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*A summary and discussion of "Is there a gender gap in pre-schoolers' competitiveness?" An experiment in the U.S by Anya C. Samak*

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EC387-6: Experimental Methods in Economics

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## 1. Introduction and Experimental Design

In Western countries, we continue to see a gender pay gap between women and men.

Although women are pursuing higher education at similar proportions as men, they are receiving relatively less and are significantly underrepresented in senior positions within firms than men.

One component that may be influential in recognising this persistent wage gap is studying the observed difference in competitiveness between men and women; this was suggested by Niederle and Vesterlund (2007); Gneezy et al. (2003).

Samak (2013) paper *'Is there a gender gap in pre-schoolers' competitiveness? An experiment in the U.S* made a significant contribution to this literature as she was the first to consider preschool children in the U.S. This study highlighted competitiveness in children and how their willingness to compete emerged overtime to explain our societal issue of the gender wage gap.

This artifactual field experiment was situated in 10 different preschool classes from two preschool campuses in Chicago Heights, Illinois, examining the difference in competitiveness of 3-5-year-old boys and girls. One hundred twenty-three children (63 girls and 61 boys) were randomly matched into boy-girl, girl-girl, and boy-boy, and they were of similar age. They engaged in a 'gender-neutral' task, and candy was used as an incentive.

Studies investigating competitiveness mostly use Niederle and Vesterlund (2007) formative design, where participants perform a task in three different stages. "In the first stage, they are paid a piece-rate; hence there is no competition. In the second stage, there is a tournament where only the winner gets paid (a higher piece rate than in the first stage). Finally, in the third stage, subjects are free to choose their compensation scheme by either selecting the piece rate or the tournament. It is the choice of the tournament in stage three that measures the willingness to compete" (Sutter *et al.*, 2019). Samak (2013) experiment, rounds 1 and 2

children participated in a piece-rate incentive scheme and a tournament incentive scheme (it differed in order) and finally selected their preferred incentive scheme in round 3.

The experimental design entailed a 'fishing task' with pictorial instructions. Subjects would 'catch' a fish using a magnetic pole, while fish 'swim' on a plate that spins slowly. Each 'caught' fish is dropped in a bucket. Children were compensated with candy when they successfully removed a 'fish' from a 'pond' - there were ten available 'fish' they practically had to 'catch.' They took part in one practice mini-round which was intended to teach them how to hold the 'fishing pole' and how to follow the 'start' and 'stop' instructions given to them. However, they did not become experienced in doing the task, and each round of the real experiment was only 30 seconds long.

Under the piece rate incentive scheme, each fish caught was equal to one candy. Under the tournament incentive scheme, each fish caught was equal to two candies for the tournament winner, but you would receive no candies if you lost the tournament. Children were given a response on their performance but not relative to others until the completion of all three rounds and were asked questions about whether they thought they did better because they were "good at the task because they tried hard, or because of luck."

The differing compositions of pairs and the order of incentives schemes for round 1 and 2 allowed the study to make comparisons between subjects, measuring the difference in performance across genders when the tournament was played first and when the piece rate was played first, this gave room to control for the order effect when measuring within-subject variation as well.

The conclusions drawn from the task suggested that girls achieved marginally worse; this was notably seen when unfamiliar with the exercises given, for example, when they played in the first round. Nonetheless, when girls gained experience under both incentive schemes, they enter and perform just as well as the boys. So the results show that at ages between 3-5, girls

perform more unsuccessfully in unaccustomed competitive settings than boys, and they may benefit from classrooms establishing a competitive environment, thus attaining experience that would essentially improve their performance.

## **2. Parental Controls**

Studying the behaviour of children can bring to light whether economic behaviour evolves in characteristic patterns overtime and if those behavioural patterns in adults are the repercussions of a directional development with age. Having such knowledge can aid in possible policy interventions that can encourage particular types of behaviour. Samak (2013) study did well in minimizing self-selection effects by conducting the experiment in a controlled setting like a pre-school. Also, she ensured the children could understand and pay attention with an experimenter (and an assistant present) in a one-on-one setting explaining the rules of the experiment, rather than in front of a whole group of participants. In addition, the study was standardized well, for example, placing a divider between the kids, using the same wording and sequence of explanations when explaining experimental rules to children (i.e., "catch"), and ensuring comprehension with the support of visual aids. This standardization makes the research better comparable.

However, there are limitations to the generalizability of the results. Samak (2013) gathered information on participants' family household income, mother's age at birth, educational attainment of the mother available, and there were no statistically significant differences in the background between the girls and boys in the study. Additionally, the study was conducted in a predominantly low-income area with a median annual household income of ~\$43,000 and low educational achievement with a greater proportion of minority residents. In 2013, which was the year the experiment took place, the average real median household income in the U.S. was \$ 56,479 (Statista, 2020); this means that participants were below the

average of the median household income, suggesting that they all had quite a low socioeconomic status (SES). This means results cannot be extrapolated to children who have a medium or high socioeconomic status.

Considering low SES families, children have been recognised to make significantly more impatient choices compared to children from medium or high SES backgrounds (Deckers *et al.*, 2017), and they are "less pro-social and less competitive than children from a higher SES-background" (Sutter *et al.*, 2019). Samak (2013) did not consider the contribution family background can have on the level of competitiveness in children. Almås *et al.* (2016) paper studied the role of family background in explaining differences in the willingness to compete in a cognitive task; he discovers how salient family background is in relation to competitiveness( including how essential it is for understanding the large gender difference in the willingness to compete). Firstly, he found that boys from low socioeconomic status families are less willing to compete than boys from wealthier families, even when controlling for confidence, performance, risk, time and social preference, and psychological traits. Secondly, girls who were from better-off families were much less willing to compete than boys. Almås *et al.* (2016) found a strong association between the father's socioeconomic status and the boys' willingness to compete, but not any links between the willingness to compete for boys or girls and the mother's socioeconomic status or other family characteristics that may potentially shape competition preferences. What is questionable in this study is that they compiled the mother's educational attainment, and there was no mention of the fathers. Socioeconomic status encompasses many things, including education, and this study failed to incorporate the fathers, which according to Almås *et al.* (2016) study is vital in the learning process of competition in children. So, we see that the more factors we contribute, i.e., socioeconomic status, the more nuanced the results can be.

Additionally to the importance of family background, Khadjavi and Nicklisch (2018) reported another feature of parental influence on competitiveness. Parents' ambitions regarding their offspring's accomplishments in their future careers forecast their child's competitiveness and can positively motivate schoolers' prospects to choose a competitive payment scheme. This is further intensified for children who have highly ambitious parents- even if they have low chances to win, they would still enter the competition. As a result, parental attitudes and wishes for their child impact their child's competitiveness.

Low SES can also be related to health issues. Bartling et al. (2012) analysed data from economic experiments carried out looking at pre-schoolers and their mothers to explore whether child health can explain developmental gaps in children's non-cognitive skills. Willingness to compete with others was their measure for children's non-cognitive skills. Their results suggested that health problems are negatively related to children's willingness to compete and that the effect of health on competitiveness differs with socioeconomic background. In their sub-sample, they found that health has a strongly adverse effect with the low socioeconomic background; on the contrary, there was no effect in their sub-sample with high socioeconomic background. "Children who have had more health issues in recent months and come from a low SES background are about ten percentage point less willing to self-select into competition" (Sutter et al., 2019)

### **3. Critical Assessment**

Another layer included in the lack of generalizability and representativeness is that this study collected more data for minority children than white children. This is not reflective of the formation of the labour force in America- the composition of the labour force by race and

ethnicity is, "white employees making the majority, 78% in 2018, whereas Black and Asians constituted an additional 13% and 6%, respectively" (U.S. Bureau of Labor Statistics, 2019)

Interestingly, another evaluation that has been made was the strong effect of bringing the two pre-school campuses together. Children who were randomized into one of the pre-schools that teaches the 'Tools of the Mind' curriculum relative to 'Literacy Express' were significantly more likely to perform better in round 3, regardless of ability in rounds 1 and 2 and irrespective of demographic background.

To improve the experiment and minimize sample bias, the study should consider widening their sample by comprising a fair mix of children from low, medium, and higher socioeconomic backgrounds- this means conducting the experiment in a private school as well as a public-funded school- and checking for any health issues. Also, looking closely at the curriculums taught in schools and systematically picking ones who are the same or very similar to each other to diminish disparity of results. Additionally, to pay special attention to parental influences, such as their ambitions and educational attainment.

Furthermore, Samak (2013) study cannot represent the entire Western community. Dreber et al. (2013) field experiment on 7-10 year Swedish children who participated in a running task found no gender difference in reaction to competition; boys and girls performed equally.

These results are not in line with Samak (2013). This may be because egalitarian principles are embedded in Nordic countries like Sweden, and as a result, are more gender-equal than western countries like the U.S. This is evident with Swedish women achieving near parity with men in government- "women now present 46% of the parliament and 50% of the government's cabinet" (Bohlen, 2019).

The "fishing" task set for the children is ambiguous as a "gender-neutral" task. "Exploring tasks associated with predominantly male stereotypes (running, fishing task, mazes, math,

throwing balls), gender differences are often, but not always, found among children and adolescents” (Dreber et al. 2014). This exercise may have been more familiar to the boys than the girls, i.e., may have seen or been on fishing trips with a parent or a grandparent. This factor may have set in stereotypes and contributed to the unfamiliarity for the girls in the experiment, exacerbating the gender gap in mixed-gender groups in Samak (2013) study. It is apparent that the task given to children matters greatly; perhaps a verbal task would aid in the development of this literature.” Dreber et al. (2014) found that boys and girls were equally likely to self-select into a verbal competition task.

Samak (2013) suffered from shortcomings with the study conducted in only a mixed-gendered system. Results differ when studying the choices girls make when given the opportunity to enter a tournament when examined in different educational environments, like if they were randomly assigned in a single-sex and coeducational school. Booth (2012) finds that “girls from single-sex schools behave more like boys even when randomly assigned to mixed-sex experimental groups.” This proposes that the idea of the average female avoiding competitive behaviour more than the average male is mistaken and observed gender differences are not due to inherent gender traits but might display social learning. Samak (2013) does not take into account how culture, as well as nature, shapes competitive behaviour. The environment is impactful to gender disparities, and it has the effect to lessen or aggravate them. As an example, hearing boys mock one another, claiming to “run” or “throw like a girl” can dishearten athletically gifted girls from partaking in sports that involve running or throwing- this magnified the participation gap that may have existed due to innate differences. Therefore, the role of nurture (such as the environment, culture, or upbringing) may be a major factor contributing to observed differences and is central to analysing why men and women contrast in their choices of entering a tournament. Akerlof and Kranton (2000) further delve into this and examines why might same-gender peer groups cause girls



to act differently. Behaving competitively can be viewed as part of male gender identity but not female; this can make girls in a mixed-gender environment vulnerable to more conflict in their gender identity as they have to compete with boys while simultaneously feeling the pressure to act in a 'feminine manner' so they can be seen as pleasant to boys. Boys may not feel similarly pressured because competitive behaviour and being attractive to girls are not so contradictory due to the pervasiveness of the 'male breadwinner' model in our society. In fact, the attendance of girls intensifies boys to develop their masculinity to heighten their attractiveness, which can result in them becoming more competitive and confident.

Moreover, they are competing with other boys, which reinforces this tendency. This is not to say boys in a mixed-gender environment do not struggle with their gender identity, but their experience is different from girls. If we hold this examination in mind, we would assume that girls in mixed-gender groups are less likely in comparison to girls in same-gender groups to enter tournaments because they have been exposed to an adolescent subculture (i.e., personal attractiveness to members of the opposite sex).

One major positive that has been brought from Samak (2013) is that the process of addressing the role of experience in compressing the gender gap in competitiveness among children had begun. However, it still leaves us with the ambiguity of the role of 'nature' versus 'nurture' at different stages of development as we know it plays a part in performance and willingness to compete.

#### **4. Conclusion**

In conclusion, Samak (2013) made a breakthrough in this literature by being the first to experiment with preschool children in the U.S. and illuminated the role of experience as an important factor for girls and their relationship with competitiveness- this allows interventionists to greatly consider and enforce more of a competitive environment in

classrooms to encourage girls. Because of this revelation, she did manage to answer if there was a gender gap between pre-schoolers. However, not as adequately as it could have been. Samak (2013) did not acknowledge how nuanced this study is and how components such as socio-economic status, family development, mixed-gendered schools, and curriculums can bring entirely different results.

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