



Background & Significance

Self-regulation in developmental psychology has been a predictive factor in many other aspects of a child's life, including academic achievement, health and wellness, addiction, and aggressive or delinquent behavior (Duckworth & Kern, 2011; Schmitt *et al.*, 2014). This study explored the extent to which a child's capacity for self-regulation predicts caries risk.

The significance of this study is that the result may add to the way caries risk assessment is determined. In the current version of the AAPD Reference Manual of Pediatric Dentistry, caries risk assessment is determined by several social and biological factors, along with clinical findings of caries. Some of the social factors include socioeconomic status, recent immigrant status, and parents with low health literacy, which all contribute to the more biological causes of caries (sugar from the diet, poor hygiene, and bacteria). Considering the multifactorial nature of how caries develop, a child's ability or inability to self-regulate may also become an important factor. Control of impulsive behaviors may be associated with how well a child can follow daily dietary and oral hygiene recommendations aimed to prevent caries. It was expected that lower self-regulation may indicate poorer performance in following oral hygiene and dietary recommendations, and thus more caries.

The objective of this study was to determine whether or not there is a correlation between self-regulation and caries risk using a delay of gratification task and self-regulation questionnaire.

Selection Criteria

Children ages 4-8 who came with a parent or legal guardian to a dental exam appointment at a clinic associated with St. Barnabas Hospital between March 2022 and December 2022 were considered for this study. These children became participants in the study if they had no contributory medical history that may affect their cognitive ability to understand the task (e.g. autism, ADHD).

A total of 112 children participated in the study. Two participants were excluded after being unable to complete the experimental task. Therefore, a total of 110 participants were included in the analysis.

Methods

Delay of Gratification Task

The design of this task was inspired by previous studies that have measured delay of gratification through use of a game that tests a choice between an immediate and delayed reward (Anzman-Frasca *et al.*, 2020; Twito *et al.*, 2019). At the beginning of the dental appointment, participants were asked to play a short game with the experimenter using a paper fortune teller, which is a folded piece of paper that was colored and numbered and could be shifted around (Figure 1). The paper fortune teller was designed in such a way where every combination of choices would result in a "win." Then, participants were shown the prize box and asked if they want to choose a prize now, or wait until the end of the dental appointment and then choose two prizes.

Participants who chose the immediate prize were coded as low self-regulation, whereas those who waited and then chose two prizes were coded as high in self-regulation. Any observations about how the participant behaves throughout this encounter were also recorded.

Self-Regulation Questionnaire

Additional information about the participant's self-regulation were recorded through an 18-question questionnaire, which was completed by the parent or guardian. The questionnaire was adopted from a combination of Fast Track Project Child Behavior Questionnaire and the Adolescent Self-Regulatory Inventory (Bandy *et al.*, 2010) and adjusted so that data is collected from a parent's point of view rather than the child's point of view. Questions that are not age appropriate for a 4-8 year old are omitted. Questions related to dietary and oral hygiene habits were also added in the context of self-regulation. Questionnaires were given in English and in Spanish.



Figure 1: Paper Fortune Teller. This was used as the game in the delay for gratification task. Participants were to choose a color, which shifts the paper based on the letters of the color. Then choose another number to reveal the question that they answer, which leads to a prize.

Decayed, Missing, Filled Teeth (DMFT) Score

During the clinical dental exam, participants had full dental charting completed. Based on clinical findings, scores for decay, missing, and filled teeth were determined.

Results

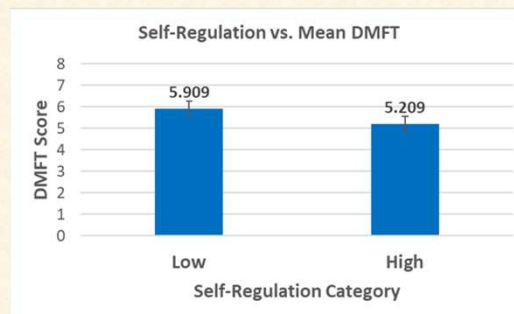


Figure 2: Mean DMFT Scores in Low and High Self Regulation (All groups)

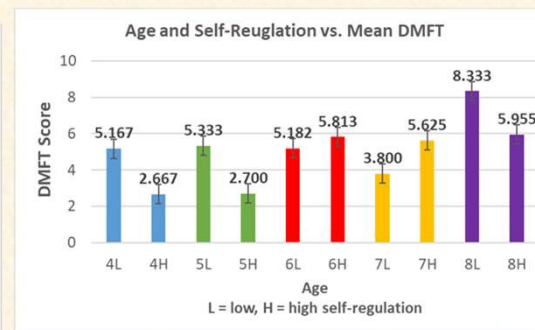


Figure 3: Mean DMFT Score in Low and High Self-Regulation by Age

	B	S.E.	Wald	df	Sig.	Exp(B)
DMFT SCORE	-.053	.052	1.049	1	.306	.948
Age	.634	.169	14.154	1	<.001	1.885
SR SURVEY SCORE	.005	.024	.046	1	.829	1.005
Constant	-3.435	1.629	4.445	1	.035	.032

Table 1: Logistic Regression Analysis of DMFT Score, Survey Score, and Age

Discussion & Conclusion

The purpose of this study was to determine if self-regulation had any correlation with dental caries in pediatric patients. As seen on Figure 2 and Table 1, results of the study show DMFT scores in low self-regulation participants (M = 5.91, SD = 4.76) were higher than those of high self-regulation participants (M = 5.21, SD = 3.76), but without a significant difference (P = .306). Age of participants demonstrated the most significant difference in self-regulation (P < .001). When comparisons were made by age, the mean DMFT score was higher for low self-regulation participants in ages 4, 5, and 8, but lower in ages 6 and 7 (Figure 3). These results suggest that self-regulation does not correlate with DMFT scores, but does correlate with age.

Limitations of this study include lack of diversity of patient population and lack of variety of caries risk assessment. Because St. Barnabas Hospital predominately treats patients with Medicaid, most participants fall into the high risk caries category due to low socioeconomic status. The population in this study was also mostly of Hispanic origin, which limits the scope of this study in terms of ethnicity. If this study was repeated in clinics that serve different socioeconomic or ethnic populations, then there would be more data that could be describe a more generalized population.

While it was found there was a relationship with age of patient and self-regulation, this study found no correlation between DMFT scores and self-regulation. Therefore, the current established factors for caries risk assessment should still be the primary focus in determining risk.

References

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