THE IMPACT OF SMARTPHONE USAGE ON EMOTIONAL WELL-BEING

A COMPREHENSIVE ANALYSIS USING THE SMARTPHONE USAGE SCALE AND POSITIVE/NEGATIVE AFFECTIVITY SCALE

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Abstract: The relationship between smartphone usage and emotions among young adults was investigated in this study. A total of 88 people were included in the study, with researchers seeking to determine if smartphone usage patterns influenced both good and negative emotional states. The study examined two hypotheses: increased smartphone usage would be associated with both heightened negative and positive emotions. The PANAS scale quantified emotional states, whereas the SUS evaluated smartphone usage. The findings demonstrated a notable association between the use of smartphones and the experience of adverse emotions. Nevertheless, a direct association between the usage of smartphones and happy feelings was only observed among male individuals. These data indicate that excessive smartphone usage may reduce unpleasant feelings in general, while the relationship with good emotions seems to be more intricate and may be impacted by gender.

I. INTRODUCTION

Globally, smartphone use has becoming tremendously popular. According to statistics, an astonishing 83-86% of the global population, which amounts to over 6 billion individuals, currently depend on these gadgets [1, 2, 4]. The number of users is predicted to increase, with estimates indicating that it will reach 7.5 billion by 2026 [4]. Curiously, the younger cohorts are spearheading the movement. Research indicates that the percentage of individuals aged 18-29 who own smartphones is as high as 96%, while 92% of individuals aged 30-49 also possess smartphones [5]. As a result of this reliance, individuals are consistently attached to their electronic gadgets for prolonged durations. Studies reveal that fewer than 5% of users are able to limit their daily smartphone usage to less than one hour [4]. The data clearly illustrates that smartphone usage is a prevailing influence in our society, especially among younger age groups.

A smartphone is an extraordinary piece of modern technology that you carry in your pocket. By leveraging the capabilities of cellular networks, it establishes a connection between the user and the outside world. You can engage in a global conversation, communicate with a friend via instant messenger, or lose yourself in the immense expanse of the internet using it. However, this is not merely a communication device; it is a computer in miniature. Proficient processors power the operation of the system, whereas advanced operating systems

such as Android or iOS serve as the cognitive infrastructure. Integrated sensors, such as those designed to perceive orientation and motion, enable the phone to respond to each contact and inclination, thereby fostering a genuinely interactive user experience. We primarily utilise our fingertips to interact with this minuscule juggernaut. By utilising the touchscreen's gesture and tap capabilities, we are able to select applications, navigate menus, and even type messages. Furthermore, what exactly are these applications that you inquire about? App stores provide an extensive collection of programmes, each specifically developed to fulfil a particular requirement. There is an app for everything, including staying in touch with loved ones, organising daily responsibilities, and being entertained. Incorporating functions such as productivity enhancers, educational applications, social media platforms, and messaging, smartphones have become indispensable companions that are seamlessly incorporated into our everyday routines.

The importance of an individual's emotional well-being, also known as emotional health, in successfully navigating the intricacies of life. Individuals who place a high value on their emotional well-being show stronger resilience when faced with difficulties and have an increased ability to adjust to changes. This results in enhanced interpersonal interactions and a strengthened capacity to cope with the demands of everyday life. Emotional well-being goes beyond the constant pursuit of happiness. It involves recognising and effectively handling the full range of emotions, both positive and negative. Through the development of robust coping strategies, individuals may successfully navigate life's unavoidable difficulties without being overwhelmed by intense emotions. Research indicates that placing a high importance on emotional well-being has the potential to improve both mental health and physical health. Thus, emotional well-being is an essential foundation for cultivating a satisfying and prosperous existence.

Positive emotions entail more than simply transient feelings of well-being. They have a vital impact on our mental well-being, shaping our ideas, actions, and even physical well-being.

1. The Broaden-and-Build Theory, proposed by Fredrickson in 1998:

This prevalent hypothesis posits that pleasant emotions, such as pleasure, satisfaction, love, and curiosity, expand our immediate range of thoughts and actions. Develop of your intellect as a searchlight. Adverse emotions restrict attention to specific dangers and actions related to survival. In contrast, positive emotions have the effect of expanding our focus, enabling us to contemplate a broader spectrum of thoughts and behaviours. This expanded viewpoint promotes: (A)Exploration and Creativity: Our receptiveness to novel experiences, concepts, and cognitive frameworks increases. (B) Social Connection: Positive emotions enhance our likability and foster more robust interpersonal bonds. (C) Resilience refers to the ability to recover and adapt in the face of obstacles by utilising the resources acquired via good experiences, such as social support and the acquisition of new skills.

2.   Functional Theories: Functional theories centre around the distinct purposes served by various happy emotions. As an illustration: Joy serves as a driving force that compels us to actively pursue enjoyable experiences and engage in social interactions. Gratitude enhances interpersonal connections and cultivates a feeling of contentment. Hope: Offers guidance and inspiration throughout difficult circumstances. These emotions have distinct functions, enhancing both personal and societal well.

3.   Evolutionary Theories: Positive emotions may have had a survival function from an evolutionary standpoint. Feelings of happiness and contentment may indicate a secure and plentiful environment, enabling individuals to unwind, discover, and establish social bonds. Positive emotions may have also facilitated collaboration and prosocial behaviour within groups, resulting in increased resilience and achievement.

The Impact of Positive Emotions Beyond Theoretical Concepts

Positive emotions possess an infectious nature. Initiating a grin towards someone might elicit a reciprocal smile, resulting in a cascade of happy emotions. The ripple effect has the potential to augment our social connections and cultivate a more favourable social milieu.

The Influence of Optimism

Gaining knowledge of the scientific principles underlying pleasant emotions enables us to actively foster and develop them in our everyday existence. By using strategies such as maintaining a gratitude book, surrounding ourselves with optimistic individuals, and participating in activities that bring us delight, we may enhance our encounters with good feelings and harness the multitude of advantages they provide. Positive emotions have a significant impact on our ideas, behaviours, and general well-being, and they are not just temporary feelings.

Negative emotions are just as important to the human experience as good ones, despite the latter generally taking centre stage. These emotions, such as melancholy, anger, fear, and disgust, may be unpleasant, yet they play crucial roles in our psychological well-being and survival. Let us examine many perspectives that provide insight into the intricate realm of unpleasant emotions.

1.   **Evolutionary Theories:** Negative emotions served as crucial alarm systems during the process of development, notifying us of possible dangers that may endanger our existence. Anger motivates us to engage in combat or protect ourselves, fear motivates us to evade danger, and disgust empowers us to steer clear of harmful chemicals. Despite being unpleasant, these feelings helped our ancestors navigate a dangerous environment.

2.   **The Appraisal Theory**, proposed by Lazarus in 1991, is a psychological framework that examines how individuals evaluate and interpret events and situations. This theory centres on the process of interpreting circumstances and the subsequent emotions that arise as a result. The magnitude of a negative feeling is contingent upon our evaluation of a given circumstance - whether it is perceived as menacing, pertinent to our

objectives, or detrimental to our self-image. For instance, the experience of losing one's job might elicit feelings of anger if it is perceived to be unfair (a threat), grief if it affects one's financial stability (related to one's goals), or guilt if one feels accountable.

3.   **The Functional Theory of Emotions**, proposed by Plutchik in 1980, is the third theory. The proposed theory posits that fundamental emotions, including negative ones, fulfil certain roles. Fear serves as a motivator for avoiding certain situations, anger urges individuals to take action in order to eliminate a perceived threat, and melancholy encourages individuals to withdraw and engage in introspection. Gaining a comprehensive understanding of these functions can assist us in efficiently managing these emotions.

While negative emotions serve a purpose, an overabundance of them can be detrimental. Constant pessimism can lead to feelings of anxiety and melancholy, as well as hinder our ability to confront challenges. However, negative emotions may also function as catalysts for constructive metamorphosis. Anger has the potential to act as a catalyst in our quest for justice, while mourning can elicit emotions of empathy within us. Similarly, dread can drive us to surpass our own limitations.

Smartphones have emerged as an irrefutable influence that shapes our behaviour and emotional terrain. The continuous stream of alerts and social media updates might stimulate a want for quick attention, affecting our concentration and potentially resulting in fragmented thinking. The prevalence of multitasking has led to a decline in the ability to concentrate deeply. Social engagement can also be impacted, since in-person encounters are occasionally substituted with virtual connections, thereby impeding social skills and cultivating feelings of isolation.

Nevertheless, cellphones do not just bring negative consequences. They provide a continuous flow of connectivity, amusement, and knowledge, potentially enhancing mood and overall well-being. The other side exposes possible drawbacks. Excessive use can result in adverse emotional states such as jealousy and anxiety, as a consequence of engaging in social comparisons on platforms that frequently present inaccurate depictions of life. The persistent presence of the fear of missing out (FOMO) can be intensified by the never-ending flow of updates. Smartphone usage can sometimes develop into an addiction, resulting in withdrawal symptoms and anxiety when the device is not accessible.

The influence is not consistent across all areas. Intense effects are more probable for heavy users compared to casual users. Personality traits can have an impact, as persons who are prone to anxiety or depression may be more vulnerable to experiencing unpleasant emotional outcomes. Children and teenagers may be particularly susceptible due to their continuing social and emotional development.

Ongoing research on the influence of cellphones on behaviour and emotions consistently indicates that smartphones are very influential tools. When used with careful consideration and accountability, they have

the potential to improve our lives. When used excessively, they might have the capacity to disturb our behaviour and emotional well-being.

Excessive smartphone usage is ubiquitous in modern culture, resulting in a range of physical health problems (Shan et al., 2013; İNal et al., 2015; Xie et al., 2016) and mental health difficulties such as depression and anxiety (Elhai et al., 2017a). Additionally, it is associated with decreased productivity and diminished academic achievement (Samaha and Hawi, 2016; Duke and Montag, 2017). However, there is a lack of knowledge on the connection between excessive smartphone usage and other contemporary ideas related to mental disorders.

In light of the fact that mood is a subjective experience, any research that investigates mood, emotion, or consciousness in general must take into account and successfully capture the perspective of a person about a felt experience. Over the course of the last several decades, psychologists have developed a large number of self-assessment mood scales that are based on pen and paper and have been demonstrated to be accurate by scientific research. It is common practice for a conventional mood scale to have anything from two (core affect [7][19]) to sixty (extended PANAS [24]) mood components. These mood components are believed to collectively constitute mood. Mood items are often evaluated on an individual basis using five-point scales; however, seven- and nine-point scales are also utilised within the process of doing research on mood. By assessing the good and negative aspects of each mood item, one may arrive at a thorough assessment of one's mood. Clinical settings, surveys, foundational studies on mood in psychological research, and efforts to design mood engines for deducing mood from user activity captured by smartphones are all examples of situations in which mood scales are employed [9], [14].

This study utilises the Smartphone Usage Scale (SUS) and the Positive and Negative Affect Schedule (PANAS) to examine the possible correlation between patterns of smartphone usage and emotional well-being. The Smartphone Usage Scale is a precise tool used to measure the frequency and intensity of smartphone use among individuals. This data offers a precise depiction of the extent to which these technologies are integrated into everyday life.

The PANAS serves as a potent instrument for researchers, evaluating the emotional terrain of the individuals. By encompassing the range of good feelings (such as pleasure and happiness) and negative emotions (such as wrath and despair), researchers are able to comprehend the total emotional value connected to different amounts of smartphone usage.

An exhaustive examination of this aggregated data has the capacity to reveal captivating realities. Does frequent smartphone usage skew the emotional balance towards optimism, providing a continuous flow of connectivity and amusement? Alternatively, does it incline users towards negativity, resulting in emotions of

isolation, jealousy, or distraction? The image may exhibit a greater level of complexity, since various usage patterns might elicit an intricate interaction of both favourable and unfavourable feelings.

In essence, this research has the capacity to fill the void in our understanding of how cellphones, which are constantly present, influence emotional well-being. The results can provide insights for both personal decision-making and wider conversations on digital well-being and the ethical development of technology.

I.   RESEARCH METHODOLOGY

Aim

To examine Smartphone Usage & Emotional well-being among the Young Adults

Objective

To examine the relationship between Smartphone Usage & Emotional Well-Being in Young Adults.

Hypothesis

• Smartphone levels are significantly associated with negative affects.

• Smartphone levels are significantly associated with Positive affect.

Variables

•   **Independent Variable:** Smartphone Usage Scale: This scale will measure the participant's smartphone usage patterns. There are various validated scales available, such as the Smartphone Addiction Scale (SAS) or the Nomophobia Inventory (NI). The chosen scale will assess aspects like frequency of use, duration of use, types of applications used, and potential feelings of dependence on the smartphone.

•   **Dependent Variable:** PANAS Scale: This established scale will measure the participant's emotional well-being. It captures two dimensions:

1.   Positive Affect (PA): Scores on this subscale will indicate the level of positive emotions experienced by the participant, such as joy, interest, and excitement.

2.   Negative Affect (NA): Scores on this subscale will indicate the level of negative emotions experienced by the participant, such as sadness, anger, and fear.

Sample

Size: 88

Age: 18-30 years old

Sampling method:. Stratified Sampling (Utilised in research to guarantee a sample that precisely mirrors the composition of the full target population.)

Tools

SMARTPHONE USE SCALE (SUS)

The Smartphone Use Scale (2020), SUS is a self-administered questionnaire developed by Shankhabela Mukherjee to assess smartphone usage patterns in young adults. The SUS likely consists of a series of questions that assess aspects like frequency of use, duration of use, types of applications used, and potential dependence on the smartphone.

"The scale comprises 30 statements and follows a 5-point Likert format (ranging from 1-5), measuring smartphone use along the dimensions of (a) smartphone use and interpersonal relationships, (b) smartphone as a precious possession, (c) smartphone as a companion, (d) smartphone as a tool for evasion, (e) smartphone as an instrument of multiple utility. : The scale is self-administering in nature with the instructions printed on the datasheet. There is no time limit for completion. The respondents' scores have a possible range of 30-150".

POSITIVE AFFECTIVITY AND NEGATIVE AFFECTIVITY (PANAS)

The Positive and Negative Affect Schedule (PANAS) is a commonly employed psychological evaluation instrument specifically developed to evaluate an individual's present emotional condition. The development of this project took place in 1988 under the guidance of a group of researchers consisting of David Watson, Lee Anna Clark, and Auke Tellegen.

"The total score is calculated by finding the sum of the 10 positive items, and then the 10 negative items. Scores range from 10 – 50 for both sets of items. For the total positive score, a higher score indicates more of a positive affect. For the total negative score, a lower score indicates less of a negative affect."

Watson, Clark, & Tellengen (1988) established the internal consistency of the PANAS scale to be between .86 and .90 for positive affect and .84 and .87 for negative affect. The PANAS (1 week) had a test-retest reliability of .79 for positive affect and .81 for negative affect, as reported by Watson et al. in 1988.

Statistical Analysis

We will use Spearman's correlation to examine the correlations between the SUS & PANAS scales & their dimensions.

IV. RESULTS

Descriptive Statistics

Table No.1

	Mean	Std. Deviation	N
SUS_SCORE	91.5455	12.23140	88
POSITIVE	34.1023	5.93265	88
NEGATIVE	27.1477	7.65873	88
AGE	20.8409	2.29385	88
GENDER	.56	.500	88

Table No. 2

Spearman's Rho		Positive Affective	Negative Affective
SUS Score	Correlation Coefficient	-.150	-.344**
	Significance	.163	.001
N = 88			

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed).

Table No. 3

Spearman's Rho		Positive Affective	Negative Affective	SUS Score
Age	Correlation Coefficient	-.160	.178	-.065
	Significance	.139	.098	.548
Gender	Correlation Coefficient	.012	-.265*	.080
	Significance	.914	.013	.460
N = 88				

**. Correlation is significant at the 0.01 level (2-tailed)
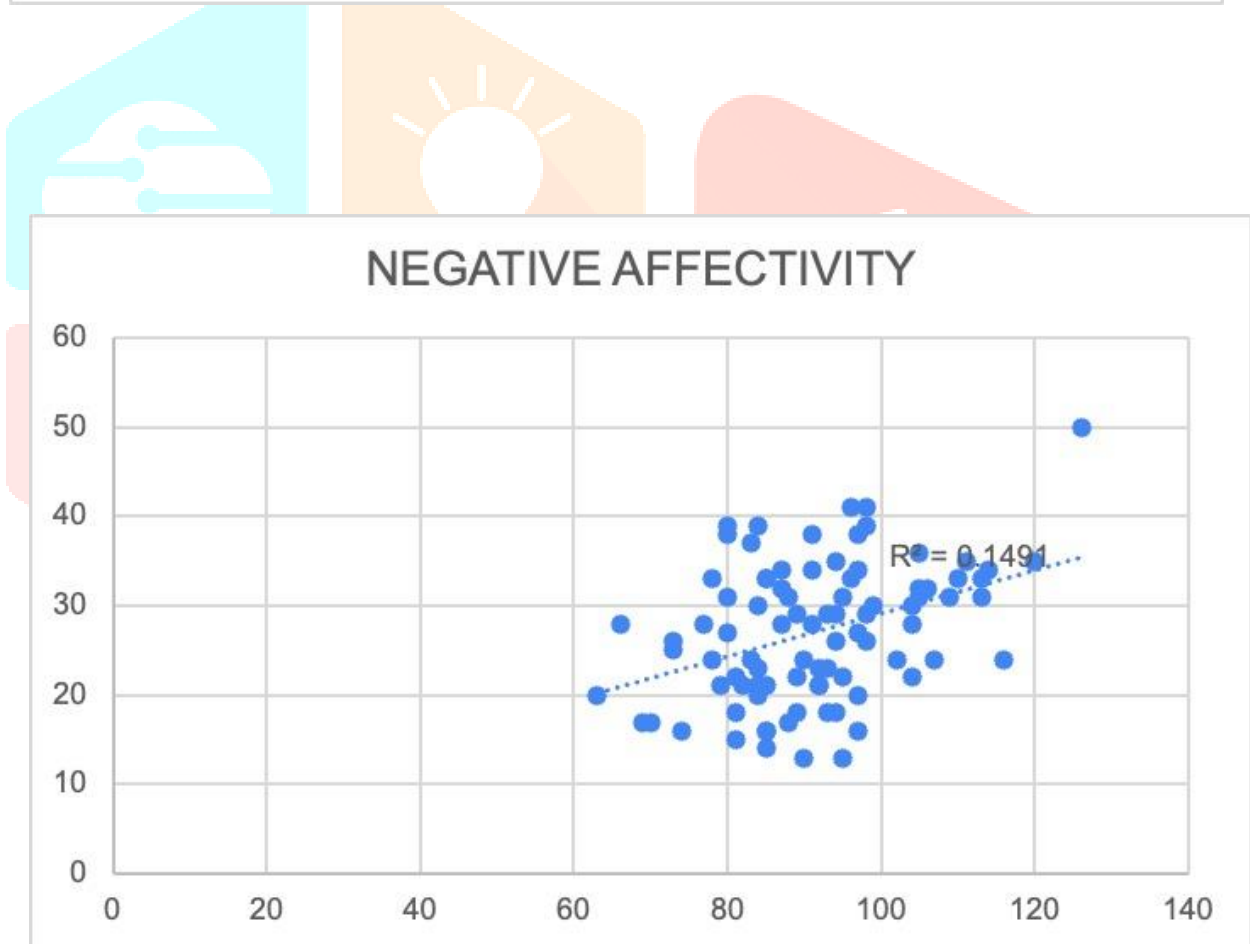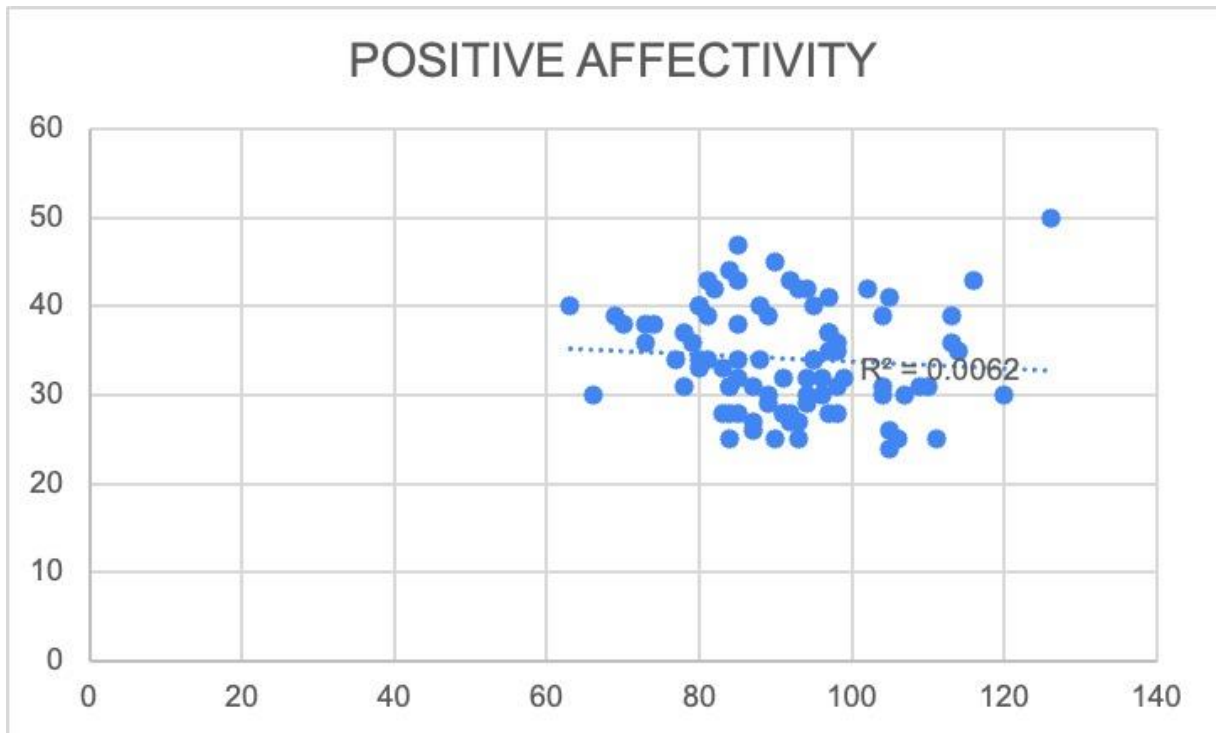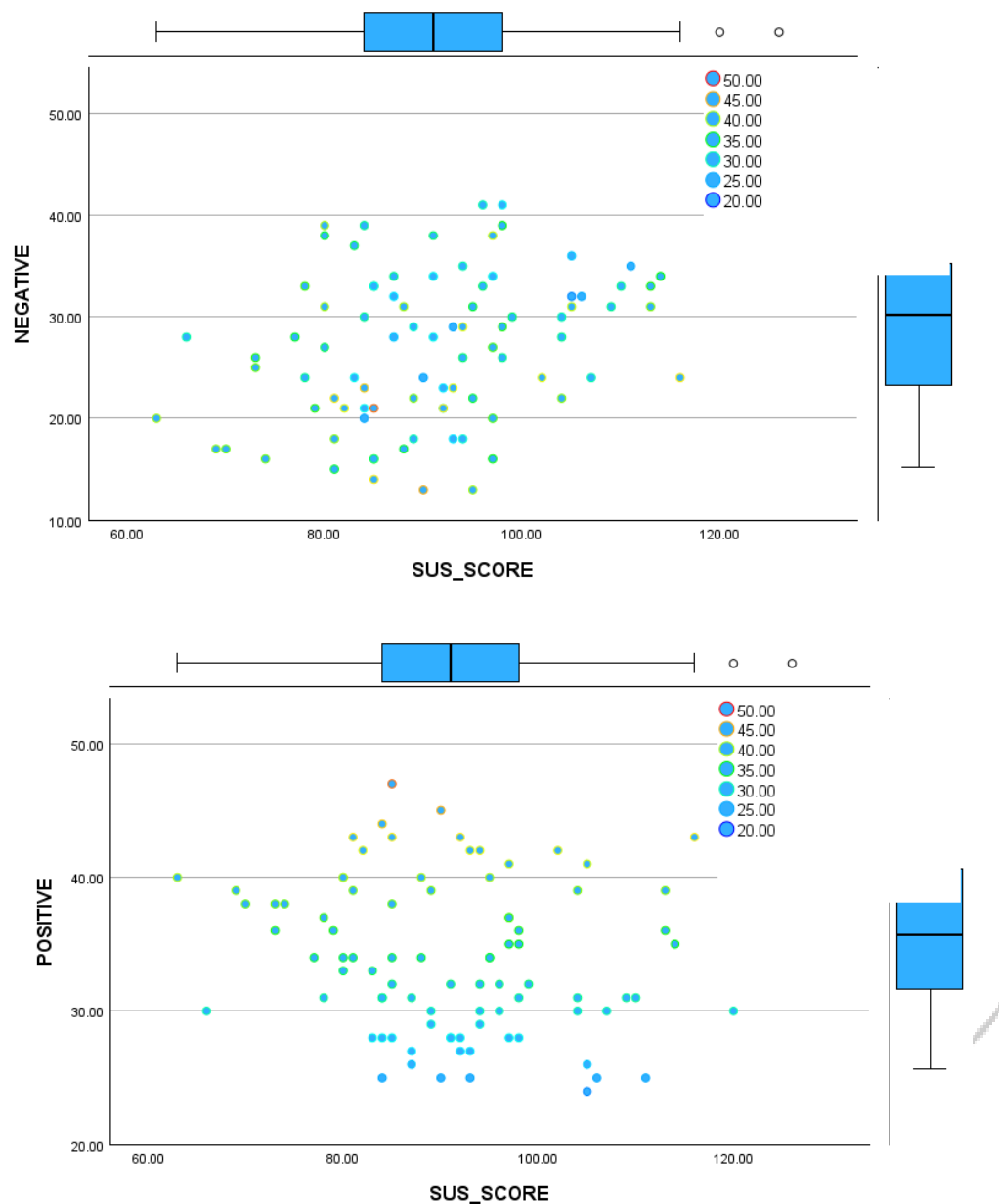*. Correlation is significant at the 0.05 level (2-tailed).

POSITIVE AFFECTIVITY

$R^2 = 0.0062$

NEGATIVE AFFECTIVITY

$R^2 = 0.1491$

Table No. 4

NEGATIVE AFFECTIVITY											
Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Value	p Value	Coefficient (B)	Std. Error	Beta	T Value	p Value
SUS Score	0.386	0.149	0.139	7.10571	15.069	<0.001	0.242	0.062	0.386	3.882	<0.001

The analysis indicates a moderate positive correlation (R = 0.386) between the predictor variable, SUS Score, and the outcome variable. Approximately 14.9% of the variance of Negative Affectivity can be explained by the SUS Score, as reflected by the R Square value. The regression model significantly predicts the outcome variable (F = 15.069, p < 0.001), with SUS Score demonstrating a statistically significant effect (p < 0.001). The coefficient for SUS Score is 0.242, suggesting that for every unit increase in SUS Score, the Negative Affectivity is expected to increase by 0.242 units. This indicates that higher SUS Score values are associated with higher levels of Negative Affectivity.

Table No. 5

POSITIVE AFFECTIVITY											
Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Value	p Value	Coefficient (B)	Std. Error	Beta	T Value	p Value
SUS Score	0.079	0.006	-0.005	5.94860	0.534	0.467	-0.038	0.052	-0.079	-0.731	0.467

The analysis reveals a weak positive correlation (R = 0.079) between the predictor variable, SUS Score, and the outcome variable. Only a small proportion of the variance in the Positive Affectivity is accounted for by the independent variable, as indicated by the low R Square and Adjusted R Square values, both close to zero. The regression model does not significantly predict the outcome variable (F = 0.534, p = 0.467), suggesting that SUS Score does not have a significant effect on Positive Affectivity. The coefficient for SUS Score is -0.038, although not statistically significant (p = 0.467), indicating a negligible negative impact. Overall, there is no significant linear relationship between SUS Score and Positive Affectivity.

V. DISCUSSION & CONCLUSION

This research explored the complex relationship between smartphone use and psychological health. We conducted an experiment to examine two main hypotheses: (1) if there is a correlation between greater levels of smartphone usage and increasing negative feelings (negative affect), and (2) conversely, whether there is a correlation between higher levels of smartphone use and having more happy emotions (positive affect). Through the examination of these connections, our objective was to elucidate the possible impact of smartphones on our emotional terrain. In addition, we examined whether demographic factors, notably gender and age, influence these associations. This comprehensive strategy aimed to offer a sophisticated comprehension of how smartphones are interconnected with our everyday existence and influence our emotional encounters.

How precisely do our devices affect our emotional health, given that they are essentially a part of us? Based on studies, the answer is not straightforward. Research conducted by Lin et al. (2016) and Ortuno-Ortuno et al. (2020) indicates a connection between excessive smartphone usage and adverse emotions such as stress and depression. However, contrasting findings from Bradley & Howard (2023) and McElroy & Young (2024)

suggest no significant relationship or even a potential positive correlation with the use of specific applications. Assessing emotions may pose difficulties, as demonstrated by researchers such as Thompson (2007) who utilise self-reported surveys like the PANAS (Positive and Negative Affect Schedule), and Khue et al. (2015) who investigate mobile adaptations of existing measurement tools. Curiously, the results differ. Rozgonjuk et al. (2018) and Kumar & Rathi (2019) shown a positive association between extended screen time and unpleasant emotions. Conversely, Sacco (2018) discovered that robust social contacts, rather than technology usage per se, had a more significant influence on happiness. The precise impact of certain applications and features is yet uncertain, as Li et al. (2020) propose that FoMO (Fear of Missing Out) might potentially serve as a mediator between unpleasant emotions and addiction to smartphones. Age and demographics may also influence the situation. A study conducted by Kumar and Rathi (2019) indicates that young individuals and middle-aged adults employ their smartphones in distinct ways. The influence of age and gender on the correlation between phone usage and well-being remains uncertain, since research conducted by Przybylski et al. (2013) and Munderia & Singh (2021) has not produced clear findings. The possible impacts on our overall welfare are worrisome. The studies conducted by Morshed et al. (2019) and Bai et al. (2024) emphasise the detrimental effects of excessive phone usage on sleep patterns and mental well-being, particularly among students. Nevertheless, Sacco's (2018) research indicates that robust social relationships hold greater significance for pleasure compared to technology itself. Excessive dependence on smartphones can have detrimental effects on our everyday life and mental health, as demonstrated by Munderia & Singh (2021). There is still a substantial amount of knowledge to acquire. Further research should investigate the causal association between phone usage and emotions, as highlighted by Crabtree (2021). It is essential to comprehend the impact of various app capabilities and usage patterns on our emotions, as highlighted by Ochs & Sauer (2021). Further study should focus on developing techniques, such as digital detox therapies and excellent sleep hygiene, to promote healthy smartphone behaviours, as investigated by Xue et al. (2024). Undoubtedly, the data collecting from cellphones for research purposes necessitates the resolution of privacy problems highlighted by Sarsenbayeva et al. (2023). The correlation between smartphones and our emotional well-being is intricate. Although several research indicate negative consequences of excessive usage, other studies demonstrate no definitive correlation or even possible advantages. Additional study is required to comprehend the intricacies of this correlation and devise tactics for encouraging favourable smartphone behaviours

The results of the study indicate that there is a statistically significant correlation between negative affectivity and sus (0.01) score, but no such correlation with positive affectivity.

Notably, it was shown that there was a significant correlation between positive affectivity and sus with male participants, rather than with female individuals.

The mean SUS score of 91.55 suggests a highly favourable user experience based on accepted metrics for usability. This is promising, as it implies that the smartphone is typically intuitive and efficiently achieves its objectives. Nevertheless, the standard deviation of 12.23 indicates a degree of variability in user opinions.

Although the primary experience appears favourable, certain users may find certain features or parts less obvious than others. The Table No.2 and Table No.3 displays the Spearman's Rho Correlation Coefficients. A noteworthy discovery is the mild inverse relationship between the SUS score and both positive and negative emotional ratings. Although it may appear paradoxical, this implies a subtle and sophisticated user experience. Users with greater System Usability Scale (SUS) ratings, which indicate superior usability, tend to report lower positive emotional scores, such as enjoyment or satisfaction. There are several possible interpretations for this. It is possible that the actions done by users were practical rather than fundamentally pleasant, even if the programme itself was user-friendly. In addition, consumers may see the software as efficient, however lacking in captivating features.

The modest negative connection with negative emotional ratings is less unfavourable. It suggests that those who find the smartphone easy to use also likely to have less annoyance or difficulties. This further strengthens the general favourable perception of usability. Nevertheless, the negative correlation underscores the fact that even when usability is great, certain individuals may still have intermittent difficulties.

The inquiry into the correlation between user experience and good emotions in the mobile application produced inconclusive findings. An investigation of regression revealed a little positive association (R = 0.079) between the SUS score, which indicates usability, and positive affectivity. This indicates a subtle pattern - individuals who perceived the smartphone as more user-friendly may have shown somewhat more favourable emotions.

Nevertheless, the R-squared value (0.006) provides a clear indication of the overall relationship, which is extremely weak. The SUS score has a minimal impact on the variance in positive affectivity scores. Put simply, there is no statistically significant correlation between usability and favourable feelings. The ease of use of a smartphone does not necessarily guarantee a more pleasurable user experience.

It is crucial to bear in mind that correlation does not indicate causality. Despite the small positive link, it is not possible to conclusively state that increased usability leads to a greater number of good emotions. There may be more things that are affecting user emotions throughout smartphone usage.

Conclusion

The notion that young adults' smartphone use and psychological health are related is supported by the research. The data specifically indicate a notable association between higher smartphone usage and negative emotions, including negative affectivity. Young individuals who allocate a greater amount of time to using their smartphones are inclined to have heightened levels of anxiety, despair, or other adverse emotions.

Curiously, the study did not discover a comparable correlation between smartphone usage and pleasant feelings (positive affectivity). These findings indicate that smartphones may mostly impact the adverse aspects of emotional well-being among young adults.

Put simply, the greater the frequency of smartphone usage among young adults, the more negative their emotional well-being appears to be. However, there is no conclusive evidence to suggest that smartphone use enhances pleasant feelings..

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