addition. DISCUSSION/SIGNIFICANCE OF IMPACT: Allopurinol is associated with reduction in required 6-MP dose, decrease in the percentage of weeks that patients have hepatotoxicity, and reduction in the ratio of toxic metabolite to active anti-leukemic metabolite in several patients. We hope that the results of this study can be used for further research and for guiding clinical practice since there are no established guidelines in pediatric oncology regarding addressing side effects of oral chemotherapy using 6-MP. If allopurinol indeed is safe and effective, adding it to the standard chemotherapy regimen can lead to better tolerance and compliance to oral maintenance chemotherapy, and hopefully improved outcomes for children with ALL and lymphoblastic leukemia.

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The effects of gravidity and parity on risk of cognitive impairment and amyloid plaque deposition

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OBJECTIVES/SPECIFIC AIMS: Our study seeks to answer the following questions: (1) To determine whether higher numbers of gravidity and parity are associated with a decreased risk of mild cognitive impairment or dementia; (2) To determine whether higher numbers of gravidity and parity are associated with a decreased risk of amyloid deposition by PET MRI. METHODS/STUDY POPULATION: Our study population includes all female study participants in the Atherosclerosis Risk in Communities (ARIC) study who did not have a diagnosis of dementia before enrollment. Participants were also required to have been evaluated for cognitive impairment in the ARIC-NCS ancillary study, or to have received an MRI PET scan of their brain as part of the ARIC-PET ancillary study. Baseline information on the gravidity and parity of all the women was recorded at initial enrollment. We use statistical analyses and epidemiological measures to explore our study questions. For our first question, we use logistic regression to evaluate the association of gravidity and parity as two separate ordinal variables using adjudicated mild cognitive impairment (MCI) and dementia. For our second question, we use logistic regression to evaluate the association of gravidity and parity (again as ordinal variables) with amyloid positivity. We use STATA for our statistical analyses. RESULTS/ANTICIPATED RESULTS: We hypothesize that increased gravidity and parity will have either no effect or a protective effect against MCI, dementia, and amyloid deposition. Our preliminary analyses show that older age of a woman at first pregnancy and at first live birth are both positively correlated with increased incidence of cognitive impairment. No relationship was found between these surrogates of lifetime estrogen exposure and cerebral amyloid deposition. DISCUSSION/SIGNIFICANCE OF IMPACT: Multiple basic science and clinical research studies have shown that estrogen exposure has an effect on cognitive function, likely through a complex interplay of multiple physiologic systems. Our study expands the research in this area by using a large, established epidemiologic cohort to examine gravidity and parity as important factors in lifetime estrogen exposure as they relate to cognitive impairment and amyloid plaque deposition.

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The relationship between cognitive functioning and abnormal eating behavior in behavioral variant frontotemporal dementia

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OBJECTIVES/SPECIFIC AIMS: Abnormal eating behavior is a core and distinguishing diagnostic feature of behavioral variant frontotemporal dementia (bvFTD) that differentiates it from other neurodegenerative disorders and late-life psychiatric conditions. Though it has been proposed that hyperphagia in bvFTD results from cognitive dysfunction, the observation of altered sweet preferences and food foraging indicate that bvFTD is accompanied by fundamental dietary changes associated with hypothalamic and insular atrophy. In the current study, we examined how cognitive dysfunction contributes to abnormal feeding behavior in bvFTD. METHODS/STUDY POPULATION: We analyzed first-visit eating and neuropsychological data from the National Alzheimer's Coordinating Center database (7 centers; September 2017 data freeze) in a subset of bvFTD patients with clinician-rated characterization of disturbed feeding severity. Group differences in cognitive domains of attention, processing speed, language, memory, and executive functioning were examined between patients with abnormal eating behavior (n = 59) and a demographically-matched sample of patients with normal feeding behavior (n = 60). Group differences in informant-reported empathy, behavioral inhibition, and depressive symptoms were also examined. RESULTS/ANTICIPATED RESULTS: Cognitive profiles in bvFTD patients did not vary as a function of disturbed feeding behavior. In a subset of cases pathologically-confirmed at autopsy, processing speed was better in cases with abnormal feeding behavior. No significant group differences were found for behavioral indices. DISCUSSION/SIGNIFICANCE OF IMPACT: These findings suggest that cognitive dysfunction is not the sole driver of abnormal eating behavior in bvFTD. Future studies with comprehensive characterization of feeding behavior, cognition and physiological/neuroimaging indices are warranted.

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The socially animated machine (SAM) robot: A social skills intervention for children with autism spectrum disorder

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OBJECTIVES/SPECIFIC AIMS: Autism spectrum disorder (ASD) is a neurodevelopmental disorder that affects one in 68 children. Children with ASD have 2 core areas of difficulty: social communication skills and restricted and repetitive interests and patterns of behavior. Children with social skills deficits are at higher risk of developing mental health problems, and underdeveloped social skills predict poorer quality of life in adulthood. Therapies have been developed to help people with ASD improve social abilities in childhood, often involving a clinician directly teaching social skills lessons, either one-on-one or in a group setting. However, children with ASD can become anxious when interacting with other people and have an intrinsic motivation to interact with technology. To capitalize on this interest, this research team developed a robot, the socially animated machine (SAM) to teach social skills to children with ASD. Previous research found that this intervention was feasible and enjoyable for children with ASD and average cognitive ability, and participants improved in complex emotion recognition following intervention. The purpose of this study was to determine whether participants of all IQ levels were motivated by the SAM intervention, and whether they improved on emotion identification, facial recognition, social skills, and adaptive behavior. METHODS/STUDY POPULATION: This study recruited 20 children with ASD ages 5–14. Children completed tasks measuring ASD symptoms, IQ, receptive language, facial recognition, and emotion identification and were assigned to the control group (nonemotion dance games with SAM robot) or the intervention group (emotion games with SAM robot). Parents and teachers completed questionnaires about the child's social skills. Following the robot intervention, facial recognition, emotion identification, and social skills were measured again, and parents and children rated participant enjoyment during the robot interaction. RESULTS/ANTICIPATED RESULTS: Overall, parents and children in both groups rated the robot interaction as highly enjoyable and motivating (parent ratings: M = 26.4 out of 30, child ratings: M = 17.5 out of 20). There were no differences between groups on post-test measures when controlling for pre-test scores (all $p > 0.05$). Both groups improved over time on emotion identification accuracy (intervention: M = 13.0% improvement, $t = 2.57$, $p < 0.05$; control: M = 10.2% improvement, $t = 2.38$, $p < 0.05$) and parent-rated social skills (intervention: pre-test M = 113.8, post-test M = 100.6, $t = -3.37$, $p = 0.01$; Control: pre-test M = 107.9, post-test M = 89.0, $t = -2.83$, $p < 0.05$; decrease in scores indicates improvement). Teachers saw a decrease in problem behaviors for the intervention group (pre-test M = 127.4, post-test M = 119.6, $t = -3.79$, $p < 0.01$, decrease in scores indicates improvement). DISCUSSION/SIGNIFICANCE OF IMPACT: This study shows that children with ASD and all levels of cognitive ability enjoyed and were motivated by the SAM robot intervention. This is particularly important for children with ASD who often have difficulty with attention and motivation. Children who are intrinsically motivated by the learning process will be more likely to benefit from it; therefore, continuing to pursue the methodology of robot-based interventions with this population is a worthwhile endeavor.