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The Integrated Effects of Diet on Neurobehaviors and Mental Wellbeing

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Introduction

- Neurotransmitters such as dopamine impact emotional wellbeing and intrinsic motivation. Elevated dopamine levels have been correlated with improved mental health; however, the overconsumption of junk foods has been correlated with similar harmful inconsistencies in brain dopamine concentrations that are seen in those suffering from drug addiction (Westbrook and Braver, 2016).
- Therefore, dietary habits may significantly influence the brain concentrations of neurotransmitters and the mental health of individuals. The precursor to dopamine is the amino acid tyrosine, which is found in protein-rich foods (Kühn et al., 2017).
- The aim of this project is to investigate a potential relationship between patterns in food group consumption (especially those rich in tyrosine) and neurobehaviors in individuals.
- Previous studies indicate that low tyrosine diets are associated with a reduction in dopamine, which correlates with low motivation or cognitive performance (Hase et al., 2015).
- This study proposes that diets rich in tyrosine are linked to positive neurobehaviors and increased motivation. This will allow the general public to better understand the correlation between diet and motivation and be able to apply it to their daily lives.

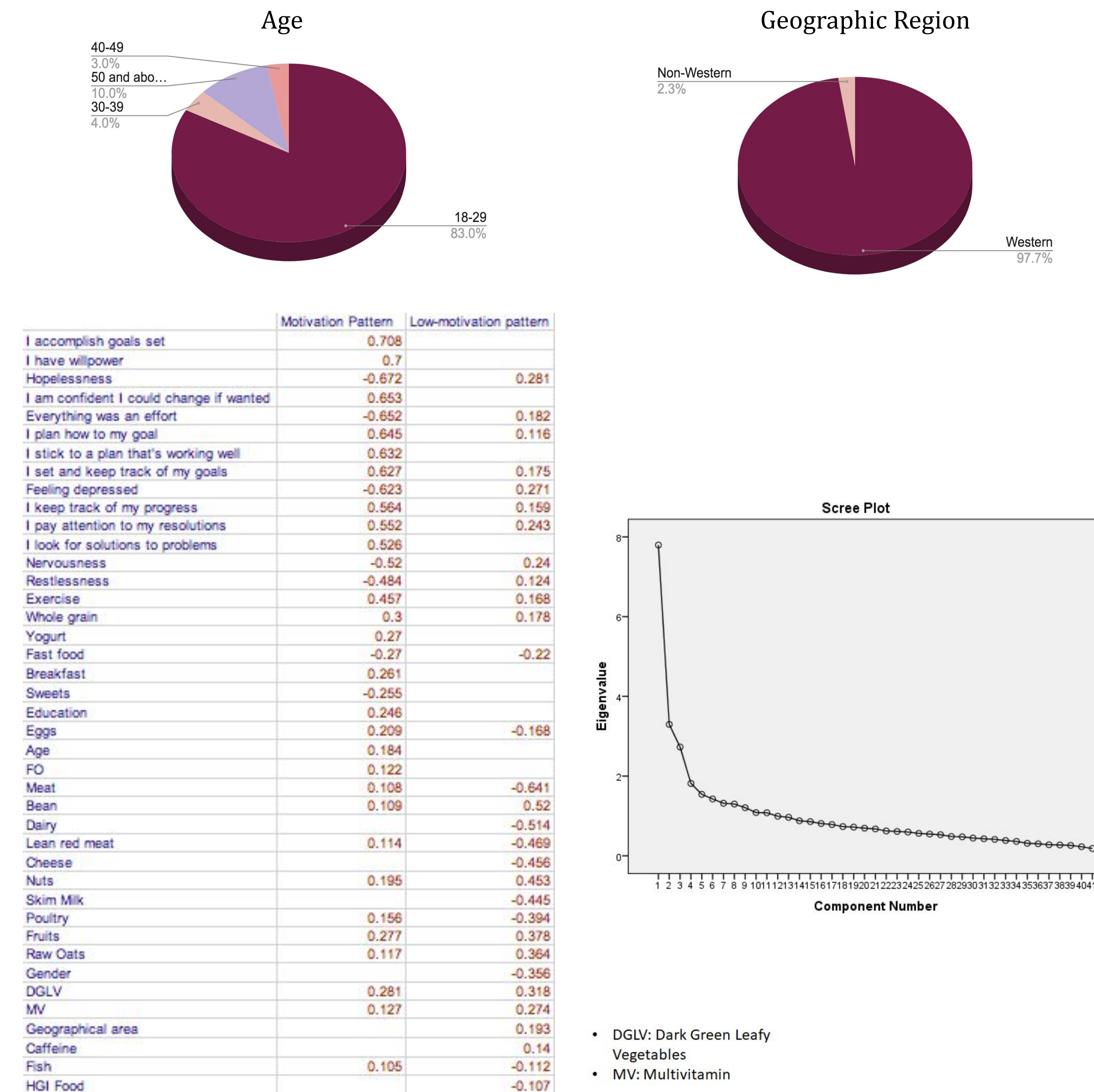
Methods

- An anonymous online survey using the Food-Mood Questionnaire (FMQ) (Begdache et al., 2019) and motivation scales was distributed online through community outreach and social media to a total of 407 participants aged 18 and above between January and March 2021.
- The survey included questions on demographic, eating and exercise habits, mental health, and motivation. Answer choices were based on a 5-point Likert scale (McSpadden et al., 2015).
- The data collected were analyzed using a Principal Component Analysis (PCA) and Spearman's Rho correlations in SPSS version 25.0.

Acknowledgements

We would like to thank all participants for completing the survey. We would also like to thank all organizations who assisted in the distribution of the survey.

Results



A total of 267 females, 136 males (and 4 other) completed the survey.

Principal Component Analysis

- Feelings of higher intrinsic motivation were strongly correlated with better self-reported emotional wellbeing , more frequent exercise, higher education, dietary patterns including fewer fast foods and sweets, eating breakfast more frequently, and eating higher-quality proteins including lean meats and fish.
- Lower intrinsic motivation was strongly correlated with more prevalent self-reported symptoms of emotional distress, and dietary patterns that included less frequent or no consumption of eggs and meats, and more frequent consumption of lower-quality proteins such as beans.

Spearman's Rho:

- There was a significant correlation observed between lower age ranges and self-reported symptoms of emotional distress ($p < .01$).
- There were significant correlations between fast food consumption and feelings of depression ($p < .01$), hopelessness ($p < .01$), and self-reported frequency of accomplishing goals ($p < .01$).

Discussion

- These findings may indicate that a lower-protein diet is associated with lower tyrosine and dopamine concentrations. This could possibly lead to a deficiency in intrinsic motivation.
- There were no significant correlations between gender or geographical location and intrinsic motivation.
 - This study utilized a relatively small sample size; further research is needed to support or challenge this outcome.
- There was a significant correlation observed between lower age ranges and self-reported symptoms of emotional distress, but no significant correlation between lower age ranges and lower intrinsic motivation.
- The observed positive correlation between intrinsic motivation and higher education may reflect reverse causality wherein individuals with higher intrinsic motivation may be more likely to pursue higher education.
 - Further research may challenge this by exploring trends in intrinsic motivation in relation to diet specifically among undergraduate and/or graduate students.

Conclusion

- The results of this study suggest that there is a correlation between eating a higher-protein diet and higher levels of emotional wellbeing and intrinsic motivation.
- Further research is needed to better understand the link between emotional wellbeing and intrinsic motivation. It is yet unknown if intrinsic motivation is a direct consequence secondary to emotional wellbeing (or vice versa) or if it may present together with emotional distress.

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