assessed educational capital and learning

capital and the individual ten subscales. The correlations ranged from $r = .13$, $p < .001$ between student-assessed economic educational capital and parent-assessed didactic educational capital, and $r = .44$, $p < .001$ between student-assessed educational capital and parent-assessed educational capital, and between student-assessed learning capital and parent-assessed learning capital. The correlation ranges from moderate to low in size, which indicates that parents' and students' assessments of students' ELC differ considerably in some of the capital types.

Table 16

Zero-Order Correlations of the Ten Subscales and Two Primary Scales of the Student and the Parent ELCQ

	Parent ELCQ											
Student ELCQ	**EcEC**	**CuEC**	**SoEC**	**InEC**	**DiEC**	**OrLC**	**AcLC**	**TeLC**	**EpLC**	**AtLC**	**EC**	**LC**
EcEC	.42	.25	.28	.21	.13	.22	.29	.24	.22	.28	.39	.31
CuEC	.17	.24	.26	.21	.19	.24	.26	.24	.21	.24	.30	.30
SoEC	.16	.24	.26	.20	.19	.21	.24	.22	.19	.24	.29	.28
InEC	.30	.29	.29	.22	.21	.26	.29	.26	.25	.30	.37	.34
DiEC	.19	.25	.31	.28	.34	.22	.17	.21	.22	.24	.38	.28
OrLC	.20	.20	.19	.17	.21	.32	.25	.24	.23	.26	.28	.33
AcLC	.22	.27	.27	.20	.25	.30	.35	.32	.32	.36	.34	.42
TeLC	.14	.22	.23	.17	.16	.24	.29	.29	.26	.31	.25	.35
EpLC	.20	.27	.29	.20	.26	.25	.35	.31	.28	.34	.34	.39
AtLC	.20	.24	.27	.21	.22	.29	.36	.31	.32	.37	.32	.42
EC	.33	.32	.35	.28	.27	.29	.32	.30	.28	.33	.44	.38
LC	.23	.28	.29	.22	.26	.33	.37	.34	.33	.38	.36	.44

Note. EcEC = economic educational capital; CuEC = cultural educational capital; SoEC = social educational capital; InEC = infrastructural educational capital; DiEC = didactic educational capital; OrLC = organismic learning capital; AcLC = actional learning capital; TeLC = telic learning capital; EpLC = episodic learning capital; AtLC = attentional learning capital; EC = educational capital; LC = learning capital. All coefficients are significant at $p < .001$.

4.4 Discussion

Because the primary intent of this dissertation is to investigate the role educational capital and learning capital (assessed from both students' and parents' perspective) play in the gifted

student identification process in Saudi Arabia, including the nomination process and the giftedness assessment, a valid instrument that can be used in Saudi Arabia was required. Therefore, I validated an existing instrument—the Educational and Learning Capital Questionnaires (ELCQ; Vladut et al., 2013; Ziegler & Stoeger, 2016) in Saudi Arabia. The validation included two different versions, one for students' use (the Student ELCQ), the other for their parents (the Parent ELCQ). The questionnaires cover key individual and environmental aspects necessary for talent development (e.g., Ziegler et al., 2017; Ziegler & Stoeger, 2017). The validation for both the Students and the Parent ELCQ comprised four steps.

To begin, the factorial validity of both the Students and Parents ELCQ was analyzed. In line with previous research findings (Vladut et al., 2013; Vladut et al., 2015) and the relevant theoretical assumptions (Ziegler & Baker, 2013), a two-factor CFA model was specified to replicate the findings with the original instrument. In general, according to the fit indices, the two-factor model solution, for both the Student and the Parent ELCQ, fit the data well. This finding corroborates related conclusions drawn in several validation studies for the Student ELCQ in different countries, such as China, Turkey, Germany, and Mexico (Coronela et al., 2021; Leana-Tascilar, 2015c; Vladut et al., 2013).

In a second step, the concurrent validity was tested by investigating the correlations of the Student and the Parent ELCQ with relevant external variables. The findings support the concurrent validity of the ELCQ. In the students' questionnaire, as expected, educational capital and learning capital as assessed by the student correlated positively *(p* < .001) with students' confidence in their scholastic abilities (Dweck & Henderson, 1988), failure coping (Schober, 2002), modifiability beliefs (Ziegler & Stoeger, 2010), and academic achievement. These findings are in line with the results of the original validation study (Vladut et al., 2013).

Moreover, in the parents' questionnaire, as expected, educational capital and learning capital as assessed by the parents correlated positively with parental value regarding achievements (Paulson, 1994), parental involvement in school activities (Sheldon & Epstein, 2007); parents' attitude towards parental involvement (Sheldon & Epstein, 2007); parents' evaluation of students' school (Sheldon & Epstein, 2007); modifiability beliefs (Ziegler &

Stoeger, 2010); and academic achievement. These findings seem plausible, as both educational and learning capital and the external scales are good predictors of students' academic success. For example, students with parents who support their education (similar to social educational capital and parental involvement in school activities scale) are more likely to achieve better grades (Pomerantz et al., 2007).

In a third step, the predictive validity and the incremental validity of the ELCQ were tested. In both the Students and the Parent ELCQ, assessments of students' educational capital and learning capital predicted students' academic achievement (predictive validity) above and beyond students' socioeconomic status (incremental validity), which is one of the most often used environmental aspects to predict academic achievement (Blums et al., 2017). These results expand upon previous studies on the importance of educational and learning capital for academic achievement (e.g., Paz-Baruch, 2019; Ziegler et al., 2017). In particular, they extend the findings of Ziegler et al. (2019), who found that educational and learning capital added incremental value when predicting academic achievement above and beyond intelligence.

In a fourth step, the internal consistency reliability of the ELCQ was calculated by estimating the Cronbach's alpha for educational capital and learning capital. The analysis showed that the overall Cronbach's alpha reliabilities of both educational and learning capital scales were acceptable. These results corroborate the original validation study (Vladut et al., 2013) for the Chinese, German and Turkish versions of the ELCQ (Vladut et al., 2013), that the ELCQ can be considered a reliable questionnaire. The reliabilities of some of the types of educational capital in the parents' questionnaire were low, but this was to be expected for two-item scales (see Eisinga et al., 2013). Because the focus of my dissertation is to assess students' overall amount of educational capital and learning capital, not the individual types of the ten capitals, the reliability of the individual ten subscales is of less importance here.

Finally, the correlation of each of the ten capital types of the Student ELCQ with each of the ten capital types of the Parent ELCQ was calculated. Because the correlations between the Student and the Parent ELCQ are not high ($r < .45$), one can assume that they should

both be used simultaneously to assess student's educational and learning capital because parents and students seem to have different perspectives regarding students' capitals. Therefore, I will use both the Student ELCQ and the Parent ELCQ to investigate the second (nomination) and third objectives (students' performance in the giftedness assessment) of this dissertation.

To summarize, the Student and the Parent ELCQ demonstrated an acceptable factorial validity as well as good concurrent, predictive, and incremental validity. Moreover, the overall Cronbach's alpha values for educational capital and learning capital was within the acceptable range. Based on these results, the Student and the Parent ELCQ can be considered useful for assessing students' educational capital and learning capital from both students' and parents' perspective. Therefore, both the Student ELCQ and the Parent ELCQ will be used to investigate the main objective of this dissertation.

5 Educational and Learning Capital and Nomination (Second Objective)

5.1 Theoretical Background

Nomination is one of the most commonly used methods to identify gifted students (Ziegler & Raul, 2000). It is used as the first step in most identification procedures to determine whether students might be gifted, and thus require further evaluation (Biber et al., 2021; Ottwein, 2020), helping save money, time, and human resources (McBee et al., 2016). There are several different types of nomination (e.g., teacher, parent, peer and self-nominations; Acar et al., 2016), with teacher and parent nomination being by far the most frequent ones (McBee et al., 2016). For this reason and because both types of nomination are used there, this study took place in Saudi Arabia (Mawhiba, n.d.–a). More explicitly, nominations by teachers, by parents, and by both teachers and parents simultaneously were investigated.

Although nomination is a critical first step because excluded students are deprived of all gifted programs and services that are available to gifted students, the predictors of whether a student might be nominated have not been adequately investigated (McBee et al., 2016). Previous studies on nomination focused on the quality of teacher nomination (e.g., Biber et al., 2021; Neber, 2004) and parent nomination (Lee & Olszewski-Kubilius, 2006) and very few tried to provide a detailed explanation about the factors that affect their nomination. Other studies mainly targeted teachers' beliefs and assumptions about the characteristics of the nominated students (e.g., Hernández-Torrano & Tursunbayeva, 2016; Siegle et al., 2010), applied descriptive analysis (using the existing dataset; Barber & Torney-Purta, 2008; McBee, 2006), or examined single predictors individually (working memory, intelligence, e.g., Kornmann et al., 2015; Rothenbusch et al., 2016), but none of them investigated both environmental and individual predictors in a more comprehensive and differentiated way. Therefore, the second objective of this dissertation is to address this research gap by using the educational and learning capital approach that has been shown to predict students' academic

achievement and excellent performance in several different talent domains (e.g., Reutlinger et al., 2020; Ziegler et al., 2019).

Educational and learning capital can be expected to predict both teacher nomination and parent nomination. Teachers and parents who nominate are typically familiar with the concept of giftedness (McBee et al., 2016; Silverman, 2018), and might therefore use environmental and individual indicators of giftedness when nominating students. Thus, students who participate in extracurricular activities (didactic educational capital), receive social support (social educational capital), set challenging learning goals (telic learning capital), and participate in school groups that compete in academic competitions (episodic learning capital) are more likely to be seen as gifted and, therefore, are more likely to be nominated for gifted identification. Moreover, given that academic achievement predicts nomination (e.g., Aljughaiman & Ayoub, 2017; Siegle et al., 2010), and given that academic achievement can be predicted by educational and learning capital (e.g. Harder et al., 2018; Paz-Baruch, 2019) one can also expect a positive relationship between educational and learning capital and nomination for gifted identification. Therefore, it can be expected that nominated students have greater amounts of educational and learning capital than non-nominated students and also that teachers' and parents' views regarding nominated students' educational and learning capital may differ since teachers and parents perceive giftedness differently (Solow, 2001).

5.2 Research Questions

Two research questions will be addressed to achieve my second objective. The first question is whether educational capital and learning capital predict whether students are nominated by (a) teachers, (b) parents, and (c) both teachers and parents simultaneously. For each type of nomination, I will investigate the predictive power of both, (a) the Student ELCQ (students' assessment of their educational capital, learning capital, and their interaction), and (b) the Parent ELCQ (parents' assessment of students' educational capital, learning capital, and their interaction). Finally, to test if using both the Student ELCQ and the Parent ELCQ enhances the predictive power even further, I will use (c) the combinations of both the Student and the Parent ELCQ.

Second, I will examine which nomination group has more educational capital and learning capital as assessed by students and parents. In contrast to the three types of nominations above, I will distinguish among the three types of nominations and not allow for the overlap as I have for the first question. For example, if students are nominated by both teachers and parents, they will not be included in the teacher nomination group or in the parent nomination group. Thus, the three nomination groups are students nominated (a) by teachers only, (b) by parents only, and (c) by both teachers and parents simultaneously.

5.3 Procedure

The data collection process was part of the validation of the ELCQ studies (see first objective).

5.4 Sample

The samples for this study are subsamples of those queried in the validation studies. They were participants from the validation of the ELCQ studies who completed the nomination items, which are the outcomes under investigation.

5.4.1 Student Sample

The student sample consisted of 2,505 ninth-grade students aged between 13 and 15 years (M = 14.10, SD = 0.35) attending 55 different schools, in Al-Ahsa. Among the students, 61% were female and 39% were male. Approximately 12% of students reported that their parents' highest educational attainment was less than high school, 27% reported high school, 42% diploma/bachelor, 9% master, and 4% PhD. Approximately 68% of students were from urban areas while the rest were from rural areas.

5.4.2 Parent Sample

The parent sample consisted of 792 parents of ninth-grader students (part of the student sample) from 35 different schools in Al-Ahsa. The sample consisted of 585 parents of female students and 207 parents of male students. Approximately 18% of parents reported that their highest educational attainment was less than high school; 25% of parents stated high school was the highest

attainment, nearly 47% held a diploma/bachelor's degree, 5% had master's, and 3% had a PhD. Approximately 47% of parents were from urban areas while the rest were from rural areas.

5.5 Measures

The outcome under investigation was whether students were nominated for gifted identification or not. Students' nomination status was assessed with two items: (a) "Has your school nominated you as a candidate for the gifted identification?" and (b) "Have your parents nominated you as a candidate for the gifted identification?" Students were counted as teacher-nominated if they had answered item (a) with yes, counted as parent-nominated if they had answered item (b) with yes, and counted as simultaneously nominated by teachers and parents if they had answered both items (a) and (b) with yes.

All of the other scales employed in the analyses had also been used in the validation of ELCQ studies. They are: (a) students' assessment of their educational capital and learning capital, which was assessed with the Arabic version (Ziegler & Stoeger, 2016) of the QELC (Vladut et al., 2013); (b) students' academic achievement, which is the average grade in mathematics, Arabic, science, English language, social studies, religion, computer science, and family education; (c) students' socioeconomic status, computed from parents' level of education and family book ownership; (d) parents' assessment of students' educational capital and learning capital, which was assessed with a modified version of the scale by Ziegler and Stoeger (2016). All these scales were filled out by the students except for the parents' assessment of students' educational and learning capital which was provided by the parents.

5.6 Data Analysis

The aim of the second objective of this dissertation was to investigate the role that students' educational and learning capital (assessed by both students and their parents) play in predicting nomination (teacher nomination, parent nomination, and both teacher and parent nomination simultaneously). Additionally, it was of interest to investigate whether educational and learning capital provide additional predictive power regarding the three types of nomination above and beyond the most commonly used predictors, namely academic achievement and socioeconomic

status. Therefore, as a first step of predicting nomination, I used logistic regression analysis to investigate how strongly each of the predictors, on its own, can predict each type of nomination before analyzing the predictive power of combinations of these predictors in the next step.

Second, I investigated the predictive power of students' educational capital and learning capital as assessed by students and parents for each type of nomination. To do so, three models were calculated to predict each type of nomination: (a) a student-assessed model that was used to examine the predictive power of the Student ELCQ; (b) a parent-assessed model that was used to test the predictive power of the Parent ELCQ; and (c) a combined assessment model (both student-assessed and parent-assessed educational capital and learning capital) that was used to test whether using both the Student and the Parent ELCQ would enhance the predictive power even further.

For these models, logistic regressions were used due to the dichotomous outcome of the manner in which students were nominated (by teacher nomination, parent nomination, or both teachers and parents simultaneously). In all these models, I controlled for academic achievement and socioeconomic status. The student-assessed and parent-assessed models each consisted of three steps. In Step 1, academic achievement and socioeconomic status were included to test in the next steps if educational capital and learning capital still have predictive power when considered alongside these two commonly used predictors of nomination. In Step 2, educational capital was added (as assessed by students in the student-assessed models and as assessed by parents in the parent-assessed models). This was done to investigate whether students with more educational capital are more likely to be among those who were nominated. In Step 3, learning capital (as assessed by students in the student-assessed models and as assessed by parents in the parent-assessed models) was added together with the interaction between educational capital and learning capital to investigate whether students with more learning capital are more likely to be among those who were nominated in the respective way, and to investigate whether students with a great amount of learning capital are more likely to be nominated when they also have a great amount of educational capital. The educational capital was added to the model before learn-

ing capital because previous studies suggested that the effect of educational capital on an outcome is through learning capital (Paz-Baruch, 2019; Veas et al., 2018). However, in order to test whether adding additional predictors would significantly increase the amount of variance explained in nomination for each of the steps in each of the three models, a chi-square test was used to measure the improvement in the current step compared to the previous step.

In contrast to the previous two models, the combined assessment model consisted of only two steps to test whether using both student-assessed educational and learning capital (the Student ELCQ) and parent-assessed educational and learning capital (the Parent ELCQ) instead of just one of these questionnaires would add more predictive power regarding the respective type of nomination. Thus, in Step 1, educational capital, learning capital, and their interaction effect as assessed by parents were entered together with the known predictors, academic achievement and socioeconomic status (which is the same as the parent-assessed model after Step 3). In Step 2, educational capital, learning capital, and their interaction effect as assessed by students, were entered to test if they increase the model's explanatory power (i.e., the amount of explained variance). The combined assessment model began with parent-assessed educational capital and learning capital in Step 1 because evidence has suggested that parents' assessments of their children are often more accurate than self-assessments by the adolescents (Fogarty et al., 2014).

After investigating the predictive power of educational capital and learning capital for each type of nomination, I examined which nomination group had more educational capital and learning capital as assessed by students and parents. In contrast to the three types of nominations above, I distinguished among the three types of nominations and did not allow for the overlap that I had in the first research question. Thus, the three groups of nominations are defined as students nominated by teachers only, students nominated by parents only, and students nominated by both teachers and parents simultaneously. Therefore, I used analysis of variance (ANOVA) with post-hoc tests to determine whether one of the respective groups has more educational capital and learning capital as assessed by students and parents than the other two.

5.7 Results

5.7.1 To What Extent Can Nomination Be Predicted by Educational Capital and Learning Capital?

5.7.1.1 Preliminary Analyses

Before conducting the primary analyses, the descriptive statistics for the predictors were computed (see Table 17). Also, the correlations between the predictors were calculated (see Table 18).

Table 17

Descriptive Statistics of All Predictors

Variables	*M*	*SD*	Range	Skew	Kurtosis
Student-assessed educational capital	4.61	0.78	1.40–6.00	–0.67	0.42
Student-assessed learning capital	4.68	0.80	1.05–6.00	–0.72	0.57
Parent-assessed educational capital	4.35	0.78	1.70–6.00	–0.22	–0.03
Parent-assessed learning capital	4.64	0.80	1.75–6.00	–0.45	0.05
Students' academic achievement	89.20	9.86	49–100	–0.99	0.29
Students' socioeconomic status	–0.01	0.81	–1.66–2.42	0.36	–0.15

Table 18

Correlation Matrix for All Predictors

Variable	1	2	3	4	5
1. Student-assessed educational capital	—				
2. Student-assessed learning capital	.75	—			
3. Parent-assessed educational capital	.45	.36	—		
4. Parent-assessed learning capital	.39	.44	.58	—	
5. Students' academic achievement	.30	.34	.20	.39	—
6. Students' socioeconomic status	.24	.17	.18	.23	.31

Note. All coefficients are significant at $p < .001$.

5.7.1.2 Predicting Teacher Nomination

Before testing the predictive power of educational capital and learning capital simultaneously, I examined how strongly each of the predictors, on its own, relates to teacher nomination. Thus, several logistic regression models were calculated (see Table 19). As expected, each of the predictors, alone, explained a sizable amount of variance in teacher nomination. The amounts of explained variance in teacher nomination ranged from R^2 = .030 for student-assessed educational capital to R^2 =.153 for academic achievement.

Next, to investigate the predictive power of educational capital and learning capital as assessed by students and parents regarding teacher nomination, I conducted the three proposed models: (a) a student-assessed capitals model, (b) a parent-assessed capitals model, and (c) a combined assessment model.

Student-Assessed Capitals Model. This model was employed to investigate the predictive power of educational and learning capital as assessed by students for predicting teacher nomination (while controlling for academic achievement and socioeconomic status). The logistic regression models for predicting teacher nomination with student-assessed capitals can be found in Table 20.

Table 19

Logistic Regression Analysis Predicting Teacher Nomination With Each Predictors on Its Own

Predictor	*OR*	Cox & Snell R^2	Nagelkerke R^2
Academic achievement	1.11	.101	.153
Socioeconomic status	1.72	.034	.052
Student-assessed EC	1.56	.020	.030
Student-assessed LC	1.70	.027	.041
Parent -assessed EC	1.69	.025	.040
Parent -assessed LC	1.81	.032	.050

Note. EC = educational capital; LC = learning capital. The amount of variance explained by each predictor is significant at $p < .001$.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by teachers (*OR* = 1.10, *p* < .001), Also, the higher students' socio-economic status, the more likely they were to be nominated (*OR* = 1.37, *p* < .001). In Step 2, as expected, students who reported more educational capital were more likely to be nominated by their teachers (*OR* = 1.17, *p* = .030), even after controlling for academic achievement and socioeconomic status. In Step 3, as expected, students who reported more learning capital were more likely to be nominated (*OR* = 1.24, *p* = .036), even after controlling for academic achievement and socioeconomic status. However, unexpectedly, when student-assessed learning capital was added to the model, student-assessed educational capital was no longer a significant predictor (*OR* = 1.00, *p* = .969). Also, unexpectedly, the interaction effect between student-assessed educational and learning capital was not significant (*OR* = 1.07, *p* = .159). Finally, as the chi-square tests in Table 20 indicate, each step significantly increased the amount of explained variance in teacher nomination.

Table 20

Logistic Regression for Predicting Teacher Nomination Using Student-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						293.09***
Academic achievement	0.10	0.01	< .001	1.10	[1.08, 1.12]	
Socioeconomic status	0.32	0.06	< .001	1.37	[1.21, 1.55]	
Constant	–9.98	0.72	< .001	0.00		
Step 2						4.78*
Academic achievement	0.09	0.01	< .001	1.10	[1.08, 1.13]	
Socioeconomic status	0.30	0.06	< .001	1.34	[1.19, 1.53]	
Student-assessed EC	0.15	0.07	.030	1.17	[1.01, 1.34]	
Constant	–10.39	0.75	< .001	0.00		
Step 3						6.06*
Academic achievement	0.09	0.01	< .001	1.09	[1.08, 1.11]	
Socioeconomic status	0.30	0.07	< .001	1.35	[1.19, 1.53]	
Student-assessed EC	0.00	0.10	.969	1.00	[0.82, 1.23]	
Student-assessed LC	0.22	0.10	.036	1.24	[1.01, 1.52]	
Student-assessed EC × Student-assessed LC	0.06	0.05	.159	1.07	[0.98, 1.16]	
Constant	–10.52	0.75	< .001	0.00		

Note. Nagelkerke R^2 = .167 in Step 1, .170 in Step 2, .173 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. ***p < .001.

Parent-Assessed Capitals Model. This model was employed to investigate the predictive power of educational and learning capital, as assessed by parents, for predicting teacher nomination (while controlling for academic achievement and socioeconomic status). The logistic regression models for predicting teacher nomination with parent-assessed capitals can be found in Table 21.

Table 21

Logistic Regression for Predicting Teacher Nomination Using Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						83.86***
Academic achievement	0.09	0.02	< .001	1.09	[1.06, 1.12]	
Socioeconomic status	0.49	0.13	< .001	1.62	[1.27, 2.08]	
Constant	–9.31	1.43	< .001	0.00		
Step 2						5.98*
Academic achievement	0.08	0.02	< .001	1.08	[1.05, 1.12]	
Socioeconomic status	0.47	0.13	< .001	1.59	[1.24, 2.05]	
Parent -assessed EC	0.30	0.13	.016	1.36	[1.06, 1.74]	
Constant	–10.24	1.48	< .001	0.00		
Step 3						0.362
Academic achievement	0.08	0.02	< .001	1.08	[1.05, 1.12]	
Socioeconomic status	0.47	0.13	< .001	1.60	[1.24, 2.05]	
Parent -assessed EC	0.32	0.15	.038	1.38	[1.02, 1.86]	
Parent -assessed LC	0.01	0.16	.943	1.01	[0.74, 1.38]	
Parent -assessed EC × Student-assessed LC	–0.06	0.10	.554	0.95	[0.78, 1.14]	
Constant	–10.31	1.49	< .001	0.00		

Note. Nagelkerke R^2 = .160 in Step 1, .171 in Step 2, .171 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. ***p < .001.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by teachers (*OR* = 1.09, p < .001). Also, the higher students' socio-economic status, the more likely they were to be nominated (*OR* = 1.62, p < .001). In Step 2, as expected, students with more educational capital as assessed by parents were more likely to be nominated (*OR* = 1.36, p = .016), even after controlling for academic achievement and

socioeconomic status. In Step 3, unexpectedly, parent-assessed learning capital was not a significant predictor of nomination (*OR* = 1.01, *p* = .943). Also, unexpectedly, the interaction effect between parent-assessed educational and learning capital was not significant (*OR* = 0.95, *p* = .554). However, parent-assessed educational capital remained a significant predictor in this step (*OR* = 1.38, *p* = .038). Finally, as evidenced by the chi-square test in Table 21, Step 1 and Step 2 each significantly increased the amount of explained variance in teacher nomination. However, the predictors added in Step 3 (parent-assessed learning capital and the interaction between parent-assessed educational and learning capital) did not improve the model's explanatory power.

Combined Assessment Model. This model was employed to investigate whether combining the Student and the Parent ELCQ instead of using just one of these questionnaires would add more predictive power regarding teacher nomination (while academic achievement and socioeconomic status are controlled for). The combined assessment model for predicting teacher nomination can be found in Table 22.

In the combined assessment model, in Step 1, educational capital, learning capital, and their interaction effect, as assessed by parents, were entered together with the known predictors, academic achievement and socioeconomic status (which is the same as the parent-assessed capitals model after Step 3). In Step 2, educational capital, learning capital, and their interaction, as assessed by students, were added. Unexpectedly, in Step 2, none of the predictors except for academic achievement and socioeconomic status were significant anymore when student-assessed educational and learning capital and their interaction were added to the model. More importantly, the chi-square test in Table 22 suggests, Step 2 did not increase the model's explanatory power, which indicates that using both the Student and the Parent ELCQ, together, does not explain more variance in predicting teacher nomination compared to using just the Parent ELCQ. When switching the order of the two questionnaires and starting with the student-assessed capitals model in the first step and then adding the parent-assessed capitals, the explanatory power did not increase significantly, $\chi^2(3) = 4.47$, $p = .215$.

Table 22

Logistic Regression for Predicting Teacher Nomination Using Both Student-Assessed and Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						90.20***
Academic achievement	0.08	0.02	< .001	1.08	[1.05, 1.12]	
Socioeconomic status	0.47	0.13	< .001	1.60	[1.24, 2.05]	
Parent-assessed EC	0.32	0.15	.038	1.38	[1.02, 1.86]	
Parent-assessed LC	0.01	0.16	.943	1.01	[0.74, 1.38]	
Parent-assessed EC × Parent-assessed LC	–0.06	0.10	.554	0.95	[0.78, 1.14]	
Constant	–10.31	1.49	< .001	0.00		
Step 2						3.80
Academic achievement	0.08	0.02	< .001	1.08	[1.05, 1.11]	
Socioeconomic status	0.47	0.13	< .001	1.61	[1.25, 2.07]	
Parent-assessed EC	0.32	0.16	.050	1.37	[1.00, 1.89]	
Parent-assessed LC	–0.05	0.16	.781	0.96	[0.69, 1.32]	
Parent-assessed EC × Parent-assessed LC	–0.04	0.10	.707	0.96	[0.79, 1.17]	
Student-assessed EC	–0.15	0.22	.507	0.86	[0.56, 1.33]	
Student-assessed LC	0.37	0.22	.096	1.45	[0.94, 2.26]	
Student-assessed EC × Student-assessed LC	–0.10	0.12	.398	0.91	[0.72, 1.14]	
Constant	–10.82	1.56	< .001	0.00		

Note. Nagelkerke R^2 =.171 in Step 1, .178 in final model; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model. ***p < .001.

5.7.1.3 Predicting Parent Nomination

Before testing the predictive power of educational capital and learning capital simultaneously, I examined how strongly each of the predictors, on its own, relates to parent nomination; thus, several logistic regression models were calculated (see Table 23). As expected, each of the

predictors, alone, explained a sizable amount of variance in parent nomination. The amounts of explained variance in parent nomination ranged from R^2 = .035 for parent-assessed educational capital to R^2 =.113 for academic achievement.

Table 23

Logistic Regression Analysis Predicting Parent Nomination with Each Predictors on Its Own

Predictor	*OR*	Cox & Snell R^2	Nagelkerke R^2
Academic achievement	1.08	.081	.113
Socioeconomic status	1.73	.041	.058
Student-assessed EC	1.69	.032	.045
Student-assessed LC	1.86	.045	.063
Parent-assessed EC	1.56	.025	.035
Parent-assessed LC	2.09	.065	.090

Note. EC = educational capital; LC = learning capital. The amount of variance explained by each predictor is significant at $p < .001$.

Next, to investigate the predictive power of educational capital and learning capital as assessed by students and parents regarding parent nomination, I calculated the three proposed models: (a) a student-assessed capitals model, (b) a parent-assessed capitals model, and (c) a combined assessment model.

Student-Assessed Capitals Model. This model was employed to investigate the predictive power of educational and learning capital as assessed by students for predicting parent nomination (while controlling for academic achievement and socioeconomic status). The logistic regression models for predicting parent nomination can be found in Table 24.

Table 24

Logistic Regression for Predicting Parent Nomination Using Student-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						261.72***
Academic achievement	0.07	0.01	< .001	1.07	[1.06, 1.08]	
Socioeconomic status	0.38	0.06	< .001	1.47	[1.31, 1.64]	
Constant	–6.73	0.54	< .001	0.00		
Step 2						24.20***
Academic achievement	0.06	0.01	< .001	1.06	[1.05, 1.07]	
Socioeconomic status	0.34	0.06	< .001	1.41	[1.25, 1.58]	
Student-assessed EC	0.31	0.06	< .001	1.37	[1.20, 1.55]	
Constant	–7.65	0.58	< .001	0.00		
Step 3						18.70***
Academic achievement	0.06	0.01	< .001	1.06	[1.04, 1.07]	
Socioeconomic status	0.36	0.06	< .001	1.43	[1.28, 1.61]	
Student-assessed EC	0.03	0.09	.774	1.03	[0.86, 1.23]	
Student-assessed LC	0.40	0.09	< .001	1.49	[1.24, 1.79]	
Student-assessed EC × Student-assessed LC	0.03	0.04	.478	1.03	[0.95, 1.12]	
Constant	–7.83	0.58	< .001	0.00		

Note. Nagelkerke R^2 = .138 in Step 1, .150 in Step 2, .160 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

***p < .001.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by parents (*OR* = 1.07, p < .001). Also, the higher students' socioeconomic status, the more likely they were to be nominated (*OR* = 1.47, p < .001). In Step 2, as expected, students who reported more educational capital were more likely to be nominated (*OR* = 1.37, p < .001), even while controlling for academic achievement and socioeconomic status. In Step 3, as expected, students who reported more learning capital were more

likely to be nominated (*OR* = 1.49, *p* < .001), even while controlling for academic achievement and socioeconomic status. However, unexpectedly, when student-assessed learning capital was added to the model, student-assessed educational capital was no longer a significant predictor (*OR* = 1.03, *p* = .774). Also, unexpectedly, the interaction effect between student-assessed educational and learning capital was not significant (*OR* = 1.03, *p* = .478). Finally, the chi-square tests in Table 24 show that each step significantly increased the amount of variance explained in parent nomination.

Parent-Assessed Capitals Model. This model was used to investigate the predictive power of educational and learning capital, as assessed by parents, for predicting parent nomination (while controlling for academic achievement and socioeconomic status). The logistic regression models for predicting parent nomination can be found in Table 25.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by parents (*OR* = 1.08, *p* < .001). Also, the higher students' socioeconomic status, the more likely they were to be nominated (*OR* = 1.51, *p* < .001). In Step 2, as expected, students with more educational capital, as assessed by parents, were more likely to be nominated (*OR* = 1.27, *p* < .025), even while controlling for academic achievement and socioeconomic status. In Step 3, as expected, students with more learning capital, as assessed by parents, were more likely to be nominated (*OR* = 1.58, *p* = .001), even while controlling for academic achievement and socioeconomic status. However, when parent-assessed learning capital was added to the model, parent-assessed educational capital was no longer a significant predictor (*OR* = 1.02, *p* = .870). Also, unexpectedly, the interaction effect between parent-assessed educational and learning capital was not significant (*OR* = 0.97, *p* = .665). Finally, the chi-square tests in Table 25 show that each step significantly increased the amount of explained variance in parent nomination.

Table 25

Logistic Regression for Predicting Parent Nomination Using Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						99.94***
Academic achievement	0.08	0.01	< .001	1.08	[1.05, 1.10]	
Socioeconomic status	0.41	0.11	< .001	1.51	[1.22, 1.88]	
Constant	–7.52	1.05	< .001	0.00		
Step 2						5.12*
Academic achievement	0.07	0.01	< .001	1.07	[1.05, 1.10]	
Socioeconomic status	0.39	0.11	< .001	1.48	[1.19, 1.84]	
Parent -assessed EC	0.24	0.11	.025	1.27	[1.03, 1.57]	
Constant	–8.28	1.11	< .001	0.00		
Step 3						11.24**
Academic achievement	0.06	0.01	< .001	1.06	[1.04, 1.09]	
Socioeconomic status	0.38	0.11	.001	1.46	[1.17, 1.82]	
Parent -assessed EC	0.02	0.13	.870	1.02	[0.79, 1.32]	
Parent -assessed LC	0.46	0.14	.001	1.58	[1.20, 2.08]	
Parent -assessed EC × Parent -assessed LC	–0.04	0.08	.665	0.97	[0.82, 1.13]	
Constant	–8.63	1.12	< .001	0.00		

Note. Nagelkerke R^2 = .165 in Step 1, .173 in Step 2, .190 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. **p < .01. ***p < .001.

Combined Assessment Model. This model was employed to investigate whether combining the Student and the Parent ELCQ instead of using just one of these questionnaires would add more predictive power regarding parent nomination (while academic achievement and socio-economic status are controlled for). The combined assessment model for predicting parent nomination can be found in Table 26.

Table 26

Logistic Regression for Predicting Parent Nomination Using Both Student-Assessed and Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						116.30***
Academic achievement	0.06	0.01	< .001	1.06	[1.04, 1.09]	
Socioeconomic status	0.38	0.11	< .001	1.46	[1.17, 1.82]	
Parent-assessed EC	0.02	0.13	.870	1.02	[0.79, 1.32]	
Parent-assessed LC	0.46	0.14	.001	1.58	[1.20, 2.08]	
Parent-assessed EC × Parent-assessed LC	–0.04	0.08	.665	0.97	[0.82, 1.13]	
Constant	–8.63	1.12	< .001	0.00		
Step 2						4.20
Academic achievement	0.06	0.01	< .001	1.06	[1.04, 1.09]	
Socioeconomic status	0.38	0.11	.001	1.47	[1.17, 1.83]	
Parent-assessed EC	0.01	0.14	.969	1.01	[0.77, 1.32]	
Parent-assessed LC	0.40	0.14	.006	1.49	[1.12, 1.97]	
Parent-assessed EC × Parent-assessed LC	–0.03	0.09	.741	0.97	[0.82, 1.15]	
Student -assessed EC	–0.10	0.18	.584	0.90	[0.63, 1.30]	
Student-assessed LC	0.33	0.19	.077	1.39	[0.96, 2.01]	
Student-assessed EC × Student-assessed LC	–0.02	0.09	.804	0.98	[0.82, 1.17]	
Constant	–9.06	1.16	.000	.000		

Note. Nagelkerke R^2 =.181 in Step 1, .197 in final model; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

***p < .001.

In the combined assessment model, in Step 1, educational capital, learning capital, and their interaction effect as assessed by parents, were entered together with the known predictors, academic achievement and socioeconomic status (which is the same as the parent-

assessed capitals model after Step 3). In Step 2, educational capital, learning capital, and their interactive effect as assessed by students, were added. Unexpectedly, in Step 2, none of the predictors except for parent-assessed educational capital (*OR* = 1.49, *p* = .006) academic achievement, and socioeconomic status were significant anymore when student-assessed educational and learning capital and their interaction were added to the model. More importantly, the chi-square test in Table 26 suggests that Step 2 did not increase the model's explanatory power, which indicates that using both the Student and the Parent ELCQ together does not explain more variance in parent nomination compared to using just the Parent ELCQ. However, when switching the order of the two questionnaires and starting with the student-assessed capitals model in the first step and then adding the parent-assessed capitals, the explanatory power was increased significantly, χ^2 (3) = 10.39, *p* = .016, This implies that using both the Student and the Parent ELCQ simultaneously has more predictive power regarding parent nomination than using the Student ELCQ alone.

5.7.1.4 Predicting Whether Students are Nominated by Both Teachers and Parents Simultaneously

Before testing the predictive power of educational capital and learning capital combined for nomination by both teachers and parents simultaneously, I examined how strongly each of the predictors, individually, relates to simultaneous nomination by teachers and parents; thus, several logistic regression models were calculated (see Table 27). As expected, each of the predictors, on its own, explained a sizable amount of variance in nomination by both teachers and parents simultaneously. The amounts of explained variance in nomination by both teachers and parents simultaneously ranged from R^2 = .040 for parent-assessed educational capital to R^2 =.116 for academic achievement.

Table 27

Logistic Regression Analysis Predicting Nomination by Both Teachers and Parents Simultaneously with Each Predictors on Its Own

Predictor	*OR*	Cox & Snell R^2	Nagelkerke R^2
Academic achievement	1.11	.065	.116
Socioeconomic status	1.78	.027	.049
Student-assessed EC	1.84	.023	.041
Student-assessed LC	1.98	.029	.052
Parent-assessed EC	1.80	.022	.040
Parent-assessed LC	2.00	.030	.055

Note. EC = educational capital; LC = learning capital. The amount of variance explained by each predictor is significant $p < .001$.

Next, to investigate the predictive power of educational capital and learning capital as assessed by students and parents regarding simultaneous nomination by teachers and parents, I conducted the three proposed models: (a) a student-assessed capitals model, (b) a parent-assessed capitals model, and (c) a combined assessment model.

Student-Assessed Capitals Model. This model was used to investigate the predictive power of educational and learning capital as assessed by students for predicting simultaneous nomination by teachers and parents (while controlling for academic achievement and socioeconomic status). The logistic regression models for predicting simultaneous nomination by teachers and parents can be found in Table 28.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by both teachers and parents simultaneously ($OR = 1.١٠$, $p < .001$), Also, the higher students' socioeconomic status, the more likely they were to be nominated ($OR = 1.4٦$, $p < .001$). In Step 2, as expected, students who reported more educational capital were more likely to be nominated ($OR = 1.٣٩$, $p < .001$), even while controlling for academic achievement and socioeconomic status. In Step 3, as expected, students who reported more learning capital were more likely to be nominated ($OR = 1.٣٨$, $p < .012$), even while controlling

for academic achievement and socioeconomic status. However, unexpectedly, when student-assessed learning capital was added to the model, student-assessed educational capital was no longer a significant predictor (*OR* = 1.0٨, *p* = .٥٢٣). Also, unexpectedly, the interaction effect between student-assessed educational and learning capital was not significant (*OR* = 1.0٨, *p* = .١٦٦). Finally, as evidence of the chi-square test in Table 28 suggests, all steps contribute significantly to the models and each step increased the amount of explained variance in both teacher and parent nomination simultaneously.

Table 28

Logistic Regression for Predicting Simultaneous Nomination by Teachers and Parents Using Student-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						191.76***
Academic achievement	0.09	0.01	< .001	1.10	[1.07, 1.12]	
Socioeconomic status	0.38	0.08	< .001	1.46	[1.26, 1.69]	
Constant	–10.24	0.91	< .001	0.00		
Step 2						14.21***
Academic achievement	0.08	0.01	< .001	1.09	[1.07, 1.11]	
Socioeconomic status	0.34	0.08	< .001	1.41	[1.21, 1.64]	
Student-assessed EC	0.33	0.09	< .001	1.39	[1.16, 1.65]	
Constant	–11.12	0.94	< .001	0.00		
Step 3						8.39*
Academic achievement	0.08	0.01	< .001	1.08	[1.06, 1.10]	
Socioeconomic status	0.35	0.08	< .001	1.42	[1.22, 1.65]	
Student-assessed EC	0.08	0.13	.523	1.08	[0.85, 1.39]	
Student-assessed LC	0.32	0.13	.012	1.38	[1.08, 1.78]	
Student-assessed EC × Student-assessed LC	0.08	0.06	.166	1.08	[0.97, 1.21]	
Constant	–11.20	0.93	< .001	0.00		

Note. Nagelkerke R^2 = .133 in Step 1, .142 in Step 2, .148 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. ***p < .001.

Parent-Assessed Capitals Model. This model was employed to investigate the predictive power of educational and learning capital as assessed by parents for predicting simultaneous nomination by both teachers and parents (while controlling for academic achievement and socioeconomic status). The logistic regression models can be found in Table 29.

In Step 1, as expected, the greater students' academic achievement, the more likely they were to be nominated by both teachers and parents simultaneously (*OR* = 1.08, p < .001),

Also, the higher students' socioeconomic status, the more likely they were to be nominated by both teachers and parents simultaneously (*OR* = 1.69, *p* < .001). In Step 2, as expected, students with more educational capital as assessed by parents were more likely to be nominated by both teacher and parent simultaneously (*OR* = 1.48, *p* = .010), even when controlling for academic achievement and socioeconomic status. In Step 3, after adding unexpectedly, learning capital as assessed by parents was not a significant predictor for simultaneous nomination by both teachers and parents (*OR* = 1.27, *p* = .226). Also, unexpectedly, there was a significant negative interaction between parent-assessed educational and learning capital (*OR* = 0.71, *p* = .017), which implies that the effect of learning capital on nomination by both teachers and parents simultaneously is lower when students have a larger amount of educational capital. However, parent-assessed educational capital remained a significant predictor in this step (*OR* = 1.65, *p* = .011). Finally, as the chi-square tests in Table 29 shows, each step significantly increased the amount of explained variance in simultaneous nomination by both teachers and parents.

Table 29

Logistic Regression for Predicting Both Teacher and Parent Nomination Simultaneously Using Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						54.40***
Academic achievement	0.08	0.02	< .001	1.08	[1.04, 1.12]	
Socioeconomic status	0.52	0.15	< .001	1.69	[1.26, 2.25]	
Constant	–9.22	1.75	< .001	0.00		
Step 2						6.88**
Academic achievement	0.07	0.02	< .001	1.08	[1.04, 1.11]	
Socioeconomic status	0.50	0.15	.001	1.64	[1.23, 2.20]	
Parent -assessed EC	0.39	0.15	.010	1.48	[1.10, 1.99]	
Constant	–10.42	1.80	< .001	0.00		
Step 3						7.11*
Academic achievement	0.07	0.02	< .001	1.07	[1.03, 1.11]	
Socioeconomic status	0.50	0.15	.001	1.65	[1.23, 2.22]	
Parent -assessed EC	0.50	0.20	.011	1.65	[1.12, 2.41]	
Parent -assessed LC	0.24	0.20	.226	1.27	[0.86, 1.89]	
Parent -assessed EC × Parent -assessed LC	–0.35	0.15	.017	0.71	[0.53, 0.94]	
Constant	–11.55	1.94	< .001	0.00		

Note. Nagelkerke R^2 = .125 in Step 1, .141 in Step 2, .156 in Step 3; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. **p < .01. ***p < .001.

Combined Assessment Model. This model investigated whether combining the Student ELCQ and the Parent ELCQ instead of using just one of these questionnaires would add more predictive power regarding simultaneous nomination by teachers and parents (while controlling for academic achievement and socioeconomic status). This combined assessment model can be found in Table 30.

Table 30

Logistic Regression for Predicting Simultaneous Nomination by Teachers and Parents Using Both Student-Assessed and Parent-Assessed Capitals

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*	χ2
Step 1						68.40***
Academic achievement	0.07	0.02	< .001	1.07	[1.03, 1.11]	
Socioeconomic status	0.50	0.15	.001	1.65	[1.23, 2.22]	
Parent-assessed EC	0.50	0.20	.011	1.65	[1.12, 2.41]	
Parent-assessed LC	0.24	0.20	.226	1.27	[0.86, 1.89]	
Parent-assessed EC × Parent-assessed LC	–0.35	0.15	.017	0.71	[0.53, 0.94]	
Constant	–11.55	1.94	< .001	0.00		
Step 2						8.18*
Academic achievement	0.06	0.02	.001	1.06	[1.03, 1.11]	
Socioeconomic status	0.52	0.15	.001	1.68	[1.25, 2.27]	
Parent-assessed EC	0.51	0.20	.012	1.66	[1.12, 2.48]	
Parent-assessed LC	0.13	0.21	.539	1.14	[0.76, 1.71]	
Parent-assessed EC × Parent-assessed LC	–0.34	0.15	.020	0.71	[0.53, 0.95]	
Student-assessed EC	–0.36	0.27	.184	0.70	[0.41, 1.90]	
Student-assessed LC	0.78	0.29	.007	2.17	[1.24, 3.81]	
Student-assessed EC × Student-assessed LC	–0.08	0.16	.621	0.92	[0.68, 1.26]	
Constant	–12.58	2.07	.000	.000		

Note. Nagelkerke R^2 =.156 in Step 1, .174 in final model; CI = confidence interval; EC = educational capital; LC = learning capital. χ2 = Chi-square test value for the improvement of the predictive power of the model compared to the previous model.

*p < .05. ***p < .001.

In the combined assessment model, in Step 1, educational capital, learning capital, and their interaction effect as assessed by parents were entered together with the known predic-

tors, academic achievement and socioeconomic status (which is the same as the parent-assessed capitals model after Step 3). In Step 2, educational capital, learning capital, and their interaction effect, as assessed by students, were added. After this step, parent-assessed educational capital (*OR* = 1.66, *p* = .020) and student-assessed learning capital (*OR* = 2.17, *p* = .007) remained significant predictors, in addition to academic achievement and socioeconomic status. However, unexpectedly, the rest of the predictors were not significant anymore when the capital assessments from both questionnaires were combined in this step. Also, there was a negative interaction between parent-assessed educational and learning capital (*OR* = 0.71, *p* = .020). More importantly, however, the chi-square test in Table 30 show that Step 2 increased the model's explanatory power, which indicates that using both the Student and the Parent ELCQ together explained more variance in simultaneous nomination by teachers and parents. When switching the order of the two questionnaires and starting with the student-assessed capitals model in the first step and then adding the parent-assessed capitals, the explanatory power increased, $\chi^2(3) = 10.78$, $p = .013$, implying that using both the Student and the Parent ELCQ simultaneously has more predictive power than using one of them alone.

5.7.2 Which Nomination Group Has More Educational Capital and Learning Capital as Assessed by Students and Parents?

Descriptive statistics of students' educational and learning capital as assessed by students and parents in each nomination group (only teacher nomination, only parent nomination, and both teacher and parent nomination simultaneously) are presented in Table 31. As expected, there were significant differences in student-assessed educational capital, $F(2, 1064) = 6.357$, $p = .002$, and student-assessed learning capital, $F(2, 1063) = 7.32$, $p = .001$, among the three nomination groups. Unexpectedly, there was no significant difference in either parent-assessed educational capital, $F(2, 338) = 2.24$, $p = .109$, or parent-assessed learning capital ($F(2, 349) = 1.43$, $p = .241$) among the three nomination groups.

Table 31

Descriptive Statistics of Students Educational and Learning capital in Each Nomination Groups

Variable	*Teacher nomination*		*Parent nomination*		Both simultaneously	
	M	***SD***	***M***	***SD***	***M***	***SD***
Student-assessed EC	4.67	0.78	4.74	0.74	4.88	0.72
Student-assessed LC	4.76	0.74	4.85	0.71	4.98	0.74
Parent-assessed EC	4.48	0.81	4.43	0.76	4.63	0.74
Parent-assessed LC	4.76	0.84	4.86	0.77	4.96	0.66

Post hoc comparisons (Bonferroni adjusted) revealed that (see Table 32), for student-assessed educational capital, there was no significant difference between students only nominated by teachers and only nominated by parents (p = .728), whereas students nominated simultaneously by both teachers and parents showed a greater amount of educational capital compared to both students nominated by teachers only (p = .003) and students nominated by parents only (p = .023). For student-assessed learning capital there was no significant difference between students only nominated by teachers and only nominated by parents (p = .431), whereas students nominated by both teachers and parents simultaneously showed a greater amount of educational capital compared to students only nominated by teachers (p = .001) and students only nominated by parents (p = .020).

Table 32

Results of Post Hoc Comparisons (Bonferroni Adjusted) Between Nomination Groups

Comparison	*M* difference	*p*	*Cohen's*
Comparison for student-assessed EC			
Teacher nomination vs parent nomination	–0.07	.728	0.09
Teacher nomination vs both simultaneously	–0.21**	.003	0.28
Parent nomination vs both simultaneously	–0.14*	.023	0.19
Comparison for student-assessed LC			
Teacher nomination vs parent nomination	–0.09	.431	0.12
Teacher nomination vs both simultaneously	–0.22**	.001	0.30
Parent nomination vs both simultaneously	–0.14*	.020	0.179
Comparison for parent-assessed EC			
Teacher nomination vs parent nomination	0.05	1.000	0.06
Teacher nomination vs both simultaneously	–0.15	.654	0.19
Parent nomination vs both simultaneously	–0.20	.110	0.27
Comparison for parent-assessed EC			
Teacher nomination vs parent nomination	–0.10	1.000	0.12
Teacher nomination vs both simultaneously	–0.20	.296	0.27
Parent nomination vs both simultaneously	–0.10	.856	0.14

*$p < .05$. **$p < .01$.

5.8 Summary

The second objective of this dissertation included two research questions. The first research question was if educational capital and learning capital predict whether students are nominated by (a) teachers, (b) parents, and (c) both teachers and parents simultaneously. The capitals were assessed with (a) the Student ELCQ (students' assessment of their educational capital, learning capital, and their interaction), (b) the Parent ELCQ (parents' assessment of students' educational capital, learning capital, and their interaction), and (c) the combination of both the Student ELCQ and the Parent ELCQ—to test if using both the Student and the Parent ELCQ together would enhance the predictive power regarding nomination even further. In this

context, academic achievement and socioeconomic status were also included as predictors to test whether educational capital and learning capital have predictive power above and beyond these two commonly used predictors of nomination. The second research question was which nomination group (only teacher nomination, only parent nomination, and both teacher and parent nomination simultaneously) had more educational capital and learning capital as assessed with the Student ELCQ and the Parent ELCQ.

5.8.1 Predicting Teacher Nomination

With respect to the first research question, my predictions regarding teacher nomination were mostly confirmed. Overall, looking at each of the predictors individually, students with greater academic achievement, higher socioeconomic status, greater amounts of educational capital, and greater amounts of learning capital were more likely to be nominated by teachers—irrespective of whether the Student ELCQ or the Parent ELCQ was employed.

When using only the Student ELCQ, as expected, students who reported more educational capital and learning capital were more likely to be nominated by teachers, even after controlling for academic achievement and socioeconomic status. However, unexpectedly, when learning capital was entered into the model, educational capital was no longer a significant predictor. Also, unexpectedly, there was no interaction between educational and learning capital. However, and more importantly, each step contributed significantly to the predictive power (i.e., explained a sizable amount of variance) in teacher nomination.

When only using the Parent ELCQ, as expected, students whose parents reported that their children had more educational capital were more likely to be nominated by teachers, even after controlling for academic achievement and socioeconomic status. However, unexpectedly, neither parent-assessed learning capital nor the interaction between parent-assessed educational and parent-assessed learning capital were significant predictors. Therefore, only the first with the control variables (academic achievement and socioeconomic status) and second with educational capital, contributed substantially to the predictive power and explained a sizable amount of variance in teacher nomination. Moreover, using both the Student and the Parent ELCQ simultaneously did not add more predictive power (i.e., explain

more variance) in teacher nomination compared to using only the Student ELCQ or only the Parent ELCQ.

5.8.2 Predicting Parent Nomination

Also, with respect to the first research question, my predictions regarding parent nomination were mostly confirmed. Overall, looking at each of my predictions on its own, students with greater academic achievement, higher socioeconomic status, greater amounts of educational capital, and greater amounts of learning capital were more likely to be nominated by parents —irrespective of whether the Student ELCQ or the Parent ELCQ was employed.

When only using the Student ELCQ as well as when using only the Parent ELCQ to predict parent nomination, as expected, students with greater amounts of educational capital and learning capital were more likely to be nominated, even when controlling for academic achievement and socioeconomic status. However, unexpectedly, when learning capital was entered into the model, educational capital was no longer a significant predictor. Also, unexpectedly, there was no significant interaction between educational and learning capital. However, and more importantly, each step contributed significantly to the predictive power (i.e., explained a sizable amount of variance) in parent nomination. Moreover, using the Parent ELCQ alone or both the Student and the Parent ELCQ together, had more predictive power than using the Student ELCQ alone.

5.8.3 Predicting Simultaneous Nomination by Both Teachers and Parents

Also, with respect to the first research question, my predictions regarding whether students are nominated by both teachers and parents simultaneously were mostly confirmed. Overall, looking at each of my predictors individually, students with greater academic achievement, higher socioeconomic status, greater amounts of educational capital, and greater amounts of learning capital were more likely to be nominated by both teachers and parents simultaneously —irrespective of whether the Student ELCQ or the Parent ELCQ was employed.

When using only the Student ELCQ, as expected, students who reported more educational capital and learning capital were more likely to be nominated by both teachers and

parents simultaneously, even when controlling for academic achievement and socioeconomic status. However, unexpectedly, when learning capital was added to the model, educational capital was no longer a significant predictor. Also, unexpectedly, there was no significant interaction between educational and learning capital. However, and more importantly, each step contributed significantly to the predictive power (i.e., explained a sizable amount of variance) regarding simultaneous nomination by teachers and parent.

When only using the Parent ELCQ, as expected, students with more educational capital were more likely to be nominated by both teacher and parent nomination simultaneously, even when controlling for academic achievement and socioeconomic status. However, unexpectedly, learning capital was not a significant predictor. Also, unexpectedly, there was a significant negative interaction between educational and learning capital, which indicates that the effect of learning capital on the respective type of nomination was lower when students have a larger amount of educational capital. However, more importantly, each step contributed significantly to the predictive power (i.e., explained a sizable amount of variance) regarding simultaneous nomination by teachers and parents.

Moreover, as expected, using both the Student and the Parent ELCQ simultaneously resulted in more predictive power regarding simultaneous nomination by teachers and parents compared to using only the Student ELCQ or only the Parent ELCQ.

5.8.4 The Differences Among the Three Nomination Groups in Their Educational and Learning Capital

With respect to the second research question, my predictions regarding the differences among the three nomination groups (only teacher-nominated, only parent-nominated, or nominated by both teachers and parents simultaneously) were partially confirmed. When using the capital assessments from the Student ELCQ, as expected, students nominated by both teacher and parent simultaneously showed a greater amount of educational capital and learning capital compared to both students who were only teacher-nominated and students who were only parent-nominated. However, unexpectedly, there was no difference between students only nominated by teachers and students only nominated by parents, regarding their

educational capital and learning capital. Also, unexpectedly, when using the capital assessments from the Parent ELCQ, there were no differences among all the three nomination groups regarding students' educational capital and learning capital.

6 Educational and Learning Capital and Performance in the Giftedness Assessment (Third Objective)

6.1 Theoretical Background

Most gifted identification procedures use giftedness assessments, namely cognitive abilities tests and standardized academic achievement tests (Gentry et al., 2021; Newman, 2018; Ritchotte et al., 2016) for the next step after nomination, in order to determine whether a student can be classified as gifted, and may therefore gain access to gifted programs. The tests that are used during this step must be aligned with the programs for which potential participants are to be selected (Zavala & Torre, 2019; Ziegler & Stoeger, 2004). Appropriate giftedness assessments would help to adequately evaluate the abilities relevant to a particular program (Robinson, 2005). For example, the giftedness assessment that is used to identify gifted students for math enrichment programs would target the students' quantitative reasoning abilities for a math test. However, this is rarely done in practice. Most of the gifted identification programs use cognitive ability tests and academic achievement tests regardless of what kind of programs are offered. (e.g., Kaufman & Sternberg, 2018; Ritchotte et al., 2016).

Despite the importance of giftedness assessments, predictors for performance on such assessments have not been thoroughly examined. In previous studies, neither the role of environmental nor individual factors has been adequately investigated. Also, it is worth noting that most previous studies have focused on predicting the academic achievement of students in general instead of predicting the academic achievement as part of identifying gifted students (e.g., Organisation for Economic Co-operation and Development, 2001; Uesaka & Manalo, 2006; Zimmerman & Kitsantas, 2014). Therefore, the third objective of this dissertation was to address this research gap by using the educational and learning capital approach to predict students' performance in the giftedness assessment used in Saudi Arabia, where this study took place.

Educational and learning capital can be expected to predict students' performance in the giftedness assessment, because based on the theory, students with a great amount of educational and learning capital should have good teachers (didactic capital), money to buy

books, help to prepare for the test (economic and infrastructural EC), good learning strategies, knowledge, etc. (actional LC), challenging goals (telic LC), and a healthy body that will enable them to study without getting tired (organismic LC) These resources should help students to develop their potential to the fullest, and therefore demonstrate better performance in the giftedness assessment (e.g., Organisation for Economic Co-operation and Development, 2001; Risemberg & Zimmerman, 1992). Moreover, it can be expected that students who come to such tests through a different nomination type (teacher or parent nomination) might have different test results.

6.2 Research Questions

Two research questions will be addressed as part of the third objective of this dissertation, which is to investigate the role that educational capital and learning capital play in students' performance in the giftedness assessment (above and beyond the most commonly used predictors, namely academic achievement and socioeconomic status). First, I will investigate which of the three nomination groups (students nominated by teachers only, by parents only, or by both teacher and parent nomination simultaneously) does better in the giftedness assessment. Then, in the second question, I will examine whether students' performance in the giftedness assessment can be predicted by (a) answers from the Student ELCQ (students' assessment of their educational capital, learning capital, and their interaction), (b) answers from the Parent ELCQ (parents' assessment of students' educational capital, learning capital, and their interaction), and (c) both the Student ELCQ and the Parent ELCQ combined.

6.3 Procedure

The data collection process was part of the validation of the ELCQ studies (see first objective). Moreover, the samples (student and parent) in the current study were all the participants (from the validation of the ELCQ studies) who took the giftedness assessment, the outcome of which is under investigation.

6.4 Sample

The samples in this section are subsamples of those participants who took part in the validation studies (the first objective).

6.4.1 Student Sample

The student sample consisted of 408 ninth-graders from 55 schools in Al-Ahsa, aged between 13 and 15 years (*M* = 14.4, *SD* = 0.41). Among the students, 57% were female and the other 43% were male. Approximately 7% of students reported that their parents' highest educational attainment was less than high school, 17% reported high school, 59% diploma/bachelor, 14% master, and 3% PhD.

6.4.2 Parent Sample

The parent sample, which was a subsample of the student sample, consisted of 148 parents of ninth-graders from 35 schools in Al-Ahsa. The sample consisted of 72 parents of female students and 76 parents of male students. Approximately 8% of parents reported that their highest educational attainment was less than high school, 17% of parents graduated high school, nearly 66% had a diploma/bachelor's degree, 7% had a masters, and 2% had PhDs.

6.5 Measures

The outcome under investigation was students' giftedness assessment performance (Mawhiba, n.d.–b). The giftedness assessment consists of multiple cognitive aptitude standardized tests that assess students' abilities in the fields of language, mathematics, science, and creativity. Students' scores were provided by the Ministry of Education.

All of the other scales employed in the analyses of the third objective were used in the validation of ELCQ studies (first objective). They are (a) students' assessment of their educational capital and learning capital, which were collected with the Arabic version (Ziegler & Stoeger, 2016) of the QELC (Vladut et al., 2013), (b) students' academic achievement, which is the students' average grade in mathematics, Arabic, science, English language, social studies, religion, computer science, and family education, (c) students' socioeconomic status, which

was computed from parents' level of education and family book ownership, (d) parents' assessment of students' educational capital and learning capital, which were collected with a modified version of a scale by Ziegler and Stoeger (2016). All these scales were answered by students except for the parents' assessment of students' educational capital and learning capital which were provided by the parents.

6.6 Data Analysis

For the third objective of this dissertation, to investigate the role that educational capital and learning capital play in students' performance in the giftedness assessment, I first compared the three nomination groups (students nominated by teachers only, by parents only, and by both teachers and parents simultaneously) regarding their performance in the giftedness assessment by conducting an analysis of variance (ANOVA). In contrast to the three types of nominations in the second objective, I distinguished among the three groups of nominations and did not allow for the overlap I had to answer the first question of the second objective for predicting nomination. Thus, the three groups of nominations are defined as students nominated by teachers only, by parents only, and by both teachers and parents simultaneously.

Finally, to examine the extent to which educational capital and learning capital, as assessed by students and parents, predict students' performance in the giftedness assessment, the same analysis method as for the second objective was used to answer this question except that instead of logistic regression, linear regression was used due to the continuous outcome. First, I investigated how strongly each of the predictors on its own predicted students' performance in the giftedness assessment. Second, I investigated the predictive power of students' educational capital and learning capital as assessed by students and parents. Here, I proposed the same three models that I had for predicting nomination: (a) a student-assessed capitals model, (b) a parent-assessed capitals model, and (c) a combined assessment model. In order to test whether adding additional predictors would significantly increase the amount of variance explained in students' performance in the giftedness assessment for each of the steps in each of the models, *F*-tests were used to assess if the respective increase in R^2 was significant.

6.7 Results

6.7.1 Which of the Three Nomination Groups Does Better in the Giftedness Assessment?

Descriptive statistics for students' scores in the giftedness assessment for each nominating group (by teachers only, by parents only, and by both teachers and parents simultaneously) are presented in Table 33. Unexpectedly, there was no significant difference in performance in the giftedness assessment among the three nomination groups, $F(2, 392) = 2.20$, $p = .113$.

Table 33

Descriptive Statistics for Students' Score in the Giftedness Assessment by Nomination Type

Group	*n*	*M*	*SD*	Minimum	Maximum
Teacher-nominated	57	672.63	69.93	320	780
Parent-nominated	171	672.49	56.21	413	807
Both teacher- and parent-nominated	167	685.73	64.52	387	820
All groups combined	395	678.11	62.09	320	820

6.7.2 To What Extent Can Students' Performance in the Giftedness Assessment Be Predicted by Educational Capital and Learning Capital?

6.7.2.1 Preliminary Analyses

Before conducting the primary analyses, the descriptive statistics for the variables under investigation were computed (see Table 34). Also, the correlations between these variables were calculated (see Table 35).

Table 34

Descriptive Statistics of All Variables Under Investigation

Variable	*M*	*SD*	Range	Skewness	Kurtosis
Student-assessed educational capital	4.89	0.65	2.45–6.00	–0.73	0.48
Student-assessed learning capital	4.99	0.68	1.75–6.00	–0.79	0.91
Parent-assessed educational capital	4.57	0.70	2.50–6.00	–0.13	0.00
Parent-assessed learning capital	5.02	0.62	3.20–6.00	–0.53	0.27
Students' academic achievement	96.61	4.67	69–100	–2.82	10.11
Students' socioeconomic status	0.31	0.73	–1.44–2.30	0.16	0.17
Giftedness assessment score	678.85	61.66	320–820	–1.02	4.04

Table 35

Correlation Matrix for All Variables Under Investigation

Variable	1	2	3	4	5	6
1. Student-assessed educational capital	—					
2. Student-assessed learning capital	.71***	—				
3. Parent-assessed educational capital	.43***	.27**	—			
4. Parent-assessed learning capital	.27**	.31***	.48***	—		
5. Students' academic achievement	.14**	.21***	.15	.37***	—	
6. Students' socioeconomic status	.22***	.15**	.14	.13	.07	—
7. Giftedness assessment score	–.08	–.11*	–.06	.14	.33***	.24***

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

6.7.2.2 Predicting Students' Performance in the Giftedness Assessment

Before testing the predictive power of educational capital and learning capital simultaneously, (and above and beyond academic achievement and socioeconomic status), I examined how strongly each of the predictors, on its own, relates to students' performance in the giftedness assessment; thus, several linear regression models were calculated (see Table 36). As expected, both students' academic achievement and socioeconomic status by themselves explained a sizable amount of variance in students' performance in the giftedness assessment.

However, unexpectedly, students who rated their learning capital as high showed worse test performance (β = –.11, *p* =.012). Moreover, student-assessed educational capital, parent-assessed educational and learning capital were unrelated to students' performance in the giftedness assessment.

Next, to investigate whether students' performance in the giftedness assessment could be predicted by educational and learning capital above and beyond academic achievement and socioeconomic status, I calculated the three proposed models: (a) a student-assessed capitals model, (b) a parent-assessed capitals model, and (c) a combined assessment model.

Table 36

Linear Regression Analyses Predicting Performance in the Giftedness Assessment Using Each Predictors on Its Own

Variable	β	R^2
Academic achievement	.33	.109***
Socioeconomic status	.24	.059***
Student-assessed EC	–.09	.007
Student-assessed LC	–.11	.012*
Parent -assessed EC	–.08	.006
Parent -assessed LC	.11	.013

Note. EC = educational capital; LC = learning capital.

*$p < .05$. ***$p < .001$.

Student-Assessed Capitals Model. This model was employed to investigate the predictive power of educational and learning capital, as assessed by students, for predicting students' performance in the giftedness assessment (while controlling for academic achievement and socioeconomic status). The linear regression models for this analysis can be found in Table 37.

In Step 1, as expected, the greater students' academic achievement, the higher they scored in the giftedness assessment (β = .30, *p* = .000), Also, the higher students' socioeconomic status, the higher they scored in the giftedness assessment (β = .24, *p* = .000). In Step

2, unexpectedly, student-assessed educational capital was negatively related to students' scores in the giftedness assessment (β = –.19, *p* = .000). In Step 3, contrary to my expectations, student-assessed learning capital was also negatively related to students' scores in the giftedness assessment (β = –.17, *p* = .010). Also, there was no significant interaction effect between student-assessed educational and learning capital (β = .05, *p* = .275). Moreover, student-assessed educational capital was not a significant predictor any more in this step (β = –.08, *p* = .197). Finally, an *F*-ratio test that was calculated to determine whether the change in R^2 for each step was significant confirmed that each step of predictors increased the model's explanatory power (i.e., the amount of explained variance in test performance). However, even though the student-assessed capitals model explained more variance in giftedness assessment performance than only academic achievement and socioeconomic status, higher amounts of learning and educational capital predicted lower scores in the giftedness assessment.

Table 37

Linear Regression for Predicting Performance in the Giftedness Assessment Using Student-Assessed Capitals

Variable	*B*	95% CI for *B*	*SE B*	β	R^2	ΔR^2
Step 1					.148	.148***
Constant	271.20	[147. 395.00]	62.97			
Academic achievement	4.15	[2.87, 5.43]	0.65	.30***		
Socioeconomic status	19.63	[12.09, 27.17]	3.84	.24***		
Step 2					181	.033***
Constant	317.18	[193.59, 440.77]	62.86			
Academic achievement	4.55	[3.28, 5.82]	0.65	.32***		
Socioeconomic status	22.93	[15.35, 30.51]	3.85	.28***		
Student-assessed EC	–17.48	[–26.05, –8.92]	4.36	–.19***		
Step 3					.197	.016*
Constant	322.97	[200.02, 445.92]	62.54			
Academic achievement	4.75	[3.48, 6.02]	0.65	.34***		
Socioeconomic status	22.42	[14.87, 29.97]	3.84	.27***		
Student-assessed EC	–7.80	[–19.69, 4.08]	6.05	–.08		
Student-assessed LC	–14.80	[–26.00, –3.60]	5.70	–.17*		
Student-assessed EC × Student-assessed LC	3.11	[–2.48, 8.70]	2.84	.05		

Note. CI = confidence interval; EC = educational capital; LC = learning capital.

*$p < .05$. ***$p < .001$.

Parent-Assessed Capitals Model. This model was calculated to investigate the predictive power of educational and learning capital, as assessed by parents, for students' performance in the giftedness assessment (while controlling for academic achievement and socioeconomic status). The linear regression models for this can be found in Table 38.

Table 38

Linear Regression for Predicting Performance in the Giftedness Assessment Using Parent-Assessed Capitals

Variable	*B*	95% CI for *B*	*SE B*	β	R^2	ΔR^2
Step 1					.101	.101**
Constant	420.04	[221.47, 618.61]	100.42			
Academic achievement	2.68	[0.63, 4.73]	1.04	.21*		
Socioeconomic status	15.83	[4.04, 27.63]	5.97	.22**		
Step 2					.122	.021
Constant	438.56	[240.57, 636.55]	100.12			
Academic achievement	2.99	[0.93, 5.05]	1.04	.24**		
Socioeconomic status	16.97	[5.21, 28.74]	5.95	.23**		
Parent-assessed EC	–10.78	[–22.57, 1.00]	5.96	–.15		
Step 3					.128	.006
Constant	439.03	[237.63, 640.43]	101.83			
Academic achievement	2.67	[0.49, 4.86]	1.11	.21*		
Socioeconomic status	16.79	[4.95, 28.63]	5.99	.23**		
Parent-assessed EC	–11.81	[–27.22, 3.61]	7.79	–.16		
Parent-assessed LC	7.12	[–9.03, 23.27]	8.16	.09		
Parent-assessed EC × Parent-assessed LC	–2.16	[–12.13, 7.82]	5.04	–.04		

Note. CI = confidence interval; EC = educational capital; LC = learning capital.

*$p < .05$. **$p < .01$.

In Step 1, as expected, the greater students' academic achievement, the higher their scores in the giftedness assessment were (β = .21, $p = .011$). Also, the higher students' socioeconomic status, the higher their scores in the giftedness assessment were (β = .22, $p = .009$). In Step 2, unexpectedly, parent-assessed educational capital was unrelated to students' scores in the giftedness assessment (β = –.15, $p = .073$). In Step 3, contrary to my expectations, parent-assessed learning capital was not significantly related to students' scores in the giftedness

assessment (β = .09, *p* = .385). Also, there was no significant interaction effect between student-assessed educational and learning capital (β = –.04, *p* = .670). Moreover, parent-assessed educational capital was not a significant predictor any more in this step (β = –.16, *p* = .132). Finally, an *F*-ratio that was calculated to determine whether the change in R^2 for each step was significant, I found that Step 1 contributed a significant amount of explained variance to the model, whereas adding parent-assessed educational and learning capital did not increase the model's explanatory power.

Combined Assessment Model. This model was calculated to investigate whether combining the Student and the Parent ELCQ instead of using just one of these questionnaires would add more predictive power regarding students' performance in the giftedness assessment (while controlling for academic achievement and socioeconomic status). This combined assessment model can be found in Table 39.

In the combined assessment model, in Step 1, educational capital, learning capital, and their interaction effect, as assessed by parents, were entered together with the known predictors, academic achievement and socioeconomic status (which is the same as the parent-assessed capitals model after Step 3). In Step 2, educational capital, learning capital, and their interaction effect, as assessed by students, were added. In this step, only academic achievement (β = .26, *p* = .003), socioeconomic status (β = .25, *p* = .002), and the interaction effect between student-assessed educational and learning capital as assessed by students (β = .29, *p* = .006) were positively related to students' performance in the giftedness assessment, which means the effect of learning capital on students' performance in the giftedness assessment is stronger when students have a larger amount of educational capital. Unexpectedly, student-assessed educational capital was negatively related to students' scores in the giftedness assessment (β = –.35, *p* = .004). More importantly, an *F*-ratio test confirmed that using both the Student ELCQ and the Parent ELCQ explains more variance in giftedness assessment scores than using only one of these questionnaires. Surprisingly the greater students' educational and learning capital were, the lower students scored in the giftedness assessment. However, when switching the order of the two questionnaires and starting with the student-assessed

capitals model in the first step and then adding the parent-assessed capitals, the explanatory power in the Step 2 did not increase, which implying that using the Student ELCQ alone has more predictive power than using the Parent ELCQ alone or using both the Student and the Parent ELCQ simultaneously.

Table 39

Logistic Regression for Predicting Performance in the Giftedness Assessment Using Both Student-Assessed and Parent-Assessed Capitals

Variable	*B*	95% CI for *B*	*SE B*	β	R^2	ΔR^2
Step 3					.128	.128**
Constant	439.03	[237.63, 640.43]	101.83			
Academic achievement	2.67	[0.49, 4.86]	1.11	.21*		
Socioeconomic status	16.79	[4.95, 28.63]	5.99	.23**		
Parent-assessed EC	–11.81	[–27.22, 3.61]	7.79	–.16		
Parent-assessed LC	7.12	[–9.03, 23.27]	8.16	.09		
Parent-assessed EC × Parent-assessed LC	–2.16	[–12.13, 7.82]	5.04	–.04		
Step 3					.236	.108**
Constant	520.43	[322.32, 718.53]	100.14			
Academic achievement	3.30	[1.16, 5.44]	1.08	.26**		
Socioeconomic status	18.02	[6.74, 29.31]	5.70	.25**		
Parent-assessed EC	0.66	[–15.32, 16.64]	8.08	.01		
Parent -assessed LC	9.27	[–6.19, 24.73]	7.82	.11		
Parent-assessed EC × Parent-assessed LC	–6.86	[–16.69, 2.97]	4.97	–.13		
Student-assessed EC	–29.31	[–48.93 –9.69]	9.92	–.35**		
Student-assessed LC	–14.52	[–32.47, 3.43]	9.07	–.17		
Student-assessed EC × Student-assessed LC	17.22	[5.02, 29.42]	6.17	.29**		

Note. CI = confidence interval; EC = educational capital; LC = learning capital.

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

6.8 Summary

There were two research questions contained in the third objective of this dissertation. The first research question was to investigate which of the three nomination groups (students nominated only by teachers, only by parents, or by both teachers and parents simultaneously) does better in the giftedness assessment. The second research question was whether students' performance in the giftedness assessment could be predicted with (a) the answers in the Student ELCQ (students' assessment of their educational capital, learning capital, and their interaction), (b) the answers in the Parent ELCQ (parents' assessment of students' educational capital, learning capital, and their interaction), and (c) the combination of both the Student and the Parent ELCQ. In this context, academic achievement and socioeconomic status were also included as predictors to test whether educational capital and learning capital have predictive power above and beyond these two commonly used predictors of giftedness assessment performance.

6.8.1 The Differences Among the Three Nomination Groups in Their Performance in the Giftedness Assessment

With respect to the first research question, the prediction regarding which of the three nomination groups (only by teachers, only by parents, or by both teachers and parents simultaneously) obtained the highest scores in the giftedness assessment was not supported. I had expected that students only nominated by teachers would score higher in the giftedness assessment than students nominated only by parents, and I had no expectation for those nominated by both teachers and parents simultaneously. Unexpectedly, there was no significant difference in performance in the giftedness assessment among the three nomination groups.

6.8.2 Predicting Students' Performance in the Giftedness Assessment

With respect to the second research question, my predictions regarding students' performance in the giftedness assessment were not supported for both the Student ELCQ and the Parent ELCQ. I had expected that students with greater amounts of educational capital and

learning capital (as assessed with the Student ELCQ, the Parent ELCQ, and with both simultaneously) would score higher in the giftedness assessment. This was not the case; students with greater amounts of educational capital and learning capital did not score higher in the giftedness assessment. On the contrary, students that reported greater amounts of educational capital and learning capital in the Student ELCQ scored significantly lower in the giftedness assessment. Because of their unexpected negative relationship with the test scores, educational and learning capital contributed significantly to the predictive power (i.e., explained a sizable amount of variance) regarding the giftedness assessment score. However, when using the Parent ELCQ, neither educational capital nor learning capital predicted students' performance in the giftedness assessment. Also, unexpectedly, the interaction between educational and learning capital for both the Student ELCQ and the Parent ELCQ was not significant. Finally, and also unexpectedly, using both the Student ELCQ and the Parent ELCQ instead of just one of these questionnaires did not increase the explanatory power regarding giftedness assessment performance.

7 General Discussion

The educational needs of gifted students differ greatly from those of average students. Therefore, they need an education that suits their educational needs and helps them develop their potential to the fullest (Coleman et al., 2015; Gallagher et al., 1997; Sisk, 1988; Winsor & Mueller, 2020). In order for schools to provide gifted students with what they need, it is first necessary to identify gifted students. Several approaches have been used to define them (e.g., the psychometric approach, the traits-oriented approach, and the developmental approach; see, e.g., Dai, 2018; Davidson, 2009; Kaufman & Sternberg, 2018; Stoeger, 2009; Stoeger et al., 2018). Each approach involves a different identification procedure (e.g., the psychometric approach uses an IQ test). However, nomination is the first step towards entering gifted programs in most gifted identification around the world regardless of the definition of giftedness that is adopted (e.g., ; Biber et al., 2021; Hernández-Torrano & Tursunbayeva, 2016; Hunsaker et al., 1997; McBee et al., 2016; National Association for Gifted Children, 2015). Next, different giftedness assessments are administered in the second step of identification after nomination. This two-step approach that is used in most gifted identification is the focus of this dissertation.

Using nomination as the first step helps reduce the number of a potentially gifted student who need further evaluation. Therefore, nomination help schools save money, time, and human resources (McBee et al., 2016). This raises the question of who gets nominated. Little is known about what predicts nomination (McBee et al., 2016). Studies reveal that academic achievement (Kornmann et al., 2015) and students' socioeconomic status (McBee, 2006) are positively related to nomination. However, other individual and environmental factors also are part of giftedness that may influence the nomination process and are yet to be investigated. Hence, there arises a need to adopt an approach that can systemically embrace these factors, thus enhancing our understanding of gifted nomination. This also aids in the analysis of whether these aspects play a role in the results of the giftedness assessment, which is the next step after nomination. The educational and learning capital approach fulfills these

criteria by offering a comprehensive taxonomy of individual and environmental aspects that are necessary for talent development (Ziegler et al., 2017; Ziegler & Baker, 2013).

The educational and learning capital approach was first introduced as a practical implication of the Actiotope Model of Giftedness (Ziegler & Baker, 2013; Ziegler & Vialle, 2017), focusing on the role of individuals, their environment, and the interaction of these two for talent development (Ziegler, 2005; Ziegler & Stoeger, 2017). The educational and learning capital approach allows one to predict and support an individual's development towards excellence in a specific talent domain (Ziegler et al., 2017). In order to accomplish this, the approach introduces a comprehensive classification of the kinds of resources that are required for talent development. These resources are referred to as educational capital and learning capital. Educational and learning capital have been shown to predict various desirable educational outcomes, such as high academic achievement (Harder et al., 2018; Leana-Tascilar, 2015a; Paz-Baruch, 2019; Ziegler et al., 2019), students' academic confidence (Vladut et al., 2013), and motivation (Leana-Tascilar, 2015a). Moreover, it has been found that a greater amount of educational and learning capital is reported by students skilled in mathematics compared to students with low mathematical performance (Paz-Baruch, 2019); by successful women in STEM compares to less successful ones (Ziegler et al., 2019); and by long-distance runners with high achievement levels compare to long-distance runners with low achievement levels (Ziegler et al., 2019).

Therefore, in my dissertation, I investigated the predictive value of educational and learning capital in a two-step approach for gifted identification. This was done by using educational capital and learning capital as predictors for (a) teacher and parent nomination, the first step in gifted identification, and (b) students' performance in the giftedness assessment, the second step. My hypothesis was that educational and learning capital as assessed by (a) the Student ELCQ and (b) the Parent ELCQ would predict both outcomes above and beyond the most commonly used predictors, namely academic achievement and socioeconomic status. Accordingly, this dissertation examined the official identification program in Saudi Arabia, which is suitable for this research because it is one of the many countries that use nomination

as the first step in identifying gifted students and a standardized giftedness assessment as the second step. In this dissertation, more than 2,500 students were surveyed, from both public and private schools, as well as from both urban rural areas.

Because this dissertation was conducted in Saudi Arabia, where the Educational and Learning Capital Questionnaire (ELCQ) had not been validated, the first objective was to validate the Student ELCQ (Vladut et al., 2013) and the Parent ELCQ (Ziegler & Stoeger, 2016). The results indicated that both the Student ELCQ and the Parent ELCQ have good overall psychometric properties for use with Saudi Arabian participants. There was evidence for the ELCQs' factorial, concurrent, predictive, and incremental validity. Also, all reliabilities were within an acceptable range. These results are consistent with validation studies for the Student ELCQ in different countries, such as Turkey and Mexico (Coronela et al., 2021; Leana-Tascilar, 2015c). This is the first study that has validated the Parent ELCQ. Also, to the best of my knowledge, this is the first investigation to assess environmental and individual resources that should predict nomination and giftedness assessment performance with a comprehensive approach that systematically includes a set of individual and environmental factors that have been found to predict academic achievement and talent in different domains (academic achievement; Leana-Tascilar, 2015a; Paz-Baruch, 2019; Vladut et al., 2013, successful women in STEM field and athletes succeed; Ziegler et al., 2019). Also, it incorporated both students' and their parents' assessments of these resources.

7.1 The Role of Students' Educational Capital and Learning Capital in the Context of Nomination in Saudi Arabia

Despite the controversy surrounding the practice of nomination (e.g., biased; Aljughaiman & Ayoub, 2017; McBee, 2006, not sufficient; Biber et al., 2021; Neber, 2004), it is still widely used in many countries (e.g., Turkey; Biber et al., 2021, United States; National Association for Gifted Children, 2015, Saudi Arabia; Aljughaiman et al., 2016, Kazakhstan; Hernández-Torrano & Tursunbayeva, 2016). Since the alternative to not using nominations is to test all students—which is not a feasible task—most schools rely on nominations from teachers and parents as the first step in gifted identification.

Despite the importance of nomination, as students that are missed in this step are denied all educational advantages offered to gifted students, the factors affecting nomination have not been adequately studied (McBee et al., 2016). Previous studies confirm the role of academic achievement (Aljughaiman et al., 2016; Barber & Torney-Purta, 2008) and family socioeconomic status (Lee & Olszewski-Kubilius, 2006; McBee, 2006). However, it is not clear whether achievement and socioeconomic status are the only determining factors or whether other factors influence the nomination process. The question is whether other individual factors related to achievement play a role in nomination, such as students' motivation, effort, or learning behavior. There is also the question of whether other environmental factors related to socioeconomic status play a role in nomination, such as parents who value learning or help their children with homework. For this reason, there is a need to adopt a differentiated approach that covers key individual and environmental factors that might predict nomination. An approach such as educational and learning capital can be expected to predict both teacher nomination and parent nomination because (a) previous research indicates that individual and environmental factors might play a key role in nomination, and (b) the assumption that teachers and parents who are asked to nominate students are familiar with the concept of giftedness that encompasses both individual and environmental aspects.

Therefore, the second objective of this dissertation is to systematically investigate the role that educational capital and learning capital play in the nomination process in Saudi Arabia. This objective encompassed two research questions. The first question was whether educational capital and learning capital (as assessed with the Student and the Parent ELCQ) predict the three types of nomination (teacher-nominated, parent-nominated, and nominated by both teachers and parents simultaneously) that are employed in Saudi Arabia. The second question was whether the three nomination groups (only teacher-nominated, only parent-nominated, and nominated by both teachers and parents simultaneously) differ regarding their amounts of educational capital and learning capital.

7.1.1 Do Educational Capital and Learning Capital Predict Nomination?

As expected, students with greater amounts of either educational capital or learning capital were more likely to be nominated for further testing by their teachers, their parents, and by their parents and teachers simultaneously. This was true regardless of whether students' educational and learning capital was assessed by the students themselves with the Student ELCQ or by their parents with the Parent ELCQ. Also, as expected, educational capital and learning capital improved the prediction for each of the three types of nomination above and beyond academic achievement and students' socioeconomic status.

Overall, my predictions about the explanatory power of educational and learning capital for nomination were mostly confirmed. This was the case both when (a) the predictive power of each of these two capital types was examined individually and when (b) their joint predictive power was examined while at the same time controlling for students' academic achievement and socioeconomic status. Also, my prediction, that using both the Student ELCQ and the Parent ELCQ in combination would predict nomination better than using just one of these questionnaires was, mostly supported. However, unexpectedly, educational capital was no longer predictive of nomination when considered alongside educational capital in most cases (in predicting teacher nomination, parent nomination, and simultaneous nomination when using the Student ELCQ and in predicting parent nomination when using the Parent ELCQ). Also, unexpectedly, there were no interaction effects between educational capital and learning capital, except when predicting simultaneous nomination when using the Parent ELCQ.

In summary, educational capital and learning capital, as assessed by students and parents, helps to explain both teacher and parent nomination. These findings confirm and extend the findings of earlier studies in the nomination literature. For example, previous studies connected aspects of educational capital, such as whether students can afford school lunch (McBee, 2006), with teachers' and parents' nomination, and aspects of learning capital, such as working memory (Kornmann et al., 2015), and whether students complete homework (Siegle & Powell, 2004), with teacher nomination. Additionally, these findings complement

previous findings about teacher nomination because they included both students' assessment and parents' assessments rather than just students' assessments or teachers' assessment, as is typically the case in giftedness research (Mun et al., 2021). The results for using assessments of students' resources by students and parents together confirm previous research results that conclude students assessments and parents' assessments of students' individual and environmental aspects are significant predictors of students' academic achievement (Gagné & Père, 2001; Kornrich & Furstenberg, 2013; Pomerantz et al., 2007). For example, in previous studies it has been shown that parents' assessment of educational capital-related aspects (e.g., of parents' valuing of education; Paulson, 1994, of parental support for children's education; Pomerantz et al., 2007, of parental contributions to the education of their children; Kornrich & Furstenberg, 2013, of their children's motivation level; Gagné & Père, 2001) correlates with academic achievement. Also, previous studies have shown that students' assessment learning capital-related aspects (e.g., of parents' educational aspirations, Paulson, 1994; of students' learning strategies, Zimmerman & Kitsantas, 2014); correlates with academic achievement. My results contribute additional evidence for role that individual and environmental factors play for teacher nomination. Previous studies have related teacher nomination to individual and environmental aspects of the student, such as academic achievement (e.g., Barber & Torney-Purta, 2008; Siegle & Powell, 2004), high motivation (Barber & Torney-Purta, 2008), intelligence (Rothenbusch et al., 2016) student interest (Siegle et al., 2010), and socioeconomic status (McBee, 2006; Siegle et al., 2010). Accordingly, these findings confirm previous results that teacher nomination is not solely determined by academic achievement and socioeconomic status. In addition, they reveal that several environmental and individual resources of students play a role in teacher nomination as identified by the Student ELCQ and the Parent ELCQ. Thus, this investigation complements the aforementioned studies and provides initial evidence that the predictive power of environmental and individual resources for nomination is still present when controlling for academic achievement and socioeconomic status. Moreover, these findings add to existing research about predictors of parent nomination. To the best of my knowledge, my study is the first to investigate the role of the students'

individual characteristics in parent nomination. Thus, this investigation provides initial evidence that parents consider students' learning capital when they nominate. Additionally, I am aware of only two studies that have connected parent nomination with students' environmental resources (Lee & Olszewski-Kubilius, 2006; McBee, 2006); in particular, socioeconomic status. Thus, this investigation complements the aforementioned studies that have used socioeconomic status to predict nomination and provides more details about the environmental factors that predict parent nomination, such as the value parents place on learning.

My findings also further support the theory of Ziegler and Baker (2013), who assert that educational capital and learning capital are essential for talent development and can help predict the achievement of excellence. Also, my findings are in line with existing studies about the predictive power of educational and learning capital. Similar results have been obtained in studies where educational and learning capital have predicted a variety of desirable educational outcomes (e.g., Harder et al., 2018; Vladut et al., 2013; Ziegler et al., 2019) and the achievement of excellence in specific domains (Reutlinger et al., 2020; Ziegler et al., 2019). My results also expand upon previous studies which have used the capital approach with studies of gifted students. In particular, there have already been some attempts to understand the role of educational and learning capital in talent development, but nearly all of these studies, within the school context, have focused on comparing gifted with non-gifted students in the school context (Leana-Tascilar, 2016), or on predicting academic achievement (e.g., Paz-Baruch, 2019; Ziegler et al., 2019), or self-confidence and the ability to deal more effectively with failure (Vladut et al., 2013). Thus, my findings contribute initial evidence that educational and learning capital can predict whether students are potentially gifted, and therefore should be considered for giftedness assessment. My findings also confirm that educational and learning capital can add more predictive power regarding academic outcomes, as was shown in a study by Ziegler et al. (2019), where educational and learning capital predicted academic achievement even when controlling for intelligence.

With respect to using both the Student and the Parent ELCQ simultaneously instead of one of these questionnaires individually, the prediction that doing so would enhance the

prediction of nomination was supported for parent nomination and both teacher and parent nominations simultaneously, but not for teacher nomination. This result is consistent with the assumption that using data from different sources will enhance predictive power. This is because such an approach reduces measurement error and enhances validity (Epstein, 1986; Rushton et al., 1983). To the best of my knowledge, my study is the first to use both students' and parents' assessments of student resources to predict nomination. My results imply that both students and parents are valuable sources of information for predicting parent nomination as well as simultaneous nomination by parents and teachers.

However, employing both the Parent and the Student ELCQ at the same time instead of using just one of these questionnaires did not increase their predictive power regarding teacher nomination. Although these results differ from my expectations, they are consistent with the findings of Gagné and Père (2001), which suggest that using a combination of both students' and parents' assessments of students' resources might have limited value when it comes to predicting academic achievement. According to the results, parents do not have more insight into aspects of educational and learning capital related to teacher nomination than students.

Also, unexpectedly, learning capital as assessed with the Parent ELCQ was unrelated to being nominated by teachers and by both teachers and parents simultaneously. Although learning capital on its own was a significant predictor, it was no longer so when it was considered alongside students' academic achievement and socioeconomic status. One possible explanation for this is that parents' assessments of students' learning capital (i.e., when parents respond to items such as "our son/daughter has excellent learning and studying skills") might be strongly influenced by their knowledge of students' academic achievement. This assumption has been supported by Rothenbusch et al. (2018), who found that parents' assessment of their children's learning capital was influenced by their academic achievement. Also, many studies suggest that teachers primarily base their decision of whether to nominate a student on the student's academic achievement (Aljughaiman & Ayoub, 2017; Hunsaker et al., 1997; Neber, 2004). Thus, it might be the case that academic achievement masks the influence of

learning capital on whether students get nominated by teachers and by both teachers and parents simultaneously.

Moreover, unexpectedly, when learning capital was considered in combination with educational capital, it was no longer a significant predictor of nomination in most cases, which indicates that the relationship between educational capital and nomination was completely mediated by learning capital. This was true irrespective of whether students' educational and learning capital was assessed by the students themselves with the Student ELCQ or by their parents with the Parent ELCQ. The only exception was when the Parent ELCQ was used to predict teacher nomination and nomination by both teachers and parents simultaneously. This finding implies that students with greater amounts of educational capital (e.g., students that have an excellent math teacher, which implies large amounts of didactic learning capital) are more likely to be nominated because such students also tend to have great amounts of learning capital (e.g., they also tend to have excellent math skills, which implies large amounts of actional learning capital). These results differ from prior expectations based on the theory behind the educational and learning capital approach (Ziegler & Baker, 2013), which suggests that both great amounts of educational and learning capital are required for developing one's potential. However, these unexpected results are consistent with other studies that suggest that learning capital might mediate the effect of educational capital on academic achievement (Paz-Baruch, 2019; Veas et al., 2018) as well as on other beneficial outcomes, such as self-confidence and ability to deal more effectively with failure (Vladut et al., 2013).

Also, unexpectedly, my prediction that the effect of students' learning capital on nomination would depend on the extent of student' educational capital was not supported. I had expected that the effect of having a large amount of learning capital (e.g., good math skills, which implies large amounts of actional learning capital) on whether students get nominated is stronger when students also have a large amount of educational capital (e.g., an excellent math teacher who helps students to develop their potential, which implies large amounts of didactic educational capital). However, this was not the case. This finding suggests that both educational and learning capital are important when it comes to nomination, but

that the predictive power of each of them is not affected by that of the other type. Additionally, my results do not rule out the possibility that there might be interaction effects between educational and learning capitals when predicting different outcomes. That is, talent development and the achievement of excellence might require very high levels of educational capital and learning capital, but nomination (i.e., parents or teachers realizing a students' potential) might not.

However, when predicting whether students are nominated by both teachers and parents simultaneously, there was an unexpected negative interaction between learning and educational capital as assessed by parents. This interaction implied that the effect of learning capital on the respective type of nomination was lower when students have a higher amount of educational capital (and vice versa). A possible explanation for this is that parents and teachers might tend to nominate students who exhibit a high amount of learning capital (e.g., excellent performance in math) especially if they also do not have a high amount of educational capital (e.g., when their parents are not well-educated), because teachers and parents may be impressed by the student's ability to excel despite the lack of support from their environment. This is in line with the finding that teachers tend to be more impressed by high academic achievement from students with low socioeconomic status than from students with high socioeconomic status (Siegle & Powell, 2004).

7.1.2 Which Nomination Group Has More Educational Capital and Learning Capital?

My predictions regarding the difference among the three nomination groups were only partially confirmed. The first prediction was that students who are nominated by both teachers and parents simultaneously should have more educational and learning capital than the other two nomination groups (only teacher nomination and only parent nomination). I had expected this because this group consists of students for whom teachers and parents agree that they might be gifted, which suggests that they might possess more individual recourses and environmental resources. This prediction was supported for the Student ELCQ, but not for the Parent ELCQ. A possible explanation might be that the parent sample (n = 352) was much smaller than the student sample (n = 1067). Therefore, although the parents whose children

were nominated by both teachers and parents simultaneously had reported higher values of educational capital (*M* = 4.63, *SD* = 0.75) and learning capital (*M* = 4.96, *SD* = 0.66) compared to the parents in the teacher nomination (EC; *M* = 4.48, *SD* = 0.81, LC; *M* = 4.76, *SD* = 0.84) and parent nomination (EC; *M* = 4.44, *SD* = 0.76, LC; *M* = 4.86, *SD* = 0.77), the differences were not significant; therefore, a higher test power might have detected more differences among the three groups.

My second prediction was that students nominated by teachers should have more learning capital compared to students nominated by parents, whereas students nominated by parents should have more educational capital compared to students nominated by teachers. This was based on empirical evidence that teachers are better at identifying gifted students than parents (McBee, 2006), therefore, students nominated by teachers might be more likely to be gifted, which should be reflected by a greater amount of educational and learning capital (according to the capital approach, Ziegler et al., 2017; Ziegler & Baker, 2013). However, this was not the case for both the Student and the Parent ELCQ. One possible explanation for this is that teachers and parents who nominate students are usually familiar with the concept of giftedness and with those individual and environmental factors that contribute to talent development. Therefore, they might look at a similar set of environmental and individual aspects when they nominate. Also, if one takes a closer look at the amount of variance that learning and educational capital explain in teacher nomination (17% for the Student ELCQ and also 17% for the Parent ELCQ) and parent nomination (16% for the Student ELCQ and 19% for the parent ELCQ), it suggests that teachers and parents are similar in their use of students' environmental and individual aspects when nominating. This finding confirms that both teachers and parents alike consider individual and environmental indicators of giftedness when they nominate gifted students.

7.2 The Role of Students' Educational Capital and Learning Capital in Students' Performance in the Giftedness Assessment

Different types of assessments are employed to identify gifted students (e.g., Cao et al., 2017; Newman, 2018; Pfeiffer & Blei, 2008). Although in theory, selecting the type of assessment

should be based on the definition of giftedness and the purpose of identification (Alhusaini & Maker, 2018; Brown et al., 2005; El Khoury & Al-Hroub, 2018a; Zavala & Torre, 2019), this is often not done in practice. Instead, most giftedness assessment procedures use standardized cognitive ability and academic achievement tests (e.g., Kaufman & Sternberg, 2018; Ritchotte et al., 2016).

Despite the importance of giftedness assessment, its predictors have not been adequately investigated. In particular, the use of a comprehensive and differentiated approach to predicting the results of giftedness assessment has been neglected even though most contemporary theories of giftedness include both individual and environmental aspects such as curriculum and students' motivation (differentiated model of giftedness and talent; Gagné, 2010), students' strong commitment (the three-ring conceptions of giftedness; Renzulli, 1986), and family learning environment (The Munich Model of Giftedness; Heller et al., 2005). Also, several studies have underscored the importance of environmental and individual aspects for high achievement (e.g., learning strategies; Zimmerman & Pons, 1986, teachers' qualifications; Hill et al., 2005). Therefore, I also aim to address this research gap by adopting the educational and learning capital approach to predict the performance of students in the giftedness assessment in Saudi Arabia.

Therefore, the third objective of this dissertation is to systematically investigate the role of educational capital and learning capital in students' performance in the giftedness assessment. This objective encompasses two research questions. The first question was whether the three nomination groups (only teacher-nominated, only parent-nominated, and nominated by both teachers and parents simultaneously) differ regarding the students' performance in the giftedness assessment. The second question was whether educational capital and learning capital (as assessed with the Student and the Parent ELCQ) predict students' performance in the giftedness assessment.

7.2.1 Which of the Three Nomination Groups Performs Better in the Giftedness Assessment?

My predictions regarding the differences among the three nomination groups were not confirmed. I had predicted that those students nominated only by teachers would score higher in the giftedness assessment than students nominated only by parents. Also, I had predicted that students who are nominated by both teachers and parents simultaneously should score higher in the giftedness assessment than students nominated only by teachers or only by parents. Unexpectedly, however, I found no significant difference in performance in the giftedness assessment among the three nomination groups. These results might seem surprising at first because existing literature suggests that compared to parent nomination, teacher nomination tends to be more successful in identifying gifted students, as evidenced by teacher-nominated students performing better on the giftedness assessment after nomination than parent-nominated students (McBee, 2006). A possible explanation for my finding could be that whether teachers or parents are better at nominating students might be dependent on the age of the nominated students. For example, when it comes to identifying children of kindergarten age or younger, parent nomination seems to be more useful (Ciha et al., 1974; Gross, 1999; Silverman et al., 1986). One reason for this might be that children at this age experience rapid cognitive development, which is why their parents are often the first to notice their talent (Olszewski-Kubilius et al., 2014; Siegle et al., 2016). However, teacher nomination seems to be the better option when it comes to students in elementary schools (McBee, 2006). One reason for this might be that every elementary school teacher teaches all the school subjects (Gerretson et al., 2008), which means spending the whole school day with the same students (Randall & Engelhard, 2009), observing them across different subjects (Siegle & Powell, 2004), and being able compare their abilities to students from the same age groups (Kornmann et al., 2015). However, when it comes to students in middle and high school (like the ones that took part in my studies), I am not aware of any study that has investigated the difference between the different types of nomination regarding students' performance in giftedness assessments. Nevertheless, nomination procedures generally exclude parent nominations as

less credible sources (Miller, 1986; Silverman et al., 1986; Wirthwein et al., 2019; Zippert & Ramani, 2017) and favor teacher nominations as better indicators of a student's ability than those of parents (McBee, 2006). Thus, my study contributes to the nomination literature by providing initial evidence that in middle school, teacher-nominated and parent-nominated students perform comparably well in the second step of gifted identification. This suggests employing both parent and teacher nomination as part of the gifted identification process, at least for middle school students.

7.2.2 Do Learning and Educational Capital Predict Performance on the Giftedness Assessment?

Unexpectedly, educational capital and learning capital were not related to giftedness assessment performance in the assumed way. This was true both when examining the predictive power of learning and educational capital on their own and when controlling for academic achievement and socioeconomic status. For the Student ELCQ, it was even found that more learning capital and more educational capital predicted lower scores on the giftedness assessment. Also, unexpectedly, there were no interaction effects between educational and learning capital in predicting giftedness assessment performance. Finally, using both the Student and the Parent ELCQ simultaneously did not enhance the predictive power of learning and educational capital for giftedness assessment performance.

At first glance, it might seem surprising that educational and learning capital were mostly unrelated to performance in the giftedness assessment. This is because existing literature suggests that students with greater amounts of educational and learning capital should perform better on the giftedness assessment. For example, educational and learning capital predict high academic achievement (Harder et al., 2018; Paz-Baruch, 2019; Vladut et al., 2013; Ziegler et al., 2019), higher intelligence (Paz-Baruch, 2019), students' confidence in schools' abilities (Vladut et al., 2013), and greater motivation (Leana-Tascilar, 2015a). Moreover, educational and learning capital have been found to predict excellence in STEM, athletics, and music (Reutlinger et al., 2020; Ziegler et al., 2019). Students with great amounts of educational

and learning capital, due to their strong learning resources (e.g., learning strategies; Zimmerman & Pons, 1986, previous knowledge; Uesaka & Manalo, 2006, physical activities; Rasberry et al., 2011), and their rich and stimulating learning environments (e.g., qualified teachers; Hill et al., 2005, spending money on education; Organisation for Economic Co-operation and Development, 2001), should score higher in standardized cognitive ability tests and academic achievement tests. Also, my finding seems especially surprising when considering that academic achievement is an essential part of the giftedness assessment in Saudi Arabia, which includes a test that assesses students' academic abilities in language, mathematics, and science (Mawhiba, n.d.–b). One possible explanation for my finding could be the fact that those who have taken the giftedness assessment can be assumed to be among the most academically capable students. For this reason, they can be expected to be somewhat similar in their amount of educational and learning capital, which would make it difficult to demonstrate a relationship between learning and educational capital and performance. In particular, this result might be due to the restricted variance regarding learning and educational capital that can be assumed to be present in my sample which might have lowered the correlations of learning and educational capital with performance (Sackett & Yang, 2000). If the entirety of the student sample (2505 students) had taken the giftedness assessment, educational and learning capital might be able to predict performance in the assessment.

Also, surprisingly, and contrary to my predictions, learning capital on its own, as assessed with the Student ELCQ, was negatively related to students' performance in the giftedness assessment. However, this unexpected result is in line with the results of Leana-Tascilar's (2016) study, which found that compared to nongifted students, gifted students reported lower amounts of telic and attentional learning capital as well as lower amounts of economic and social educational capital. Also, another study by Harder et al. (2014) found that intelligence was uncorrelated with educational and learning capital, which they operationalized in the form of motivation and learning behavior as indicators of learning capital, and school/class climate as an indicator of educational capital. However, because the giftedness assessment mainly measures cognitive abilities and academic competencies in math, science,

and language, as do most giftedness assessments (e.g., Kaufman & Sternberg, 2018; Ritchotte et al., 2016), my finding might not apply to other types of giftedness assessments, such as creativity tests, as well as to other types of giftedness, such as athletic prowess or musical talent. Although the scores for the individual tests in the giftedness assessment were not available for this study, the results for the individual tests can be expected to be quite similar due to the individual tests measuring similar competencies.

Also, unexpectedly, educational and learning capital, as assessed with the Student ELCQ, were negatively related to giftedness assessment performance. A look at the relationship between the individual types of educational capital and giftedness assessment performance might help to explain this unexpected result. Among the five individual types of educational capital, only didactic educational capital is negatively related to giftedness assessment performance (r = –.16, p = 001). This might be because in Saudi Arabia, when students need educational help or struggle with their learning, their parents might be more motivated to choose the best school for their children or to provide them with a private tutor to enhance their learning. If this is the case, assessments of educational capital would be high not because the students' potential gifts were supported, but because the weaknesses of the students were addressed. In contrast, parents who feel that their children exhibit high academic performance might tend to stand back because they believe that their children can succeed on their own. This stereotype about gifted students has been shown to be present in different cultures and societies (Subotnik et al., 2011). When considering the negative relationship between learning capital and giftedness assessment performance, telic learning capital seems to be the cause (r = –.16, p = 001). Thus, students with lower performance in the giftedness assessment agreed more with statements such as "I always set goals for myself for continuously improving my performance at school." than students with lower performance in the giftedness assessment. This might be because these students might feel the need to improve their performance at school, which could be the reason why they set such goals, whereas it can be assumed that most students who score higher in the giftedness assessment are already quite successful academically therefore do not feel the need to set such goals.

Also, my prediction that the size of the effect of students' learning capital on students' performance in the giftedness assessment would be dependent on the amount of students' educational capital, was not supported. For both the Student ELCQ and the Parent ELCQ, there was no significant interaction between students' educational capital and learning capital when predicting performance in the giftedness assessment. This result is similar to the one involving the missing interaction between learning and educational capital when predicting nomination. Also, my result differs from Bronfenbrenner's (1994) work that suggests that the relationship between individual characteristics and learning development depends on environmental factors. They also differ from the finding that environmental factors moderate the relation between adolescents' individual characteristics and their aspirations (Marjoribanks, 1999). However, my unexpected result is consistent with findings that the effect of students' individual characteristics (e.g., cognitive competence, self-determination, and social competence) on students' learning outcomes have been found not to be moderated by external factors (e.g., by effective teaching practice and a supportive environment on college campus; Yu et al., 2017). A possible explanation for my result might be that I used different measures for environmental and individual aspects than previous studies. For example, the five types of learning capital measured in my study (organismic, actional, telic, episodic, and attentional learning capital) may not capture the same individual characteristics as Marjoribanks' (1999) study, which assessed students' individual characteristics in the form of intelligence.

Finally, the prediction that using the Student ELCQ and the Parent ELCQ simultaneously would enhance the predictive power regarding giftedness assessment performance was not supported. One possible explanation is that the Student ELCQ and the Parent ELCQ (with the exception of learning capital as assessed with the Student ELCQ) were uncorrelated with the students' performance in the giftedness assessment (which correlation is a requirement to enhance the predictive power of the aggregated scales; Epstein, 1986).Therefore, the combination of the two questionnaires is unlikely to improve the predictive power of educational and learning capita.

7.3 Limitations and Future Research

In this dissertation, I have provided new insights that broaden the research on learning and educational capital and support the role of educational and learning capital regarding the nomination of gifted student for gifted identification. However, the studies in my dissertation also have several limitations. One key limitation is their cross-sectional design, which means that the direction of influence cannot be inferred from the results. Although I would argue that educational and learning capital are likely to affect the nomination process, one might argue that being nominated might also affect how students and parents rate students' educational and learning capital. Nevertheless, based on theoretical considerations that assume educational and learning capital to be prerequisites for students' learning development and achievement of excellence (Ziegler & Baker, 2013), the direction of influence I assumed in this study aligns with existing findings and thus seems plausible. However, future studies should investigate the relationship of learning and educational capital with nomination and giftedness assessment performance within a longitudinal study design. In such a longitudinal study, one could also draw conclusions about whether students with more educational and learning capital are more likely to succeed in gifted programs, whether gifted education results predict changes in students' amount of educational and learning capital. Ideally, such a longitudinal study would collect assessments of students' educational and learning capital before, during, and after their participation in gifted education programs to understand (a) how their educational and learning capital changes over time and (b) if gifted education programs influence learning and educational capital. For example, in such longitudinal studies, one could compare the performance in gifted programs of gifted students with greater amounts of educational and learning capital to those with lower amounts of educational and learning capital while controlling for academic achievement and socioeconomic status.

Another limitation is that teachers' nominations included two groups of students: officially teacher-nominated students and unofficially teacher-nominated students. The officially teacher-nominated group consisted of students that were nominated by their school and for whom the Ministry of Education paid the test fee. For this type of nomination, teachers

complete a scale that assesses behavioral characteristics that are supposed to differentiate between gifted and non-gifted students for each nominated student (e.g., cognitive and creative abilities). This is a rather small group because the Ministry chooses a limited number of schools and asks each of them to nominate just a single student. Thus, many teachers use the unofficial option and nominate those students whom they believe to be gifted by encouraging them to take the giftedness assessment. However, these two groups can be assumed to be very similar because a comparison of their economic educational capital revealed no significant difference. This was done because I assumed the real difference between these two groups is that the unofficial teacher-nominated student's group paid the test fee while the ministry paid the fee for the officially teacher-nominated students. However, the results related to teacher nomination might have been different if only officially nominated students were included instead of including both groups in the analysis.

A further limitation is that teachers and parents nominate students without using any well-defined criteria or rating scales that enable them to focus on characteristics that differentiate between gifted and non-gifted students (except for officially teacher-nominated students). Thus, the result might be substantially different if teachers and parents had some type of training about how to recognize giftedness because this might cause them to nominate different students. When teachers and parents have this knowledge, they might consider more individual and environmental indicators of students' potential, so the educational and learning capital approach, in that case, might explain even more variance in teacher nomination and parent nomination than in my study. Thus, in future studies, researchers should analyze whether different results are obtained for teachers and parents who have received training on how to identify gifted children compared to teachers and parents who have not.

Yet another limitation lies in the fact that the studies relied on typical Likert-type rating scales querying agreement to rather general statements about students' resources to assess educational and learning capital. Responses on such rating scales usually depend on an individual's own criteria when making an assessment. Thus, the criteria might differ among students—particularly because some of the participating students might be gifted, whereas

others are not (Ross, 2006). For example, gifted students who are hyperaware of their strengths and weaknesses might underestimate their real resources in comparison to other students who are oblivious of their shortcomings. Thus, a more objective assessment of students' resources would be beneficial. For example, future studies could include in-class observations to assess students' performance and attentiveness in a real learning situation and judge the quality of their class's structure. This would allow researchers to obtain more detailed information that allows for a more accurate assessment of educational and learning capital. Additionally, parent interviews could be useful to learn more about students' learning capital (Stoeger et al., 2017), as well as to obtain detailed information about the level of educational support parents provide to their children. In addition, a more differentiated assessment of students' abilities would be useful (e.g., a test of students' mathematical or verbal ability as an assessment of actional capital). It might also be helpful to ask students more specific questions if a self-report measure of learning and educational capital is employed. For example, instead of assessing students' organismic capital with an item such as, "I am so physically fit that I can learn and study for school for long periods of time without getting tired," (as the Student ELCQ does), one might want to have more specific items such as, "How often do you exercise?" or "How often do you eat breakfast before school?" The use of such more differentiated measures might result in higher variances of the educational and learning capital among the nominated students, which might raise the predictive power of educational and learning capital for performance on the giftedness assessment.

Another limitation is the use of overall scores for educational capital and learning capital instead of individual scores for each of the ten types of capital. This limitation stems from the fact that the Parent ELCQ only contains two items for each type of capital, which seems insufficient for a reliable assessment of individual capitals. For this reason, I have used the overall scores for the Parent ELCQ, and because one of the dissertation focuses is the comparison between parent and student assessment of educational and learning capital, I had to use the overall scores for the Student ELCQ as well, otherwise the results would not be comparable. Future studies should consider each of the ten types of capital individually to

investigate the role that each type plays for nomination and giftedness assessment performance. For example, it can be assumed that specific capitals are more important depending on the domain in which nomination and giftedness assessment are employed (e.g., organismic capital might play a much larger role in sports than in music). Thus, it would be interesting to investigate which individual type of capital is the most important one for whether students get nominated and whether different identification requires different capitals.

Another limitation is that the measurement of students' educational and learning capital in this dissertation was based only on students' and parents' assessments, but not on teachers' assessments. Teacher assessments might offer further insights into students' educational and learning capital because they have been shown to have different perceptions of students than both parents and students (Acar et al., 2016). Thus, future studies should also include teachers' assessment of students' educational and learning capital to achieve better predictions of nomination.

A final limitation is that the findings cannot be generalized easily to (a) other countries with different gifted identification procedures and (b) different age groups of students. This matter seems particularly important because the role of educational and learning capital in student learning development differs according to age (Leana-Tascilar, 2015b). Thus, in future studies, researchers should aim to provide evidence for the role of students' educational and learning capital for gifted identification procedures (a) in different countries, (b) for students from various grade levels, and (c) for different types of nomination (e.g., also for self-nomination and peer nomination) and different identification procedures (e.g., creativity tests). For example, educational and learning capital might be even more important for nomination in East Asian countries that are known for a student population with higher levels of educational capital (e.g., where parents tend to place a high value on learning and are highly involved in learning) and learning capital (e.g., where hard work and effort are considered to be very important; Phillipson et al., 2013). For instance, researchers might want to investigate the role of educational and learning capital in the context of Singapore's gifted identification procedure because in this context, (a) gifted identification targets third-grade students, (b)

self-nomination is employed, (c) the giftedness assessment focuses on different areas than the one in Saudi Arabia (e.g., English language proficiency, mathematical ability, and general ability), and (d) Asian culture tends to perceive high achievement as a result of environmental factors and dedication (Neihart & Tan, 2016), which might result in a larger predictive power of educational capital for nomination.

7.4 Implications

My dissertation provides initial evidence for the effectiveness of educational and learning capital for predicting the first step of identifying gifted students that go beyond traditional assessments used in previous research. The findings of my dissertation also have practical and theoretical implications for various pedagogical agents, such as educators, policy makers, teachers, and parents.

First, educational and learning capital might help bridge the gap between theories and practice in most gifted identification programs. Contemporary theories stress the significance of both individual and environmental components of giftedness (e.g., Gagné, 2010; Heller et al., 2005; Ziegler, 2005). Therefore, the majority of gifted programs adopt such theories. However, programs tend to depend solely on the cognitive ability tests and academic achievement tests for their identification procedure (e.g., Kaufman & Sternberg, 2018; Ritchotte et al., 2016). This is in no small part because it is exceedingly onerous to employ that covers both individual and environmental aspects of giftedness for assessing all potentially gifted students (even when only testing the few students that pass the nomination stage). However, it would be feasible to use an instrument based on the educational capital approach as a screening instrument during nomination This would help identify those students with the greatest amounts of educational and learning capital, which has been shown to be a good predictor of talent development (e.g., Reutlinger et al., 2020; Ziegler et al., 2017; Ziegler et al., 2019) and that thus might be better at predicting students' success in gifted programs than merely the results of cognitive ability and achievement tests.

Another important implication of my studies is that it documents the usefulness of employing parent nomination (in addition to teacher nomination) in gifted identification programs. Most identification procedures rely purely on teacher nominations in the first step (e.g., Biber et al., 2021; Foreman & Gubbins, 2015; Hernández-Torrano & Tursunbayeva, 2016), but, as documented by my results, parent nomination could be a valuable tool for reducing the number of gifted students who are missed. The finding that parent-nominated students performed equally well in the giftedness assessment as teacher-nominated students indicates that parents seem to be similarly good at identifying gifted students. Based on my results, one can also assume that around 42% of gifted students would have been overlooked if only teacher nomination was used (i.e., if all parent-nominated students were not nominated). This suggests a wider use of parent nomination.

Another important practical implication is that assessing students' educational and learning capital can go beyond identification to support their individual needs when they take part in gifted identification. Information gathered about students during the identification process reveals their individual strengths and weaknesses, which allows educators to enhance students' talent development accordingly. For example, if the assessment of students' educational and learning capital reveals that a student has low economic capital, then this information would help to avoid placing the student in a gifted program requiring financial support from their parents. Instead, the program's administrators could seek financial support for these students. Thus, the capital approach provides greater insight into students' current resources and into what resources the particular students would require in order to develop their potential than other assessment methods such as intelligence tests, which evaluate only one aspect of giftedness and supply little information about how to support a specific students' talent development (Ziegler et al., 2019).

In addition, because most of these resources can be acquired or improved, educators could use them to support students' learning development. Therefore, these findings might motivate educators to promote awareness of these resources' importance among teachers and parents, as well as to encourage training parents and teachers how to provide

and improve such resources. For example, parents could be encouraged to provide greater social and financial support to improve their children's learning conditions. The same is true for teachers, who could work to improve their pedagogy and use effective strategies to help students learn. Furthermore, teachers and parents could be made more aware of their students' resources and thus more eager to enhance them. For example, they could teach students self-regulation skills (actional learning capital), which has been shown to help gifted students improve their learning (Ziegler & Vialle, 2017).

Educators and schools could also apply the educational and learning capital approach as an evaluation framework to assess the quality of students' learning conditions. For example, the approach suggests that schools should evaluate their infrastructure, such as whether they have laboratories and libraries. In addition, schools could evaluate the quality of their teachers' pedagogy and check whether they have professional development plans in place to enhance teachers' instructional skills. Also, schools could provide students with social support by having a qualified student counselor on staff, evaluate the physical activity included in their curricula, and determining whether they provide students with healthy foods. Such an evaluation would help schools determine any resources that are lacking, and enable them improve these resources accordingly (Leana-Tascilar, 2015c). This would benefit both gifted and non-gifted students.

This dissertation also has practical implications for gifted identification in Saudi Arabia. First, because there is a particularly strong need for developing and validating measures for the different dimensions of giftedness in Arabic with representative Saudi standardization samples (Subhi-Yamin, 2009), this dissertation addresses an important research gap by validating the Student and the Parent ELCQ for usage in the Saudi gifted identification context. Moreover, most research on giftedness in Saudi Arabia has examined the importance of students' individual aspects for gifted identification and learning development, whereas environmental aspects tended to be underemphasized. Therefore, the results of this dissertation might encourage researchers to explore the role of the environment in talent development in

the context of Saudi culture. In Saudi Arabia, gifted education programs primarily have a limited and temporary impact on gifted students' learning development (e.g., students' motivation decreases during the program; Aljughaiman et al., 2009). Thus, these results might direct policy makers' and researchers' attention to the importance of students' educational and learning capital for students for maximizing the benefits of such services; therefore, they might want to include assessments of learning and educational capital when identifying and supporting gifted students in gifted education programs. Also, all measures that have been so far developed for use in the Saudi context have been limited to identifying academically gifted students (Mawhiba, n.d.–b). This limited view might be one of the reasons why several different domains (e.g., art and music) are not considered when identifying gifted students. This problem might partially be remedied by adapting the learning and educational capital questionnaires to different specific domains, such as the STEM field, sports, art, and music. For example, an item used to assess learning resources in the domain of mathematics that reads "I know from experience how I can improve my performance in math," could be changed to, "I know many people who think that learning and practicing music is very important" to assess learning resources in the domain of music. The educational and learning capital questionnaires might also be useful tools for identifying underachievers and gifted students with low socioeconomic status. This suggestion is based on the fact that even after controlling for students' academic achievement and socioeconomic status, educational and learning capital still predicted nomination in Saudi Arabia.

Finally, these findings raise questions about whether using only the giftedness assessment for the final step of identification is the most effective approach. My finding that educational and learning capital were not positively related to students' performance in the giftedness assessment implies that a portion of the gifted students identified by the giftedness assessment criteria might not have had high motivation, adequate social support, or effective learning strategies. Although they apparently exhibit high cognitive ability, as demonstrated by their test scores, this might be insufficient for them to develop their talent or to benefit fully from gifted programs (Ziegler et al., 2017; Ziegler & Baker, 2013). For example, teacher

nomination has been shown to predict students' success in gifted programs—the purpose of identification—better than cognitive tests do (Foreman & Gubbins, 2015). This implies that teachers are apparently able to recognize factors that are important for success in gifted education programs that cognitive tests overlook. Thus, Mawhiba, the institution responsible for gifted identification in Saudi Arabia, might want to consider using additional criteria for gifted identification, such as assessments of educational and learning capital. Assessments of learning and educational capital might be either used as part of the giftedness assessment or as a screening tool to decide which students to nominate for the giftedness assessment.

7.5 Conclusion

Although the two-step gifted identification procedure is quite common in many countries and gifted programs, the factors that predict whether students are nominated in the first step and then identified in the second step due to a high score in the giftedness assessment have been insufficiently investigated. When predicting nomination and performance in giftedness assessment, previous studies have typically focused on less differentiated variables (e.g., students' academic achievement and socioeconomic status) or on examining individual predictors in isolation instead of using a more comprehensive and differentiated approach. Therefore, in this dissertation, I addressed this research gap by employing the educational and learning capital approach, which offers a comprehensive taxonomy of individual and environmental aspects that are necessary for talent development (Ziegler et al., 2017; Ziegler et al., 2019; Ziegler & Baker, 2013). This approach was developed in response to calls by experts in the giftedness field to use more sophisticated approaches than the traditional ones (e.g., Davidson, 2009; Ziegler, 2005; Ziegler & Stoeger, 2004), which they consider as not differentiated enough and as largely neglecting environmental aspects of giftedness.

Overall, using the Student and the Parent ELCQ has been shown to predict nomination, which is the first step in gifted education in Saudi Arabia, above and beyond students' academic achievement and socioeconomic status. These results align with (a) prior results concerning the predictive power of educational and learning capital for desirable outcomes with (e.g., academic achievement, motivation, excellence in specific domains such as STEM

and music) as well as with (b) studies that document the effect of students' individual resources (e.g., Kornmann et al., 2015; Siegle & Powell, 2004) and environmental resources (e.g., Lee & Olszewski-Kubilius, 2006; McBee, 2006; Siegle et al., 2010) on nomination.

However, in terms of the second step, performance in the giftedness assessment, students' educational capital and learning capital were not predictive. Yet this result must be interpreted with caution for four reasons. First, the giftedness assessment in Saudi Arabia assesses only cognitive ability and academic competencies; therefore, it is possible that different results might be obtained if other assessment types were used in the second stage, such as creativity tests or performance-based tests. Second, I aimed to predict the identification of academically gifted students, which implies a rather broad domain. If the aim had been to identify students gifted in a narrower domain such as mathematics, sports, or music, then the educational and learning resources might be more strongly related to students' performance. Third, I conducted the study with middle-school students; therefore, the results might have been different if the study had been conducted with younger students. This is because several studies have found that environmental factors (Jeynes, 2005, 2007; Leana-Tascilar, 2015b) and individual factors (Leana-Tascilar, 2015b) have a greater impact on the academic achievement of younger children than of older children. Finally, the students who took the giftedness assessment probably have rather high values for educational and learning capital, which would diminish the correlation between educational and learning capital and giftedness assessment performance due to the restricted variance (Sackett & Yang, 2000). Thus, if both nominated and not nominated students had participated in the giftedness assessment, educational and

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