

Circadian typology, a bridge between Caffeine consumption and psychological distress : a correlation elicited by Mediation analysis among young Sudanese adults.

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INTRODUCTION

Caffeine's wakefulness-promoting and sleep-disrupting effects are well established,(1-3) yet whether caffeine affects human circadian timing is unknown. Also, Evidence suggests evening-type individuals have a higher risk of reporting psychological distress.(4) Also, Caffeine consumption was also addressed as a risk factor for psychological distress,(5) However, less is known regarding the underlying processes that mediate this association. This study aimed to investigate whether chronotype would mediate the association between Caffeine consumption and psychological distress through either the direct or indirect effect of the mediation model.

MATERIALS & METHODS

This is a cross-sectional study conducted among young adults at Al-Neelain university faculty of medicine. Morningness-Eveningness Questionnaire (MEQ) was used to assess Circadian typology, scoring was (Definite morning (70-86), moderate morning (59-69), neutral (42-58), moderate evening (31-41), and definite evening (16-30). Kessler 10-item Questionnaire (K-10) was used for psychological distress assessment. Caffeine was addressed in the context of amount (in milligrams), frequency and consumption timing before bed. low amount was regarded as (0-200mg), moderate (200-400mg) and (>400mg) was high. Frequency was addressed using a Likert scale and timing apart from bed was (0-3hours), (3-6hours) and (>6hours). CMackinnon's four-step procedure was employed to examine the mediation effect, while Hayes PROCESS macro (model 4) was used to perform the mediation analysis.

RESULTS

Among the participants (n = 303), the mean age of the participants was (22.71±2.49) years. 72.2% of participants were low amount caffeine consumers (0-200mg/day). The mean for chronotype (MEQ) was (52.12±9.71) and neutral type comprised most of the population circadian typology (58.1%). Most of the individuals were severely psychologically distressed (42.2%) . Multiple regression analysis showed that increased Caffeine consumption predicted evening chronotype (**figure.1.0**). In addition, MEQ scores was negatively associated with psychological distress while controlling for caffeine amount and self-rated health($\beta = -.1136, P<0.05$).(figure.2.0) This association indicated the negative impact of evening chronotype on psychological wellbeing. Finally, the results of bias-corrected percentile bootstrap method presented that the total effect was positive significant ($\beta = 1.538, P<0.05, SE = .7518, 95\% CI = [0.0583 - 3.0173]$), mainly as a completely indirect path between caffeine consumption and psychological distress via chronotype (MEQ) score. ($\beta = 0.2838, SE = 0.1658, 95\% CI = [0.026 - 0.657]$).(figure.3.0) Caffeine frequency before bed was also significantly positively associated with higher levels of psychological distress after controlling for chronotype (MEQ scores) and self-rated health. $\beta = 1.246, SE = 0.393, P < 0.01, 95\% CI = [0.4737 - 2.018]$.(figure.4.0) Timing of caffeine consumption apart from bed didn't have any association with neither circadian preference nor psychological distress.

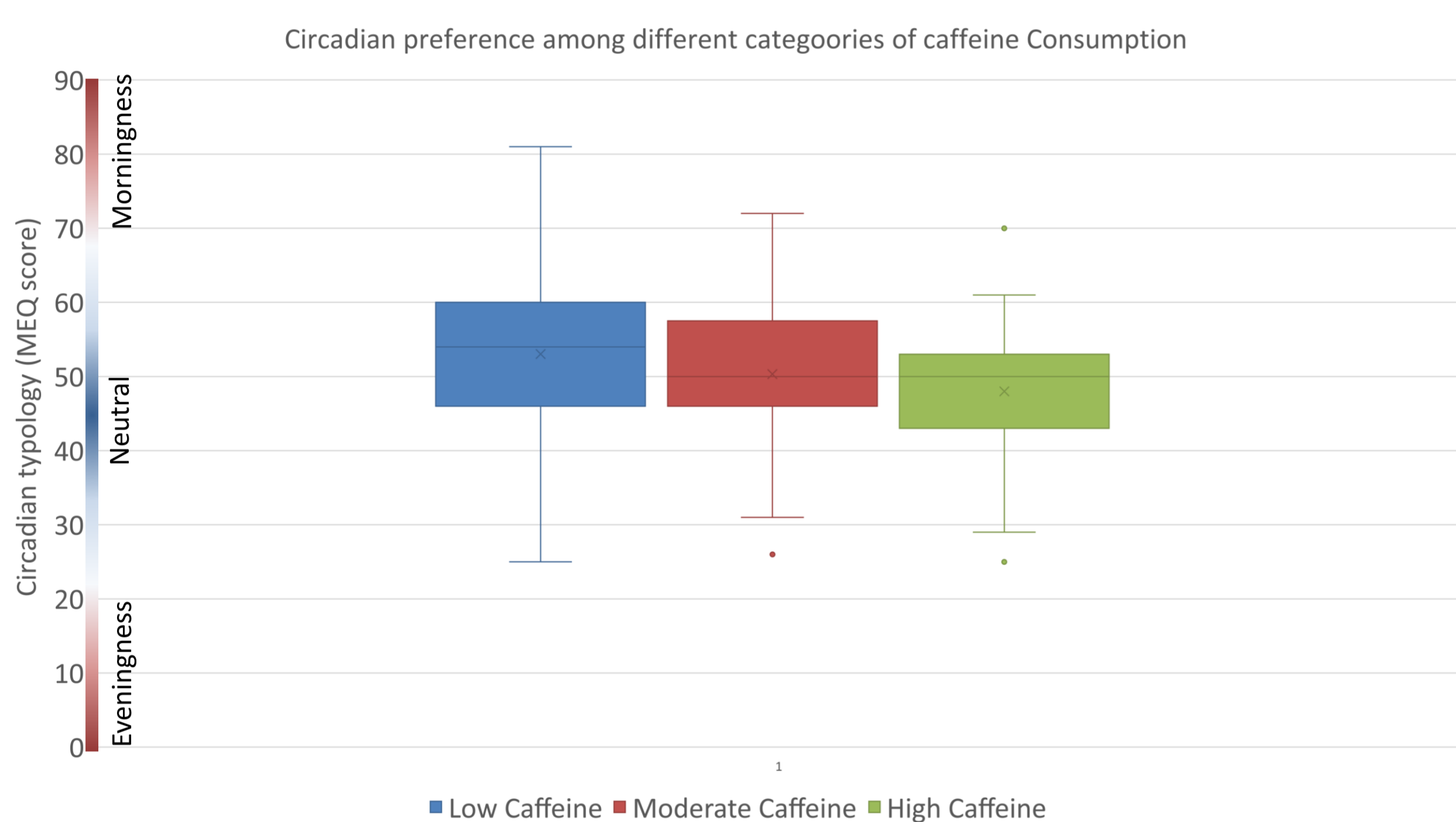


Figure.1.0 Circadian preference among different categories of caffeine consumption

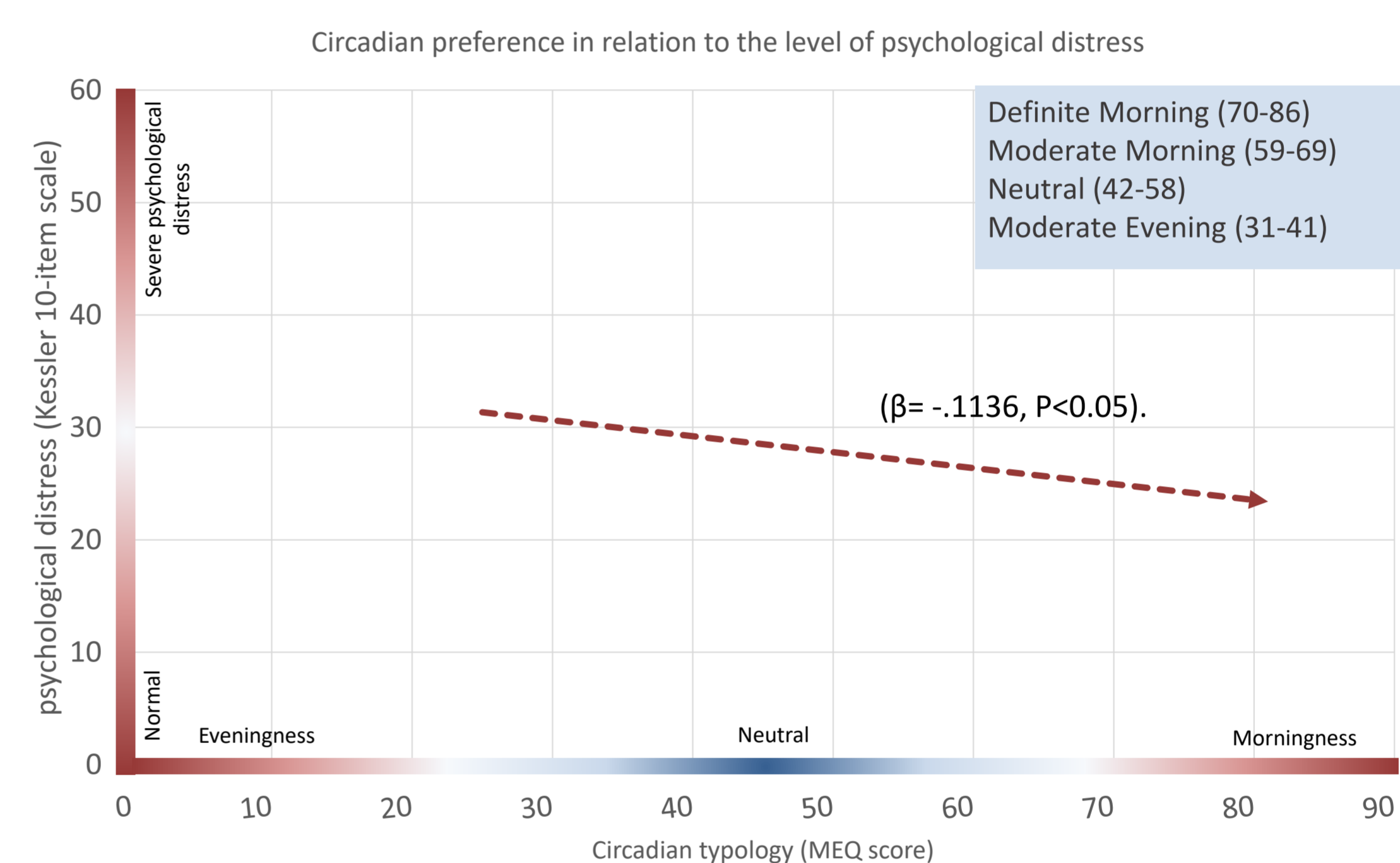


Figure.2.0 Circadian preference in relation to the level of psychological distress

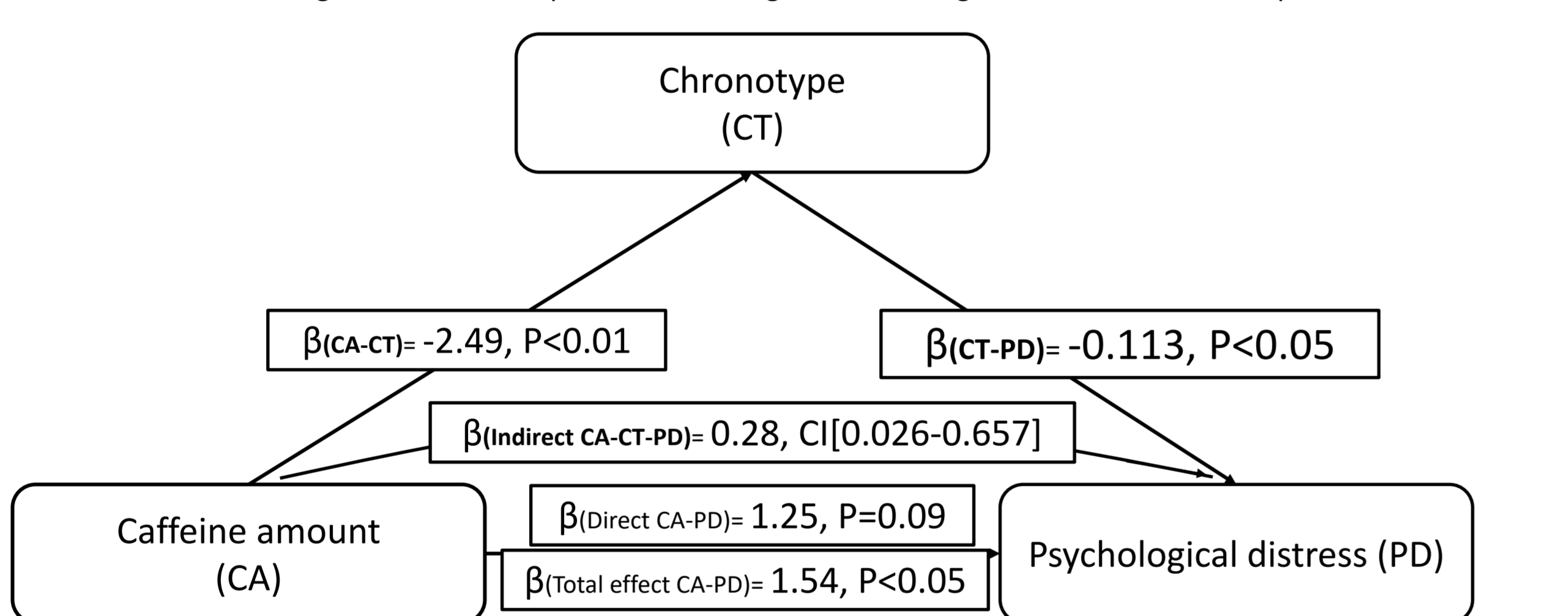


Figure.3.0 Mediation model for the influence of chronotype on the relationship between Caffeine consumption amount and psychological distress

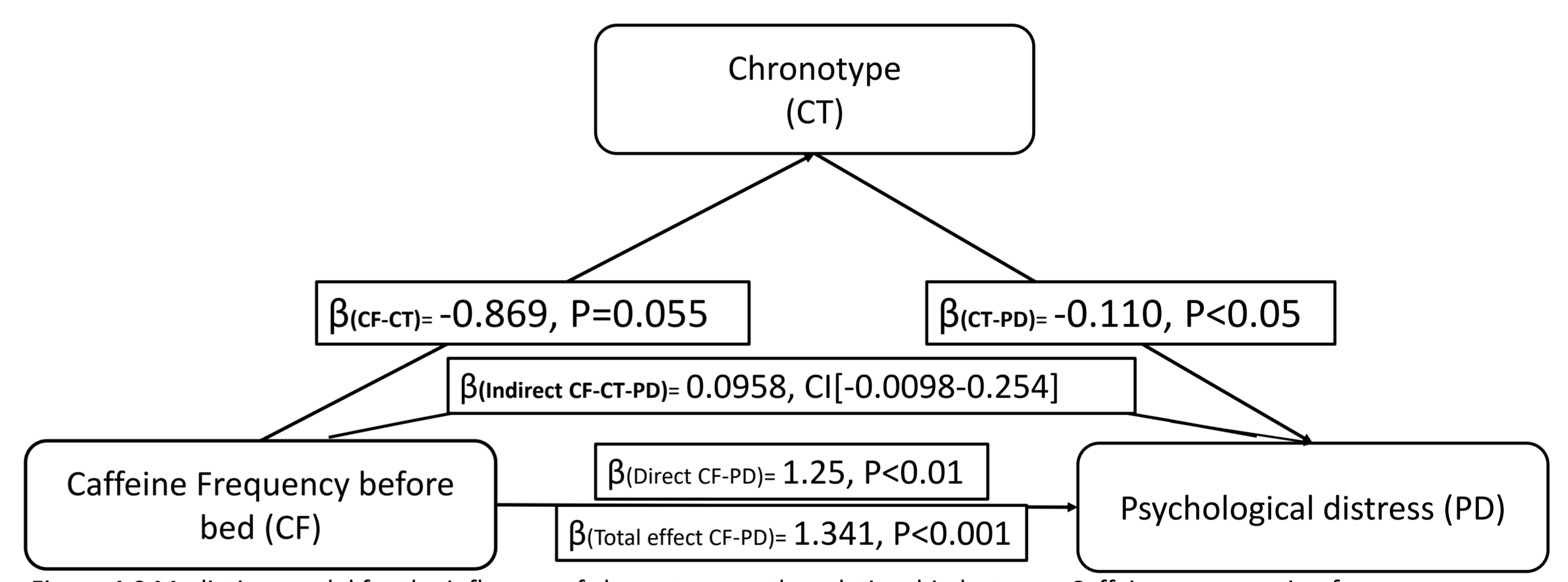


Figure.4.0 Mediation model for the influence of chronotype on the relationship between Caffeine consumption frequency and psychological distress

CONCLUSION

Caffeine resulted in a dose-dependent lengthening of the circadian period which completely Mediated the association between Caffeine consumption and psychological distress. Although timing apart from sleeping and frequency of consumption before bed didn't affect circadian typology, caffeine frequency primarily had a direct deleterious effect on psychological well-being. Reduction of caffeine consumption is advised and Interventions for the enhancement of circadian typology (morning typology) to prevent and reduce psychological distress should be prioritized to medical students who are prone to eveningness. Night is for calm, comfort, and relaxation, but the day is for searching for living.

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