

## ARTICLES

# The relationship between childhood attitude towards The Count and mathematical ability later in life: a thirty-year retrospective study

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It is a well known fact that the children are our future (Houston, 1986). But whether those children's futures will include an aptitude for mathematics may be predicted by their early childhood fondness, or lack thereof, for Sesame Street's Count von Count (a.k.a., The Count). The purpose of this study was to investigate the relationship between childhood attitude towards The Count and mathematics ability in later life. A convenience sample of participants was surveyed and the results were analyzed using simple linear regression. Results indicated a significant positive correlation between childhood attitude towards Count von Count and mathematical ability in adulthood.

Recent evidence suggests that early life experiences can affect later cognitive functioning, including mathematical aptitude (Aubrey et al, 2003). However, a thorough search of the literature reveals a lack of any investigations into the relationship between childhood fondness for Sesame Street's Count von Count (Figure 1) and mathematical aptitude in later life. This paper, in which we



**Figure 1 | Count von Count.** Note that he is "comprised of triangles and pointy things [that] make [one] uncomfortable" (comment from study participant).

test the hypothesis that there is a significant positive correlation between childhood attitude towards the The Count and mathematical skills later in life, is our attempt to rectify this serious oversight on the part of all previous researchers.

## METHODS

A convenience sample of participants were approached to take part in the study. Inclusion criteria included: (a) being present in one of the investigators's (N.L.S.) office (n=9) or (b) being easily reachable by said investigator by instant messaging technology (n= 3) at the time of sampling. Data mining of internet sources (Zuckerman, 2007a) was also used to procure data (n=1) and one participant was responded to a veiled call for subjects on the Internet (Zuckerman, 2007b; n=1). Care was taken to ensure equal numbers of male and female participants (females, n = 7;

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males,  $n = 7$ ). Participants were interviewed using the following two questions: "Did you like the Count on Sesame Street when you were a kid?" and "Are you good at math?"

Variables considered as possibly related to mathematical ability as an adult (MATH) include gender (GENDER), childhood fear of the Count (SCARED), identification of the Count as a favourite childhood character (FAVOURITE) and overall impression of the Count as a child (COUNT). The variables GENDER, SCARED and FAVOURITE are dichotomous variables to identify male (0) or female (1), or the absence (0) or presence (1) of a respective characteristic. Models are:

- (1)  $MATH = \beta_1 * COUNT$
- (2)  $MATH = \beta_1 * COUNT + GENDER$
- (3)  $MATH = \beta_1 * COUNT + SCARED$
- (4)  $MATH = \beta_1 * COUNT + FAVOURITE$
- (5)  $MATH = \beta_1 * COUNT + GENDER + \beta_2 * COUNT * GENDER$

Simple linear regression is employed to investigate the models using the R statistical software (R, 2006). Models are compared using Analysis of Variance (ANOVA). A model is considered superior to another (nested) model if the ANOVA indicates a significant difference between models. Attention was also paid to the unadjusted R-square value and the Pearson's correlation coefficient.

Residual plots, normal Q-Q plots, standardized residuals and Cook's distance were employed to identify potential outliers and high leverage points.

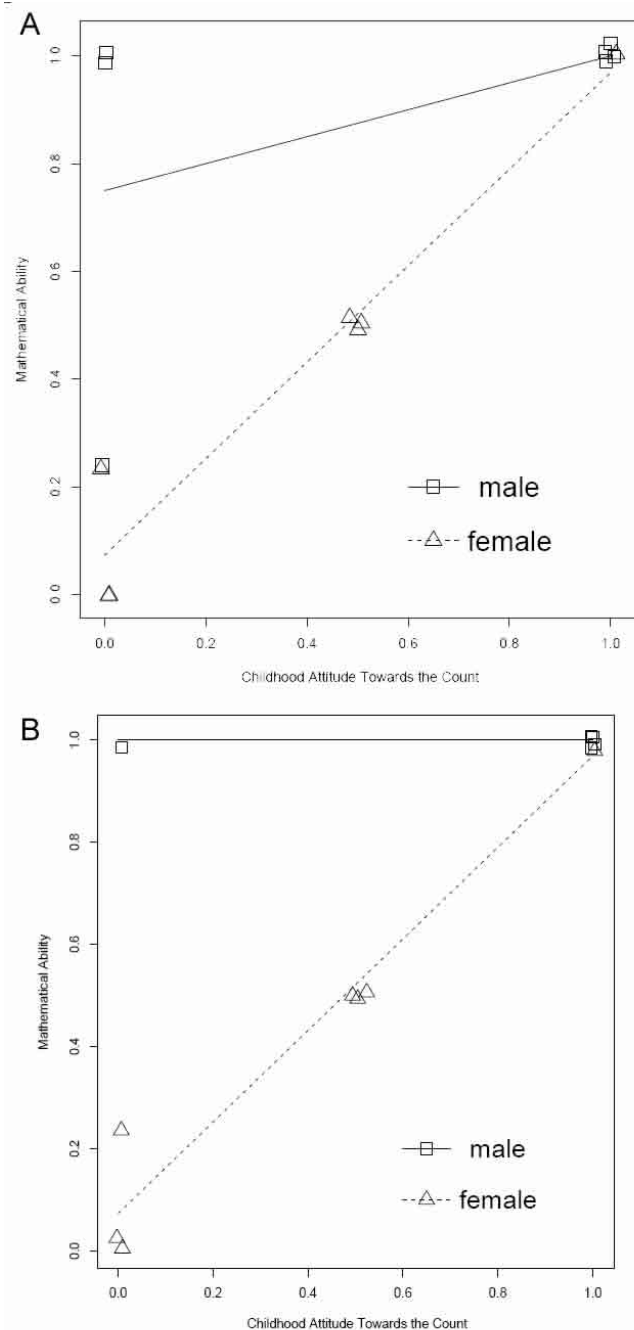
## RESULTS

There was a significant positive correlation between childhood attitude towards Count von Count and later mathematical ability (Figure 2). Linear regression identified gender specific intercepts and slopes relating mathematical ability and childhood attitude towards the Count. The final model selected (including potential outliers) is based on model 5 described previously. This model incorporates a gender specific intercept and slope. The R squared value exceeds 0.94.

Gender specific models are:

$$MATH(\text{Males}) = 0.75 + 0.25 * COUNT$$

$$MATH(\text{Females}) = 0.07292 + 0.89583 * COUNT$$



**Figure 2 | The relationship between childhood attitude towards Sesame Street's Count von Count and mathematics ability in adulthood. Although several observations were equivalent for various study participants, random noise is added to each for plotting purposes. The plot also indicates regression lines for each gender. A. Represents all data. B. Represents data with outliers removed.**

This model suggests that males have a larger baseline math ability (0.75 versus 0.07292). The math ability of males also depends less on their childhood attitude towards the Count as compared to females (0.25 vs 0.89583). This suggests that females are influenced more so than males by their early impressions of the Count and thus exposure to the Count should be weighed against possible outcomes. Female children that have responded negatively to vampires or members of the monarchy in the past might be restricted from exposure to the Count in order to prevent a potential detrimental math effect. Likewise, those females with a penchant for bloodlust or titles might be best served mathematically by full exposure to this Sesame Street character.

Residual analysis, Q-Q plots, standardized residuals and Cook's distance highlighted 2 potential outliers and highly influential data points. These observations were removed from the dataset, resulting in a total  $n = 12$ . Interestingly, one participant was self-identified as having a high math aptitude and answered the question, "Did you like the Count on Sesame Street when you were a kid?" with the response "No, he was boring." Upon removal, the models were recomputed resulting in the following gender specific relationships:

$$\text{MATH}(\text{Males}) = 1$$

$$\text{MATH}(\text{Females}) = 0.07292 + 0.8958 * \text{COUNT}$$

This particular model suggests that males are all good at math (independent of their attitude towards the Count), and females have a math ability that is directly proportional to their attitude towards the Count. This model has an R-square value exceeding 0.99. Regardless, the two models cannot be directly compared based on the differing sample sizes used to determine each of them. The removal of the outliers is questionable as they provide some valuable information despite not following the typical pattern exhibited by other subjects. It is suggested that a larger sample is collected to determine if this is in fact true.

Finally, it should be noted that the majority of respondents who did not like the Count identified "afraid" as their reason for disliking the Count, suggesting that it is childhood Count fear, rather than just dislike for any reason, that may be associated with later mathematical skill. Despite attempts to include a SCARED variable to capture this potential relationship, significant results were not found. Regardless, further research is required to fully test this hypothesis.

## DISCUSSION

Clearly, there is a very strong link between one's childhood attitude towards The Count and their later mathematical ability. However, as this is a correlational study, it is impossible to determine causation. For example, do children with a genetic predisposition to do well in math also possess a genetic predisposition to like the Count? Preliminary genetic analyses demonstrate that the Count-fondness-gene and the mathematical-ability-gene may reside on the same chromosome (Figure 3). Alternatively, as early life stress is known to program a variety of brain areas, including those involved in learning (Becker et al, 2007), it is possible that stress induced by the childhood fear of The Count may program an individual's brain in such a way as to interfere with their later

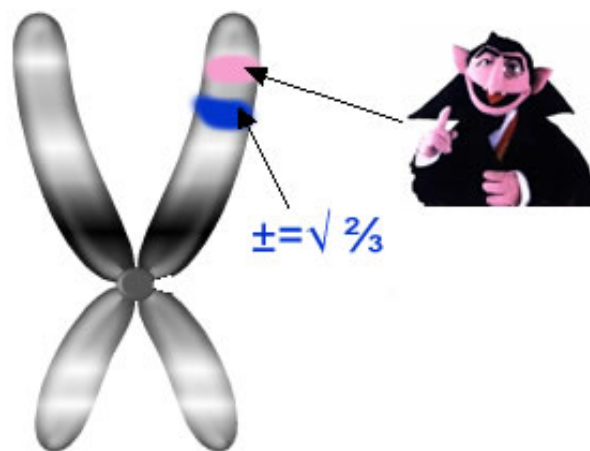


Figure 3 | Map of chromosome 7, illustrating the closely linked positions of the "Count-fondness-gene" and the "mathematical-ability-gene." Yes, 7, 7 chromosomes, ah ah ah!

mathematical abilities. Further studies to elucidate the mechanism(s) by which Countphilia/phobia is related to math ability/inability are urgently needed. In addition, investigations of whether a childhood fondness for other Sesame Street characters (e.g., Captain Breakfast) relate to subject preference (e.g., nutrition) in adulthood are warranted.

In conclusion, fondness for the Count during childhood is predictive of later mathematical ability, whereas dislike of the Count, particularly in the form of fear, predicts later mathematical ineptitude. Our groundbreaking study represents the first foray into the relationship between early life Sesame Street character experiences and later cognitive abilities.

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## Author Information

*Author contributions:* N.L. Snow conceived the initial idea for the study, collected the data and contributed to the writing of the manuscript. M.E. Snow contributed to the data collection and analysis and writing of the manuscript. D.J. Gillis conceived of the hypothesis for the study, conducted the data analysis and contributed to the writing of the manuscript.

*Conflicts of interest:* MES likes both eating junk food and being healthy. NLS believes in facing her fears, but apparently not all of them. Sharks, check. Zombies, check. And Math, nada. Now that this is being brought to her attention she is thinking of joining her friends grade one math class. This week they are making patterns as a foundation for Algebra. Intimidating. DJG believes in the symmetric property of equivalence but the symmetric property of equivalence does not believe in DJG. The authors declare no competing financial interests. Seriously, if someone were paying them off, they would drive nicer cars.

*Acknowledgements:* MES would like to acknowledge a fine glass of Riesling, which contributed to the drafting of this manuscript. NLS would like to acknowledge a slow day at the office. DJG wishes to thank the letter E and the numbers 1, 3 and 9.

Received 19 October 2007; accepted 23 October 2007.