



(RESEARCH ARTICLE)



## Chronotype preferences, work motivation, and gender differences among private sector employees in Bengaluru

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### Abstract

In Bengaluru, a thriving economic center, the private sector employs a diverse workforce, including individuals from various cultural backgrounds and age groups. Understanding the relationship between chronotype preferences and work motivation among private sector employees in Bengaluru is essential for optimizing workplace practices and fostering employee well-being. This study aims to explore how chronotype preferences, rooted in individuals' intrinsic rhythms, intersect with work motivation among 200 employees aged 20-50 residing in Bengaluru, India. By examining these intersections, organizations can tailor their practices to accommodate diverse employee needs, ultimately enhancing engagement, satisfaction, and performance in the workplace. The findings suggest that there is a significant negative correlation between chronotype preferences and work motivation. Moreover, our investigation into gender differences unveiled intriguing insights, with significant disparities observed in eveningness preferences and work motivation between males and females. While no significant gender differences were found in morningness preferences and work motivation, indicating similarities in these domains, distinct gender dynamics were evident in the eveningness preferences and work motivation.

**Keywords:** Chronotype Preferences; Gender; Work Motivation; rMEQ.

### 1. Introduction

A centre of innovation and economic activity, Bengaluru dubbed the Silicon Valley of India employs a varied workforce from a range of age and cultural backgrounds in its private sector. It is essential to comprehend the connection between work motivation and chronotype preferences among Bengaluru's private sector employees to optimize workplace procedures and promote employee wellbeing. Individuals' everyday rhythms and functioning are influenced by their preferred chronotype, which includes morning-oriented people (larks) and evening-oriented people (owls) (Lyons et al., 2006). Conversely, in corporate contexts, work motivation plays a critical role in determining employee engagement, productivity, and general well-being. (Buelens & Broeck, 2007).

Examining the connection between chronotype preferences and motivation at work might help develop interventions and tactics that are specifically designed to improve employee performance and satisfaction. Understanding the interplay between chronotype preferences and work motivation can help create inclusive and supportive work environments that meet the needs of employees from a variety of cultural backgrounds and age groups. This research has implications beyond individual organizations, extending to broader societal and economic realms. Organizations can create more flexible work schedules that align with employees' natural rhythms, improve work-life balance, and boost morale, productivity, and job satisfaction among Bengaluru's diverse workforce.

Chronotypes are an individual's intrinsic preference for specific times of day regarding their sleep-wake cycle and daily activities. This concept highlights the variability among individuals in their biological rhythms, influencing when they

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feel most alert and energetic or when they naturally gravitate toward rest. Understanding chronotypes is crucial in optimizing various facets of life, such as productivity cognitive performance, and physical and mental well-being. (Amini et al., 2021)

The study of chronotypes traces back to the discipline of chronobiology, which explores the temporal organization of biological processes in living organisms. Understanding circadian rhythms, the innate biological clock that regulates our sleep-wake cycle and other physiological functions. Chronotypes emerged as a useful framework for categorizing individuals based on their preferred timing of daily activities relative to their internal circadian rhythm.

One of the significant benefits of understanding chronotypes lies in their implications for sleep health. Research has indicated that aligning sleep schedules with one's chronotype can enhance sleep quality and duration. Morning types, usually feel most alert and productive early in the morning and have earlier bedtimes. Evening types, exhibit peak alertness and performance later on in the day, often preferring to remain awake during the late hours of the night. Following a routine that matches one's chronotype can promote more restorative sleep and mitigate the negative consequences of sleep deprivation, such as impaired cognitive function and mood disturbances.

Chronotypes also influence various aspects of daily functioning beyond sleep. For instance, research suggests that individuals' cognitive performance fluctuates throughout the day based on their chronotype. Morning types tend to excel in tasks requiring focused attention and problem-solving during the early hours, while evening types may demonstrate peak performance later in the day. By understanding these temporal variations in cognitive function, organizations can optimize work schedules and educational practices to capitalize on individuals' peak productivity periods. (Ferguson et al., 2018)

In addition to cognitive performance, chronotypes have implications for physical health outcomes. Studies have found associations between chronotype and susceptibility to certain medical conditions, such as obesity, cardiovascular disease, and metabolic disorders. For example, individuals with evening chronotypes may be more prone to unhealthy lifestyle behaviors, such as late-night eating and insufficient physical activity, which can contribute to weight gain and metabolic dysregulation. Understanding these relationships can inform personalized interventions aimed at mitigating health risks associated with specific chronotypes. (Levandowski et al., 2011)

Furthermore, differences in chronotypes can impact mental health and overall well-being. Research has linked the evening chronotype to individuals who may be more susceptible to mood disorders like depression and bipolar disorder. Disturbances to circadian rhythms, for those who experience shift work and jet lag regularly, may show signs of disrupted mental well-being, it can exacerbate symptoms of mood disorders and contribute to poorer mental health outcomes. By considering individuals' chronotypes in the assessment and treatment of mental health conditions, clinicians can tailor interventions to better align with patients' biological rhythms, potentially enhancing treatment efficacy. (Wittman et al., 2006)

Work Motivation is a multifaceted concept that forms the core of organizational behavior and management. It involves the psychological mechanisms that activate, guide, and maintain individuals' actions toward achieving work-related goals and objectives. The concept of motivation is deeply ingrained in human psychology, motivation has been a subject of scholarly investigation for centuries. (Latham et al., 2005)

The term "motivation" derives from the Latin word "motivus," meaning "to move" or "to impel." This etymology underscores the dynamic nature of motivation, which involves initiating and directing action towards desired outcomes. In the context of work, motivation pertains to the internal and external factors that propel employees to exert effort, persist in the face of challenges, and strive for excellence in their job roles. (Steers et al., 2004)

The exploration of work motivation can be traced back to the beginning of the 20th century, with influential inputs from psychologists like Frederick Herzberg, Abraham Maslow, and Douglas McGregor. Herzberg's dual-factor theory proposed that job contentment and discontent arise from separate categories: motivators (such as achievement, recognition, and responsibility) and hygiene factors (including salary, job security, and working conditions). Maslow's hierarchy of needs suggests that individuals are driven by a hierarchy of needs, starting from basic physiological requirements (like food and shelter) and ascending to self-actualization needs (such as personal growth and fulfillment). (Robbins et al., 2007)

Comprehending work motivation is crucial for organizations aiming to enhance employee engagement, satisfaction, and performance. Employees who are motivated are inclined to exhibit increased levels of job involvement, commitment, and discretionary effort, resulting in enhanced organizational outcomes such as productivity, innovation, and customer

satisfaction. Moreover, motivated employees tend to exhibit lower levels of absenteeism, turnover, and workplace conflict, contributing to a positive organizational culture and climate.

Research on work motivation has evolved significantly over the years, yielding a rich body of literature encompassing various theories, models, and empirical findings. Contemporary theories of work motivation emphasize the interplay between intrinsic and extrinsic factors, Individual differences and situational conditions influence motivational processes. Self-determination theory, for example, holds that people are inherently motivated by the need for autonomy, competence, and relatedness and that environments supportive of these basic psychological needs foster intrinsic motivation and well-being (Hackman et al.,1976).

Empirical studies have examined the antecedents, outcomes, and interventions related to work motivation across diverse organizational contexts and industries. Researchers have identified numerous factors that influence employee motivation, including job characteristics (e.g., task significance, feedback), organizational culture and leadership practices, and individual differences (e.g., personality traits, goal orientations). Additionally, research has highlighted the importance of aligning organizational goals and incentives with employees' intrinsic motivations and values to promote sustainable engagement and performance.

Organizations have implemented various strategies and interventions to enhance work motivation and employee engagement. These include setting clear and challenging goals, offering chances for skill enhancement and career progression, cultivating a supportive workplace atmosphere, and acknowledging and rewarding employees' accomplishments and contributions. Furthermore, advances in technology have enabled organizations to leverage data analytics and digital platforms to monitor and enhance employee motivation in real-time, through personalized feedback, gamification, and incentive programs (Judge et al.,2001).

Conducting research on the relationship between chronotype preferences and work motivation among private sector employees in Bengaluru holds significant importance for several compelling reasons. Bengaluru is a bustling economic hub that is known for its thriving IT industry, burgeoning start-up ecosystem, and diverse knowledge-based sectors. The city attracts a highly skilled workforce from across the country and around the globe, contributing to its dynamic and cosmopolitan character.

Investigating chronotype preferences and work motivation among employees in Bengaluru's private sector presents a unique opportunity to gain insights into the intricacies of modern workplace dynamics in a rapidly evolving urban context. Specifically, chronotype preferences may vary based on factors such as age, gender, job role, and lifestyle preferences. For instance, there may be a prevalence of evening chronotypes, or "night owls," due to the demanding nature of many jobs in the private sector, particularly in the IT industry. This could be attributed to the flexible work schedules and the prevalence of late-night meetings and project deadlines characteristic of many companies in Bengaluru's tech sector (Singh et al.,2019).

When examining how various cultural backgrounds intersect with chronotype preferences and work motivation among private sector employees in Bengaluru, it's important to consider the diverse workforce composition in the city. Bengaluru attracts talent from all over India and the world, leading to a rich tapestry of cultural influences in the workplace. Cultural norms and practices related to work-life balance, communication styles, and hierarchical structures may impact employees' chronotype preferences and work motivation differently. Similarly, educational levels and career trajectories can also intersect with chronotype preferences and work motivation among private sector employees in Bengaluru. The private sector in Bengaluru is characterized by a fast-paced and competitive environment, where organizations constantly strive to innovate, adapt, and stay ahead of the curve. Employees in this sector often face high workloads, tight deadlines, and demanding performance expectations, which can impact their motivation, productivity, and well-being (Raghuram & Sinha, 2017)

Understanding how chronotype preferences intersect with work motivation among private sector employees can provide valuable insights into how individuals cope with the challenges and demands of their jobs, as well as how organizations can support and optimize their performance. Furthermore, Bengaluru's private sector encompasses a diverse workforce, comprising individuals from various cultural backgrounds, educational levels, and career trajectories. Research on chronotype preferences and workmotivation can illuminate how these diverse factors shape employees' attitudes, behaviors, and experiences in the workplace. By exploring these intersections, researchers can identify nuanced patterns and tailor interventions to address the specific needs and preferences of different employee groups. In today's competitive talent market, organizations must not only attract but also retain top talent by fostering a conducive and supportive work environment. Understanding how chronotype preferences influence employees' motivation and performance can inform the development of workplace policies, practices, and initiatives that promote

employee well-being, satisfaction, and commitment. Moreover, research on chronotype preferences and work motivation contributes to the broader discourse on work-life balance and employee well-being in urban settings (Meyer & Herscovitch, 2001).

Bengaluru, like many other rapidly growing cities, faces issues related to urbanization, traffic congestion, pollution, and housing affordability, which can impact individuals' overall quality of life and mental health. By examining how work-related factors, such as chronotype preferences and work motivation, interact with these urban challenges, researchers can identify strategies To help employees achieve a healthier equilibrium between their professional and personal lives, resulting in enhanced resilience, contentment, and fulfillment.

### **1.1. Rationale of the study**

The rationale and purpose of the research on Chronotype preferences and work motivation among private sector employees in Bengaluru is to gain insights into how individual biological rhythms intersect with motivational factors in the workplace. By understanding these dynamics, the aim is to optimize work practices, such as schedules and task assignments, to enhance employee engagement, satisfaction, and performance. Additionally, the research seeks to contribute to a deeper understanding of the organizational landscape in Bengaluru's dynamic economy, ultimately aiming to promote employee well-being, productivity, and success in the private sector.

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## **2. Material and methods**

### **2.1. Research design**

The study adopted a quantitative research design to investigate the relationship between chronotype preferences and work motivation among employees in private organizations. This non-experimental approach focuses on analyzing numerical data to elucidate connections between these variables. Quantitative research offers an organized means of exploring the intricacies of a subject matter, providing detailed insights and potentially sparking new avenues for research exploration within the domain.

### **2.2. Statement of the Problem:**

The study aims to investigate the relationship between chronotype preferences and work motivation among private sector employees in Bengaluru, with a particular focus on understanding how individual biological rhythms intersect with motivational factors in the workplace. Additionally, the research seeks to explore potential gender differences in these dynamics and their implications for optimizing work practices and fostering employee well-being, satisfaction, and performance in the dynamic economy of Bengaluru's private sector.

### **2.3. Objectives of the study**

To investigate the relationship between individual chronotype preferences and work motivation among employees in private organizations.

To understand if there are any significant gender differences between chronotype preferences and work motivation

### **2.4. Hypotheses**

H0<sub>1</sub> There is no significant relationship between individual Chronotype Preferences and Work Motivation among employees in private organizations in Bengaluru.

- H0<sub>2</sub> There is no significant relationship between Morningness and Work Motivation.
- H0<sub>3</sub> There is no significant relationship between Eveningness and Work Motivation.
- H0<sub>4</sub> There is no significant gender difference between Morningness and Work Motivation.
- H0<sub>5</sub> There is no significant gender difference between Eveningness and Work Motivation.

### **2.5. Operational Definitions**

Chronotype Preferences: An individual's inherent tendencies toward morningness, eveningness, or neutrality.

Work Motivation: An individual's drive, desire, and inclination to engage in work-related activities.

## 2.6. Variables

Independent Variables:: Chronotype preferences (Morningness, Neutral, Eveningness), Gender (Male, Female)

Dependent Variable:: Work Motivation

## 2.7. Criteria

### 2.7.1. Inclusion Criteria

Participants must be employed by a private sector organization and fall within the age range of 20 to 50. They should reside in Bengaluru and possess fluency in English.

### 2.7.2. Exclusion Criteria

Participants outside the age range of 20 to 50 and those not employed in a private sector organization will be excluded from the study.

## 2.8. Sample and Technique

The following study was conducted using data from 200 participants. These questionnaires were only administered to Private sector employees residing in Bengaluru between the ages of 20 - 50. The data collection took place with the help of an online survey. The survey consisted of two questionnaires. As the research is non - probabilistic, a convenient sampling technique was used.

## 2.9. Scales used

The following study was done with the help of two questionnaires.

### 2.9.1. Work Motivation Questionnaire (WMQ)

To assess Work Motivation, The tool utilized was the Work Motivation Questionnaire (WMQ-A), created by Agarwal (2012). The 26 items on the scale are grouped into six categories: (1) Dependency; (2) Organizational Orientation; (3) Work Group Relations; (4) Intrinsic Motivation (Psychological Work Incentives); (5) Material Incentives; and (6) Job Situation. The items on the Likert-type scale are assessed on a five-point scale. Since the items are Likert-type, summated scoring is carried out by allocating 1 to the most extreme negative response and 5 to the most positive response. Accordingly, each item received 5, 4, 3, 2, 1; however, a, b, c, d, and we may also be assigned, in that order. At the 0.01 level of significance, the Spearman-Brown formula reliability coefficient was 0.994, indicating significance. Which, at the 0.01 threshold of significance, is significant. All items underwent factor analysis using the principal component approach to assess factorial validity.

### 2.9.2. The Reduced Morningness Eveningness Questionnaire (rMEQ)

To assess the Chronotype Preferences, The reduced version of the Morningness–Eveningness Questionnaire (rMEQ), a validated instrument used to measure an individual's chronotype preference, specifically focuses on morningness. Developed as a concise adaptation of the original Horne & Östberg Morningness–Eveningness Questionnaire (MEQ), the rMEQ developed by Adan and Almirall (1991) consists of five items and has been translated and validated in multiple languages, including English, Italian, and German, and Polish. The rMEQ has strong concept validity and convergent validity with the MEQ, as well as good test-retest reliability, thanks to its sufficient psychometric features (Young 2018).

Scores on the rMEQ scale span from 4 to 25, where higher scores signify a stronger preference for morningness. Chronotype classifications are determined by cutoff scores: 4–11 for the evening type, 12–17 for the neutral type, and 18–25 for the morning type. However, it's important to note that these chronotypes are not population criteria but rather represent individual preferences along a morningness continuum. The rMEQ offers a practical and efficient means of assessing morningness preference, making it suitable for use in research studies with broad samples of subjects. Its simplicity and cross-cultural adaptability make it a valuable tool for understanding how chronotype preferences influence various outcomes, including work motivation and productivity.

## 2.10. Data analysis

The data were analyzed using Spearman's correlation was used to explore the association between Chronotype preferences, its extremes Morningness and Eveningness and Work Motivation. Furthermore, to assess gender

differences in Morningness, Work Motivation, and Eveningness with Work Motivation, the independent sample t-test was conducted using IBM-SPSS.

### 3. Results

**Table 1** Descriptive statistics and correlation coefficients for work motivation chronotype preferences, morningness and eveningness

Variables	M	SD	1	2	3	4
Work Motivation	91.88	16.752	-			
Chronotype reference	1.88	.699	-.196**	-		
Morningness	5.98	8.97	.195**	-.857**	-	
Eveningness	1.66	3.55	-.139	.737**	-.316**	-

\*\*P < 0.01 \*P < 0.05; n= 200

A Spearman correlation was used to assess the association between Work Motivation and Chronotype Preferences, and its two dimensions Morningness and eveningness. Table 1, presents correlations between work motivation and various chronotype preferences among employees in private organizations in Bengaluru.

The correlation coefficient between work motivation and chronotype preferences is -0.196, indicating a negative correlation that is statistically significant at the 0.01 level. This suggests a significant relationship between chronotype preferences and work motivation, contrary to hypothesis H01, which posits that there is no significant relationship between individual Chronotype Preferences and Work Motivation among employees in private organizations in Bengaluru. Hence, the hypothesis is rejected

Additionally, the correlation coefficient between work motivation and morningness is -0.857, demonstrating a negative correlation that is highly significant at the 0.01 level. Therefore, hypothesis H02, stating that there is no significant relationship between Morningness and Work Motivation is rejected.

Similarly, the correlation coefficient between work motivation and eveningness is -0.316\*, reflecting a moderate negative correlation that is statistically significant at the 0.01 level. Hence, hypothesis H03, asserting that there is no significant relationship between Eveningness and Work Motivation is also rejected.

Overall, the analysis suggests that both chronotype preferences and specific morningness and eveningness tendencies are significantly associated with work motivation among employees in private organizations in Bengaluru.

**Table 2** T-test Results Comparing Males and Females on Morningness and Work Motivation

Variables	Male		Female		T	df	P	Cohen's D
	M	SD	M	SD				
Morningness	8.83	9.74	2.95	6.94	4.89	198	1.96	0.69
Work Motivation	96.50	17.7	86.98	13.96	4.17	198	1.96	0.59

\*\*P < 0.01 level (2-tailed); \*P < 0.05; n= 200;

The independent sample t-test was performed to determine if there is a notable difference in the means of morningness and work motivation between male and female populations. For morningness, the mean score for males (8.83) is substantially higher than that of females (2.95), indicating that males tend to have higher morningness preferences compared to females.

Similarly, for work motivation, the mean score for males (96.50) is higher than that of females (86.98), suggesting that males tend to exhibit higher levels of work motivation compared to females. The t-test value of 4.17 for work motivation,

and 4.89 for morningness at a significance level of 0.05, as the significance is higher than 0.05, we will accept the null hypothesis which states that there is no significant gender difference between morningness and work motivation.

In summary, based on the outcomes of the t-test, it can be inferred that there are no significant differences between males and females regarding both morningness preferences and work motivation.

**Table 3** T-test Results Comparing Males and Females on Eveningness and Work Motivation

Variables	Male		Female		t	df	P	Cohen's D
	M	SD	M	SD				
1.Eveningness	.64	2.22	2.73	4.32	-4.33	198	1.96	0.60
2.Work Motivation	96.50	17.87	86.98	13.96	4.17	198	1.96	0.59

\*\*P < 0.01 level (2-tailed); \*P < 0.05; N= 200;

The Independent Sample T-test was conducted to assess whether there is a significant difference in the means of eveningness and work motivation between male and female populations. For eveningness, the mean score for males (0.64) is substantially lower than that of females (2.73), indicating that males tend to have lower eveningness preferences compared to females.

Similarly, for work motivation, the mean score for males (96.50) is higher than that of females (86.98), suggesting that males tend to exhibit higher levels of work motivation compared to females. The t-test value of 4.17 for work motivation and -4.33 for eveningness, both associated with p-values below 0.05, indicates that the differences between the means of work motivation and eveningness scores for males and females are statistically significant. Therefore, we accept the null hypothesis, suggesting that there are no significant gender differences in both eveningness preferences and work motivation.

In summary, based on the results of the t-test, it can be concluded that there are significant differences between males and females in terms of both eveningness preferences and work motivation.

#### 4. Discussion

The current study was undertaken to explore the correlation and gender disparity between Chronotype preferences and Work Motivation among private sector employees residing in Bengaluru, India. The results of the Spearman correlation analysis reveal significant associations between chronotype preferences, morningness, eveningness, and work motivation among employees in private organizations in Bengaluru. Contrary to the initial hypothesis proposing no significant relationship between chronotype preferences and work motivation, the analysis demonstrates a negative correlation indicating that individuals with specific chronotype preferences tend to exhibit varying levels of work motivation.

Further examination of morningness and eveningness preferences reveals significant correlations with work motivation. The negative correlation between morningness and work motivation rejects hypothesis H02, suggesting that individuals with higher morningness preferences tend to exhibit lower levels of work motivation. Similarly, the moderate negative correlation between eveningness and work motivation rejects hypothesis H03, indicating that individuals with higher eveningness preferences also tend to demonstrate lower levels of work motivation.

Additionally, the independent sample t-tests conducted to assess gender differences in morningness, eveningness, and work motivation reveal noteworthy findings. While there were no significant gender differences observed in morningness preferences and work motivation, significant differences were identified in eveningness preferences and work motivation. Males exhibited lower eveningness preferences and higher levels of work motivation compared to females.

These findings underscore the importance of considering individual chronotype preferences, particularly morningness and eveningness, in understanding variations in work motivation among employees in private organizations. The results also highlight potential gender differences in eveningness preferences and their impact on work motivation,

suggesting avenues for further research and potential implications for organizational policies and practices aimed at enhancing employee motivation and well-being.

The study on chronotype, self-regulation, and cognitive performance by Heimola et al. (2021) provides valuable insights into how morning preference influences working memory and self-regulation skills. Their findings suggest that individuals with a morning preference tend to exhibit superior cognitive performance, characterized by reduced errors and faster overall performance. Moreover, the study highlights the detrimental effects of sleep deprivation on working memory performance, underscoring the importance of addressing sleep-related concerns in the workplace to enhance employee motivation and productivity.

Building upon these insights, the research on chronotype preferences and work motivation among private-sector employees in Bengaluru can further explore how morning preference interacts with cognitive functioning and self-regulation in the context of the workplace. Individuals with a morning preference, who demonstrate superior cognitive performance and self-regulation skills, may also exhibit higher levels of work motivation due to their enhanced ability to focus, plan, and execute tasks effectively. Conversely, employees experiencing sleep deprivation or struggling with self-regulation may demonstrate lower levels of work motivation and productivity.

Additionally, the study by Yıldırım & Nalçacı (2023) on academic motivation, cognitive absorption levels, and chronotype preferences among pre-service teachers offers further insights into the relationship between individual traits and motivation. Their findings suggest that individuals with a morning chronotype and a high level of curiosity and focus in digital environments tend to exhibit higher academic motivation. This highlights the importance of understanding how individual traits, such as chronotype preferences and internet usage habits, influence motivation and performance in specific contexts.

Drawing parallels to the current research, it's plausible that employees with morning chronotype preferences, similar to pre-service teachers, may demonstrate higher levels of work motivation. The ability to maintain focus, curiosity, and cognitive absorption, whether in digital environments or work tasks, could contribute to enhanced motivation and productivity among employees in the private sector. Furthermore, exploring how internet usage patterns impact work motivation can provide valuable insights into mitigating digital distractions and fostering a more conducive work environment for employee engagement and performance.

The current study on chronotype preferences and work motivation in Bengaluru can leverage insights from studies on cognitive performance, self-regulation, and academic motivation to deepen our understanding of how individual traits influence motivation and productivity in the workplace.

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## 5. Conclusion

In conclusion, our study delved into the relationship and gender differences between Chronotype Preferences and Work Motivation among Private Sector Employees in Bengaluru, India. Through rigorous analysis, we uncovered insightful findings that shed light on the complex interplay between these variables.

Our findings revealed a significant negative correlation between chronotype preferences and work motivation, indicating that as work motivation increases, there may be a tendency for a decrease or irregular changes in chronotype preferences, and vice versa. Additionally, we found a positive relationship between morningness and work motivation, suggesting that individuals with morningness preferences tend to exhibit higher levels of work motivation. However, a statistically significant negative correlation was observed between eveningness and work motivation, indicating a more nuanced relationship in this regard.

Moreover, our investigation into gender differences unveiled intriguing insights, with significant disparities observed in eveningness preferences and work motivation between males and females. While no significant gender differences were found in morningness preferences and work motivation, indicating similarities in these domains, distinct gender dynamics were evident in the eveningness preferences and work motivation.

Furthermore, our study drew parallels with related research, particularly in understanding the association between chronotype preferences, cognitive performance, and self-regulation. The insights gleaned from these studies underscored the importance of addressing sleep-related issues and maintaining focus and curiosity, both in digital environments and work tasks, to optimize employee motivation and productivity.



In summary, our research contributes to a deeper understanding of the factors influencing work motivation among private-sector employees in Bengaluru. By elucidating the intricate relationships between chronotype preferences, work motivation, and gender differences, we provide valuable insights that can inform targeted interventions and strategies to enhance productivity and well-being in the workplace. Further research is warranted to explore potential underlying mechanisms and delve deeper into these relationships.

### *Limitations*

While our study offers valuable insights into the association between chronotype preferences and work motivation among private sector employees in Bengaluru, India, it is essential to acknowledge several limitations. Firstly, the utilization of self-report measures for chronotype preferences and work motivation may introduce bias or inaccuracies, potentially affecting the validity of our findings. Individuals may not accurately assess their chronotype preferences or work motivation levels, leading to measurement errors.

Additionally, the cross-sectional design of our study constrains our capacity to establish causal relationships between chronotype preferences and work motivation over time. Longitudinal studies would provide a more comprehensive understanding of these dynamics and enable the exploration of potential causal pathways. Furthermore, our study solely concentrated on private sector employees in Bengaluru, potentially restricting the generalizability of the findings to other populations or geographical regions. Future research endeavors could seek to replicate the study with diverse samples to enhance the robustness and generalizability of the results.

### *Implications*

Moving forward, several avenues for future research could address the limitations of our study and further advance our understanding of the interplay between chronotype preferences and work motivation. Firstly, intervention studies aimed at optimizing chronotype preferences and enhancing work motivation in the workplace could provide valuable insights into effective strategies for promoting employee well-being and productivity.

Implementing interventions such as flexible work schedules or chronotype-aware management practices could help individuals align their work tasks with their peak performance periods, thereby improving motivation and job satisfaction. Furthermore, investigating potential mediating factors, such as job satisfaction or stress levels, could elucidate the underlying mechanisms driving the association between chronotype preferences and work motivation. Understanding these mediating pathways could inform the development of targeted interventions aimed at enhancing employee motivation and performance.

Lastly, taking into account the influence of other contextual factors, such as organizational culture or job demands, could offer a more nuanced understanding of how various elements interact to shape employee motivation. By incorporating these factors into future research, we can gain a comprehensive understanding of the complex dynamics shaping work motivation in the private sector.

Overall, addressing these future implications has the potential to significantly contribute to our knowledge of work motivation and enhance organizational practices in the private sector.

### *Future Scope*

The research on the relationship between chronotype preferences and work motivation among private sector employees in Bengaluru offers numerous avenues for future exploration and enhancement. Firstly, longitudinal studies could be conducted to establish causal relationships between chronotype preferences and work motivation over time, providing deeper insights into the dynamics of these variables.

Additionally, intervention studies implementing strategies such as flexible work schedules or chronotype-aware management practices could be pursued to optimize chronotype preferences and enhance work motivation in the workplace. Exploring potential mediating factors, such as job satisfaction or stress levels, could elucidate underlying mechanisms driving the association between chronotype preferences and work motivation, thus informing the development of targeted interventions.

Furthermore, considering the influence of contextual factors like organizational culture or job demands would provide a more nuanced understanding of how various elements interact to shape employee motivation. Moreover, expanding the study to encompass diverse populations and geographical regions would enhance the generalizability of findings.

Finally, incorporating advanced methodologies such as neuroscientific techniques or wearable technology could offer novel insights into the physiological and behavioral aspects of chronotype preferences and work motivation. Overall, addressing these future directions has the potential to deepen our understanding of work motivation dynamics and contribute to the development of effective organizational practices in the private sector.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors affirm no conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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