

## **The Male Disadvantage in Educational Achievement and Attainment**

### **Background Note**

In August 2017, the Norwegian Government appointed a National Commission on Gender Equality in Education. The Commission was mandated with the task of providing systematic knowledge about why there are gender gaps in education, and offer local and national authorities recommendations for policy measures to prevent unfavourable gender gaps.

The background for the appointment was a growing attention to several facts. In Norway,

- *Boys perform systematically worse than girls in school.* In 10th grade, boys receive a 10% lower GPA score than girls on average. Girls receive higher marks than boys in all subjects except physical education. The gender gap is especially large in reading skills and in Norwegian.
- *More boys than girls need educational support.* Approx. 70% of pupils receiving special needs education in primary and lower secondary education are boys.
- *Boys have higher drop-out rates.* Five years after school entry, 30% of boys have not completed upper secondary education. The corresponding share for girls is 20%.
- *Men participate and graduate less in tertiary education.* In 2016, approx. 60% of women in the age group 30–39 hold a university or college degree, while this is true only of 40% of men in the same age group. In 2015, more women than men obtained a doctoral degree for the first time in Norwegian history.

However, the male disadvantage in education is not an exclusively Norwegian phenomenon. In fact, there are similar patterns of gender gaps in educational performance and attainment in most OECD countries. An OECD Education Working Paper shows that on average, girls read better than boys, more boys than girls are all-round low-achievers, and more boys than girls drop out of upper secondary education. The female share of students graduating with a bachelor degree is on average 60% in the OECD area (Borgonovi et al., 2018).

Moreover, the gender gap in disfavour of boys is not a novel phenomenon. A meta-analysis of studies from several countries, including China, Czech Republic, Estonia, Finland, Germany, Israel, Sweden, Turkey and the U.S., shows that girls achieved better academic results than boys all the way back to 1914 (Voyer & Voyer, 2014). However, the consequences of the gender gap are more pronounced today, partly because women have entered tertiary education in large numbers since the 1970s. The correlation between low educational attainment and negative labour, social and health outcomes is also stronger today. There are fewer jobs with no formal competence requirements. Men with low educational attainment marry less, have fewer children, and live shorter, than men with high educational attainment.

Perhaps surprisingly, the gender gap in educational achievement persists across immigration status and parents' socio-economic status (SES) in Norway. The gender dimension seems to work independently of immigration status and SES dimensions, although their intersections make up "double negatives" at the lower end and "double positives" at the upper end of the achievement distribution.

In sum, the gender gap in educational achievement seems to be stable across countries, across time, and across immigration status and socio-economic parameters. This has implications for the admissibility and plausibility of the various explanations offered for why boys are falling behind in school.

### **Contributing factors to the gender gap**

The Commission has reviewed international and Nordic research literature in search of causal factors that explain or help explain the gender gap. There are many candidate explanations.

Internationally, the *resilience hypothesis* has gained some traction. According to the hypothesis, boys are less resilient than girls to disadvantaged circumstances in childhood and adolescence. Some studies find that boys are more negatively affected than girls when raised in a single parent family, by parents with low educational attainment, or in underprivileged neighborhoods (Autor et al., 2016, Bertrand & Pan, 2013, Drukker et al., 2009). Note that in several studies, the effect is measured in academic performance and behaviour challenges. Therefore, these studies do not preclude that girls are as negatively affected as boys, but suffer different consequences, e.g. anxiety or depression.

Interestingly, we do not find the same pattern in the Nordic countries. Family income only has a negative effect on children's educational attainment in the marginal lower end of the income distribution, and the effect is equal on boys and girls (Løken, 2010, Løken et al., 2012). Two-parent families are more favourable to the educational attainment of girls than of boys (Brenøe og Lundberg, 2018), and the neighborhood profile has a stronger effect on girls' academic achievement (Markussen og Roed, 2018). Diverging results in international and Nordic studies suggest that a country's family policies and social welfare system may play a role in how family and childhood factors affect the gender gap in education.

*Parent-child-interaction* has been discussed as another possible explanation of the gender gap. Some studies find that both mothers and fathers spend more time with their daughters than with their sons on activities that promote learning, like reading and counting, despite the fact that fathers spend more time with their sons than with their daughters in general (Baker & Milligan, 2016). Other studies find that boys are more vulnerable to lack of parental support (Bertrand & Pan, 2013), especially lack of support from their fathers (Hoeve et al., 2009). But few studies are able to isolate parenting factors as causal factors. It is therefore possible that gender differences in the skills, traits and behaviour of children are causing variations in parental time investment and support to sons and daughters, and not the other way around (or that these correlating phenomena are both caused by a third factor).

*Teacher-pupil-interaction* is one of the main hypotheses put forward to explain the male disadvantage in education. Specifically, the ratio of female to male teachers in primary and lower secondary education has been a matter of concern in many countries, giving way to the idea that boys would do better in school if they were taught by male teachers, through motivational/role model mechanisms, or by reducing stereotype threat. There is, however, little empirical evidence to support this hypothesis. The majority of studies that are able to isolate teacher-pupil gender matching as a causal factor, find that having a female teacher

does not affect the academic achievement of boys negatively (Antecol et al., 2014, Cho, 2012, Holmlund & Sund, 2008, Lim & Meer, 2017, Muralidharan og Sheth, 2016, Paredes, 2014).

On the other hand, and regardless of teacher gender, there is some probative evidence to suggest that girls benefit from the social interaction with their teacher, and that boys are victims of stereotype threat, when their academic performance is assessed by teachers and not through anonymous tests (Cornwell et al., 2013, Falch & Naper, 2013, Hinnerich, 2011, Lavy, 2008). Statistics also show that in countries where teacher-evaluation is the more common assessment practice, the male share of new entrants in tertiary education is proportionately lower (Borgonovi et al., 2018). Some studies find that pupils achieve better academic results and are less involved in problem behaviour with good classroom management (Marzano et al., 2003, Oliver et al., 2011). It has, however, proven difficult to find studies with a robust design that have explored whether the didactic methods of teaching or the pedagogic profile of schools and education systems have an impact on the gender gap in education.

Studies and mappings on *teacher-child-interaction in preschool/kindergarten* find that kindergarten teachers react differently to similar behaviour in boys and girls. Boys are more often assisted in dressing themselves despite not having asked for help, boys are more often reprimanded, and boys more frequently receive yes/no-questions than girls. Girls have higher quality relations with, and are more often comforted by, their kindergarten teachers (Eidevald, 2009, Hansen et al., 2016). It is not known whether these gender differences in teacher-child-interaction translate to gender differences in learning. But studies find that boys more often than girls opt out of voluntary language activities in kindergarten (Stangeland et al., 2018). In contrast to the findings on teacher-pupil gender matching, one study finds that having more male teachers in kindergarten is associated with improved academic results among both boys and girls in primary education (Drange & Rønning, 2017). It is possible, however, that this result is driven by other factors than teacher gender, e.g. that kindergartens that strive for a gender balanced teacher group also have a stronger focus on quality care and learning.

The pupils' *school starting age* and *relative age in class* have also drawn attention as possible explanations for why boys are falling behind in school. In most education systems in the OECD area, children start school at the age of 6. Critics suggest that children and especially boys are not ready for school at that age. Some studies find that starting school later may lead to better academic results (Sievertsen, 2015), but this effect is mostly due to the red-shirted pupils being one year older than their classmates at the time of test-taking. When this is corrected for, starting school later seems to have no positive effects on the IQ-level, educational attainment or income later in life (Black et al., 2011). Studies also find that pupils that are relatively older than their classmates (e.g. born in January) do better in school (Solli, 2017). Conversely, pupils that are relatively younger than their classmates (e.g. born in December) are more frequently diagnosed with ADHD (Holland & Sayal, 2018, Karlstad et al., 2017). Some studies find that red-shirting pupils that are born late in the year, may reduce the number of pupils that are reported as hyperactive by their mothers or treated for ADHD (Pottegård et al., 2014, Sievertsen, 2015).

The topic of school-readiness relates to observed gender differences in *self-regulation*. Self-regulation is the skill of regulating one's own attention, activity level, impulses, emotions and

social behaviour. The skill is correlated with school achievement and participation in tertiary education (DiPrete & Jennings, 2012, Eisenberg et al., 2010, Jacob, 2002). Research shows that the development of self-regulation is significantly delayed in boys compared to girls from childhood to adolescence (Else-Quest et al., 2006, Murray et al., 2019, Størksen et al., 2015). There is a further question left to be answered of what is causing these gender differences in self-regulation. Other studies find that gender differences in *personality traits* such as conscientiousness, agreeableness and aggression may partly explain the observed gender differences in school achievement (Duckworth & Seligman, 2006, Hicks et al., 2008, Spinath et al., 2014).

It is now widely accepted that boys and girls have similar levels of general intelligence (see e.g. Spinath et al., 2014). Yet there is some evidence that boys and girls have slightly different *cognitive profiles* at various stages of childhood. Studies find that girls on average develop language skills earlier than boys (Bleses et al., 2008, Marjanovic-Umek & Fekonja-Peklaj, 2017, Stangeland et al., 2018), while boys develop spatial skills earlier than girls (Moore & Johnson, 2008) – skills that are important for mathematical reasoning (Reilly et al., 2017). On average in the OECD area, girls do better in literacy tests, while boys do better in numeracy tests (Borgonovi et al., 2018). These gender differences in cognitive profile on group level most likely interact with and perhaps reinforce *gender stereotypical expectations* from peers, teachers, parents and the children themselves. Studies find that boys do worse in reading tests when they are told beforehand that it is a reading test and not a game (Pansu et al., 2016) and girls' negative self-conception in mathematics may prevent them from pursuing a career in STEM-disciplines (Eccles & Wang, 2016).

Gender differences in *cognitive development* may also have an impact on the gender gap in education. Studies find that the timing of puberty has an impact on the cognitive development of adolescents, where late onset of puberty is associated with slower development of cognitive skills, and, for boys, also low income later in life (Koerselman & Pekkarinen, 2018). Girls normally enter puberty 1–3 years earlier than boys. This is especially relevant in education systems that start tracking around the age of 15–16, the peak of puberty for boys. To date, there is too little research on this topic to conclude whether gender differences in cognitive development can explain the gender gap in educational achievement.

Lastly, there may be different *labour market incentives* for men and women that have an impact on how much effort boys and girls invest in school. Studies find that the economic returns to education are slightly higher for women than for men (Crivellaro, 2016) and women have non-pecuniary returns to education that men do not have, at least not to the same degree (DiPrete & Buchmann, 2013, Oreopoulos & Salvanes, 2011). In Norway, the economic returns to educational attainment stopping at high-school level are higher for men than for women, due to comparatively higher economic returns to traditionally male TVET programs (Reisel, 2013). The local labour market has a larger impact on the drop-out tendency of boys than of girls in high-school (von Simson, 2015). One study also finds that the signaling value of education is significantly higher for women than for men, due to the more frequent miscalculation of the productivity of women than of men by employers (Nielsson & Steingrimsdottir, 2018).

Gender differences in labour market incentives may explain the observed differences in *educational and occupational expectations* between boys and girls. In the OECD area, girls expect to attain a higher educational level than boys, and more girls than boys plan on a career in a high-status profession (OECD, 2015). A significant increase in girls' educational and occupational expectations since the 1980s may also explain the fact that girls have left boys behind in the upper end of the GPA distribution (from marks B to A) (Fortin et al., 2015). Nevertheless, few studies are able to isolate these factors as causal factors. It is therefore possible that the gender gap in academic achievement is causing the gender differences in educational and occupational expectations and choices, and not the other way around.

### **Policy measures**

Based on the existing knowledge of male disadvantage in education, the Commission developed in total 64 recommendations for policies and concrete measures to prevent and mitigate the gender gap. The Commission report was handed over to the Norwegian Minister of Education and Integration Jan Tore Sanner on February 4<sup>th</sup>, 2019.

The Commission developed its recommendations guided by a set of principles. The policy measures should:

- Improve boys' performance, not impair girls' performance
- Help reducing the socio-economic gap in performance
- Target both boys and girls, men and women
- Contribute to an inclusive learning environment
- Be evidence-based

The Commission developed recommendations in four main areas of education policy:

1. Early intervention and adapted education  
(e.g. consider models for flexible school starting age)
2. Content and structure in primary and lower secondary education  
(e.g. consider models for different weighting of final and examination marks)
3. Transitions in the educational pathway  
(e.g. codify in law the right to apprenticeships for pupils in TVET programs)
4. Evidence systems for preschool/kindergarten, primary and secondary education  
(e.g. develop a national course database for education)

The report is available in Norwegian: <https://nettsteder.regjeringen.no/stoltenbergutvalget/>.

An English translation of the report is forthcoming.

## References

- Antecol, H., Eren, O. & Ozbeklik, S. (2014). The effect of teacher gender on student achievement in primary school. *Journal of Labor economics*, 33(1), 63–89.
- Autor, D., Figlio, D., Karbownik, K., Roth, J. & Wasserman, M. (2016). *Family disadvantage and the gender gap in behavioral and educational outcomes*. NBER Working Paper No. 22267, National Bureau of Economics Research.
- Baker, M. & Milligan, K. (2016). Boy-girl differences in parental time investments: Evidence from three countries. *Journal of Human Capital*, 10(4), 399–441.
- Bertrand, M. & Pan, J. (2013). The trouble with boys: Social influences and the gender gap in disruptive behavior. *American Economic Journal: Applied Economics*, 5(1), 32–64.
- Black, S. E., Devereux, P. J. & Salvanes, K. G. (2011). Too young to leave the nest? The effects of school starting age. *The Review of Economics and Statistics*, 93(2), 455–467.
- Bleses, D., Vach, W., Slott, M., Wehberg, S., Thomsen, P., Madsen, T. O. & Basbøll, H. (2008). Early vocabulary development in Danish and other languages: A CDI-based comparison. *Journal of child language*, 35(3), 619–650.
- Brenøe, A. A. & Lundberg, S. (2018). Gender gaps in the effects of childhood family environment: Do they persist into adulthood? *European Economic Review*, 109, 42–62.
- Borgonovi, F., Ferrara, A. & Maghnouj, S. (2018). *The gender gap in educational outcomes in Norway*. Paris: OECD Publishing.
- Cho, I. (2012). The effect of teacher–student gender matching: Evidence from OECD countries. *Economics of Education Review*, 31(3), 54–67.
- Cornwell, C., Mustard, D. B. & Van Parys, J. (2013). Noncognitive skills and the gender disparities in test scores and teacher assessments: Evidence from primary school. *Journal of Human Resources*, 48(1), 236–264.
- Crivellaro, E. (2016). The College Wage Premium over Time: Trends in Europe in the Last 15 Years. I *Inequality: Causes and Consequences* (s. 287–328). Emerald Group Publishing Limited.
- DiPrete, T. A. & Buchmann, C. (2013). *The rise of women: The growing gender gap in education and what it means for American schools* Russell Sage Foundation.
- DiPrete, T. A. & Jennings, J. L. (2012). Social and behavioral skills and the gender gap in early educational achievement. *Social Science Research*, 41(1), 1–15.
- Drange, N. & Rønning, M. (2017). *Child care center staff composition and early child development*. Discussion Papers No. 8904, Statistisk sentralbyrå.
- Drukker, M., Feron, F. J. M., Mengelers, R. & Van Os, J. (2009). Neighborhood Socioeconomic and Social Factors and School Achievement in Boys and Girls. *The Journal of Early Adolescence*, 29(2), 285–306.
- Duckworth, A. L. & Seligman, M. E. (2006). Self-discipline gives girls the edge: Gender in self-discipline, grades, and achievement test scores. *Journal of Educational Psychology*, 98(1), 198.
- Eccles, J. S. & Wang, M.-T. (2016). What motivates females and males to pursue careers in mathematics and science? *International Journal of Behavioral Development*, 40(2), 100–106.
- Eidevald, C. (2009). *Det finns inga tjejbestämmare: att förstå kön som position i förskolans vardagsrutiner och lek* Jönköping: Högskolan för lärande och kommunikation.
- Eisenberg, N., Valiente, C. & Eggum, N. D. (2010). Self-Regulation and School Readiness. *Early Education and Development*, 21(5), 681–698.
- Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H. & Van Hulle, C. A. (2006). Gender differences in temperament: A meta-analysis. *Psychological Bulletin*, 132(1), 33–72.

- Falch, T. & Naper, L. R. (2013). Educational evaluation schemes and gender gaps in student achievement. *Economics of Education Review*, 36, 12–25.
- Fortin, N. M., Oreopoulos, P. & Phipps, S. (2015). Leaving boys behind: Gender disparities in high academic achievement. *Journal of Human Resources*, 50(3), 549–579.
- Hansen, O. H., Nordahl, T., Nordahl, S. Ø., Hansen, L. S. & Hansen, O. (2016). *Resultater fra Kortlægningsundersøgelse for 5 kommuner 2015 – Billund, Fredericia, Hedensted, Nordfyn og Svendborg*. Aalborg: Aalborg Universitetsforlag.
- Hicks, B. M., Johnson, W., Iacono, W. G. & McGue, M. (2008). Moderating effects of personality on the genetic and environmental influences of school grades helps to explain sex differences in scholastic achievement. *European Journal of Personality*, 22(3), 247–268.
- Hinnerich, B. T., Höglin, E. & Johannesson, M. (2011). Are boys discriminated in Swedish high schools? *Economics of Education Review*, 30(4), 682–690.
- Hoeve, M., Dubas, J. S., Eichelsheim, V. I., Van Der Laan, P. H., Smeenk, W. & Gerris, J. R. (2009). The relationship between parenting and delinquency: A meta-analysis. *Journal of abnormal child psychology*, 37(6), 749–775.
- Holland, J. & Sayal, K. (2018). Relative age and ADHD symptoms, diagnosis and medication: A systematic review. *European Child & Adolescent Psychiatry*.
- Holmlund, H. & Sund, K. (2008). Is the gender gap in school performance affected by the sex of the teacher? *Labour Economics*, 15(1), 37–53.
- Jacob, B. A. (2002). Where the boys aren't: Non-cognitive skills, returns to school and the gender gap in higher education. *Economics of Education Review*, 21(6), 589–598.
- Karlstad, Ø., Furu, K., Stoltenberg, C., Håberg, S. E. & Bakken, I. J. (2017). ADHD treatment and diagnosis in relation to children's birth month: Nationwide cohort study from Norway. I: SAGE Publications Sage UK: London, England.
- Koerselman, K. & Pekkarinen, T. (2018). Cognitive consequences of the timing of puberty. *Labour Economics*, 54, 1–13.
- Lavy, V. (2008). Do gender stereotypes reduce girls' or boys' human capital outcomes? Evidence from a natural experiment. *Journal of Public Economics*, 92(10–11), 2083–2105.
- Lim, J. & Meer, J. (2017). The impact of teacher-student gender matches: Random assignment evidence from South Korea. *Journal of Human Resources*.
- Løken, K. V. (2010). Family income and children's education: Using the Norwegian oil boom as a natural experiment. *Labour Economics*, 17(1), 118–129.
- Løken, K. V., Mogstad, M. & Wiswall, M. (2012). What linear estimators miss: The effects of family income on child outcomes. *American Economic Journal: Applied Economics*, 4(2), 1–35.
- Marjanovič-Umek, L. & Fekonja-Peklaj, U. (2017). Gender Differences in Children's Language: A Meta-Analysis of Slovenian Studies. *CEPS Journal: Center for Educational Policy Studies Journal*, 7(2), 97.
- Markussen, S. & Roed, K. (2018). The Golden Middle Class Neighborhood: Trends in Residential Segregation and Consequences for Offspring Outcomes. IZA Discussion Paper No. 11684, IZA Institute of Labor Economics.
- Marzano, R. J., Marzano, J. S. & Pickering, D. (2003). *Classroom management that works: Research-based strategies for every teacher* ASCD.
- Moore, D. S. & Johnson, S. P. (2008). Mental Rotation in Human Infants: A Sex Difference. *Psychological Science*, 19(11), 1063–1066.
- Muralidharan, K. & Sheth, K. (2016). Bridging education gender gaps in developing countries: The role of female teachers. *Journal of Human Resources*, 51(2), 269–297.

- Murray, A. L., Booth, T., Eisner, M., Auyeung, B., Murray, G. & Ribeaud, D. (2019). Sex differences in ADHD trajectories across childhood and adolescence. *Developmental Science*, 22(1), e12721.
- Nielsson, U. & Steingrimsdottir, H. (2018). The signalling value of education across genders. *Empirical Economics*, 54(4), 1827–1854.
- OECD. (2015). *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence*. Paris: OECD Publishing.
- Oliver, R. M., Wehby, J. H. & Reschly, D. J. (2011). Teacher classroom management practices: Effects on disruptive or aggressive student behavior. *Society for Research on Educational Effectiveness*.
- Oreopoulos, P. & Salvanes, K. G. (2011). Priceless: The Nonpecuniary Benefits of Schooling. *Journal of Economic Perspectives*, 25(1), 159–184.
- Paredes, V. (2014). A teacher like me or a student like me? Role model versus teacher bias effect. *Economics of Education Review*, 39, 38–49.
- Pansu, P., Régner, I., Max, S., Colé, P., Nezlek, J. B. & Huguet, P. (2016). A burden for the boys: Evidence of stereotype threat in boys' reading performance. *Journal of Experimental Social Psychology*, 65, 26–30.
- Pottegård, A., Hallas, J. & Zoëga, H. (2014). Children's relative age in class and use of medication for ADHD: a Danish Nationwide Study. *Journal of Child Psychology and Psychiatry*, 55(11), 1244–1250.
- Reilly, D., Neumann, D. L. & Andrews, G. (2017). Gender Differences in Spatial Ability: Implications for STEM Education and Approaches to Reducing the Gender Gap for Parents and Educators. I M. S. Khine (Red.), *Visual-spatial Ability in STEM Education: Transforming Research into Practice* (s. 195–224). Cham: Springer International Publishing.
- Reisel, L. (2013). Is more always better? Early career returns to education in the United States and Norway. *Research in Social Stratification and Mobility*, 31, 49–68.
- Sievertsen, H. H. (2015). *En god start: Betydningen af alder ved skolestart for barnets udvikling* (15:38). København: SFI Det Nationale forskningscenter for velferd.
- Solli, I. F. (2017). Left behind by birth month. *Education Economics*, 25(4), 323–346.
- Spinath, B., Eckert, C. & Steinmayr, R. (2014). Gender differences in school success: what are the roles of students' intelligence, personality and motivation? *Educational Research*, 56(2), 230–243.
- Stangeland, E. B., Lundetræ, K. & Reikerås, E. (2018). Gender differences in toddlers' language and participation in language activities in Norwegian ECEC institutions. *European Early Childhood Education Research Journal*, 1–16.
- Størksen, I., Ellingsen, I. T., Wanless, S. B. & McClelland, M. M. (2015). The Influence of Parental Socioeconomic Background and Gender on Self-Regulation Among 5-Year-Old Children in Norway. *Early Education and Development*, 26(5–6), 663–684.
- von Simson, K. (2015). Explaining upper secondary school dropout: New evidence on the role of local labor markets. *Empirical Economics*, 48(4), 1419–1444.
- Voyer, D. & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. *Psychological Bulletin*, 140(4), 1174.