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Üniversite Öğrencilerinde Ekran Süresi ile Kinezyofobi, Ağrı İnançları, Boyun Özürlülüğü ve Yorgunluk Arasındaki İlişkinin İncelenmesi

An Investigation into The Relationship Between Screen Time and Kinesiophobia, Pain Belief, Neck Disability and Fatigue Among University Students

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ÖZET

Dijitalleşmenin artmasıyla birlikte üniversite öğrencilerinin günlük ekran süresi önemli ölçüde artmıştır. Uzun süreli ekran kullanımı, dijital yorgunluk, hareketten kaçınma davranışları ve ağrıya ilişkin olumsuz inançlar yoluyla fiziksel işlevselliği olumsuz etkileyebilir. Bu çalışmanın amacı, üniversite öğrencilerinde günlük ekran süresi ile kinezyofobi, ağrı inançları, boyun özürlülüğü ve dijital yorgunluk arasındaki ilişkileri incelemektir. Bu çalışma nicel, betimsel ve ilişkisel bir tasarım kullanılarak gerçekleştirilmiştir. Çalışmaya toplam 140 üniversite öğrencisi katılmıştır. Veriler çevrimiçi bir anket kullanılarak toplanmıştır. Değerlendirme için Hareket Korkusu Nedenleri Ölçeği, Ağrı İnançları Ölçeği, Boyun Özürlülük İndeksi ve Dijital Yorgunluk Ölçeği kullanılmıştır. Günlük ekran süresi, dijital yorgunluk ile pozitif ilişkili bulunmuştur ($r = 0,242$, $p = 0,004$). Ekran süresi ile kinezyofobi ($r = 0,077$, $p = 0,365$), ağrı inançları ($r = -0,081$, $p = 0,345$) ve boyun özürlülüğü ($r = 0,151$, $p = 0,076$) arasında anlamlı bir ilişki bulunmamıştır. Kinezyofobi, boyun özürlülüğü ($r = 0,537$, $p < 0,001$) ve dijital yorgunluk ($r = 0,505$, $p < 0,001$) ile anlamlı ilişkiler göstermiş; ancak ağrı inançları ile anlamlı bir ilişki göstermemiştir ($r = -0,096$, $p = 0,261$). Ağrı inançları, dijital yorgunluk ile anlamlı bir ilişki gösterirken ($r = -0,198$, $p = 0,020$), boyun özürlülüğü ile anlamlı bir ilişki göstermemiştir ($r = -0,013$, $p = 0,879$). Boyun özürlülüğü ile dijital yorgunluk arasında anlamlı ve pozitif bir ilişki saptanmıştır ($r = 0,581$, $p < 0,001$). Bulgular, ekran süresinin fiziksel şikayetleri bağımsız olarak açıklamaktan ziyade öncelikle dijital yorgunluk ile ilişkili olduğuna işaret etmektedir. Kinezyofobi ile boyun özürlülüğü arasındaki güçlü ilişki, psikolojik faktörlerin fonksiyonel kısıtlamalardaki rolünü vurgulamaktadır. Bu ilişkisel çalışmanın bulguları, dijital yorgunluğun üniversite öğrencileri arasında ekran süresi ile ilgili temel bir endişe olduğunu ve kinezyofobi ile boyun özürlülüğünün fiziksel işlevsellik üzerinde önemli etkileri olabileceğini göstermektedir. Koruyucu ve önleyici yaklaşımlarda, bireylerin hareket algılarının, yorgunluk düzeylerinin ve boyun özürlülüğünün ekran süresi ile birlikte bütünsel olarak ele alınması önerilmektedir.

Anahtar Kelimeler: *Boyun ağrısı, ekran süresi, kinezyofobi, öğrenciler, yorgunluk.*

SUMMARY

With increasing digitalisation, daily screen time among university students has significantly increased. Prolonged screen use may negatively affect physical functioning through digital fatigue, avoidance of movement behaviours, and negative beliefs about pain. The aim of this study is to examine the relationships between daily screen time and kinesiophobia, pain beliefs, neck disability, and digital fatigue among university students. This study was conducted using a quantitative, descriptive, and correlational design. A total of 140 university students participated in the study. Data were collected using an online questionnaire; the Kinesiophobia Causes Scale, Pain Beliefs Scale, Neck Disability Index, and Digital Fatigue Scale were used for assessment. Daily screen time was positively associated with digital fatigue ($r = 0.242$, $p = 0.004$). No significant associations were found between screen time and kinesiophobia ($r = 0.077$, $p = 0.365$), pain beliefs ($r = -0.081$, $p = 0.345$), or neck disability ($r = 0.151$, $p = 0.076$). Kinesiophobia showed significant associations with neck disability ($r = 0.537$, $p < 0.001$) and digital fatigue ($r = 0.505$, $p < 0.001$),

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but not with pain beliefs (r = -0.096, p = 0.261). Pain beliefs were significantly associated with digital fatigue (r = -0.198, p = 0.020), but not with neck disability (r = -0.013, p = 0.879). A significant positive association was found between neck disability and digital fatigue (r = 0.581, p < 0.001). The findings suggest that screen time, rather than explaining physical complaints independently, is primarily associated with digital fatigue. Kinesiophobia and neck disability demonstrate strong inter-correlations, highlighting the role of psychological factors in functional limitations. The findings of this correlational study indicate that digital fatigue is a fundamental concern among university students in relation to screen time, and that kinesiophobia and neck disability may have significant effects on physical functioning. In protective and preventive approaches, it is recommended that individuals' perceptions of movement, fatigue levels, and neck disability be addressed holistically, alongside screen time.

Keywords: *Neck pain, screen time, kinesiophobia, students, fatigue.*

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INTRODUCTION

With the rapid development of the digital age, the duration of use of technological devices such as smartphones, tablets, and computers in daily life has increased significantly (Deivendran et al., 2025; Elvan et al., 2024). University students, in particular, are among the risk groups who spend long periods of time in front of screens due to academic and social requirements (Chen et al., 2025). Studies have shown that prolonged screen use has various adverse effects on the musculoskeletal system and causes pain, especially in the neck region (Kazeminasab et al., 2022). A strong correlation has been reported between smartphone usage time and neck pain among university students; as usage time increases, so does the severity and prevalence of pain (Chen et al., 2025). Prolonged immobility in front of a screen can lead to a decrease in physical activity levels and the adoption of a sedentary lifestyle. A sedentary lifestyle contributes to the chronicity of pain and negatively impacts quality of life, while also constituting a significant risk factor for the development of kinesiophobia, characterised by avoidance of movement (De la Corte-Rodriguez et al., 2024). Kinesiophobia is defined as an excessive and irrational fear that movement will increase pain and is an important psychological factor contributing to the persistence of functional limitations in musculoskeletal pain (Li et al., 2023; SH, 1990).

In addition, individuals' excessive focus on their bodily sensations can lead to increased levels of health-related anxiety. This condition, defined in the literature as ‘health anxiety,’ can cause individuals to interpret normal or mild physical symptoms as signs of a serious illness, leading to an intensification of pain perception and physical complaints. In this respect, health anxiety emerges as an important psychological component in the perception and evaluation of physical symptoms (Asmundson & Katz, 2009; Löwe et al., 2022; Özsoy & Okan, 2021).

Neck awareness, on the other hand, is a multidimensional concept encompassing an individual's posture, movements, and cognitive perception of pain in relation to the neck region (Onan et al., 2020). It has been reported that decreased neck awareness is associated with postural control impairment, increased pain intensity, and functional limitations, particularly in individuals with chronic neck pain (Onan et al., 2020; Yamashita et al., 2021). This suggests that neck pain is a multifactorial problem involving not only biomechanical but also perceptual and cognitive components (Kazeminasab et al., 2022; Qu et al., 2022).

The literature contains studies examining the relationships between screen time and neck pain, neck disability, and certain psychological variables in university students (Nikolic et al., 2023; Yılmaz & Göz, 2023). However, these studies have generally focused on a limited number of variables and have not simultaneously addressed both the physical and psychological dimensions of screen use. The existing literature suggests that these studies have mostly addressed the variables in question through a single or limited set of variables; there appears to be a limited number of studies that evaluate both psychological and physical factors such as kinesiophobia, pain beliefs, neck disability, and fatigue in relation to screen time simultaneously and holistically. In this context, this planned study aims to reveal the multidimensional effects of screen time in university students and to fill an important gap in the literature by addressing the relevant variables together.

Purpose

This study aims to examine the relationship between screen time and kinesiophobia, pain beliefs, neck disability, and fatigue among university students. Due to the limited number of studies in the literature that address these variables together in relation to screen time, the research aims to evaluate the psychological and physical dimensions of digital device use

among university students with a holistic approach and to fill an important gap in the existing literature. The hypotheses of the study are as follows:

H1: Screen time is expected to be positively associated with kinesiophobia levels among university students.

H2: Screen time is expected to be positively associated with pain beliefs.

H3: Screen time is expected to be positively associated with neck disability levels among university students.

H4: Screen time is expected to be positively associated with fatigue levels.

H5: When screen time, kinesiophobia, pain beliefs, neck disability, and fatigue are evaluated together, it is expected that these variables will demonstrate significant inter-correlations, as assessed through Spearman correlation analysis.

MATERIALS AND METHODS

Type of Study

This study is quantitative, descriptive, and correlational in nature.

Location and Time of Study

The study was conducted between July and December 2025. Data were collected through questionnaires completed by participants online via Google Forms.

Research Design and Sample

The population of the study consisted of university students who voluntarily participated in the study. Data were collected online using a convenience sampling method; the questionnaire was distributed to students from different universities via digital platforms. A preliminary power analysis was performed to calculate the required sample size. The sample size calculation was performed using the G*Power (version 3.1.9.4) programme (Faul et al., 2007). In the calculation, Cohen's effect size value of 0.30 (medium effect size) was used for correlation analyses; based on a 95% confidence level, 95% power, and 0.05 probability of error, the minimum sample size was determined to be 138 individuals.

A total of 147 university students were reached between July and November 2025 as part of the research. Seven participants over the age of 30 were excluded from the study in accordance with the exclusion criteria, and the analyses were performed using the data of 140 university students.

Inclusion and Exclusion Criteria

Volunteers aged 18–30 who were university students were included in the study. Individuals with a previously diagnosed neurological or psychiatric disorder were excluded from the study.

Data Collection Tools

Demographic information such as age, gender, and marital status of university students was collected using an information form created via Google Forms. To assess participants' kinesiophobia levels, the Kinesiophobia Causes Scale (KCS) was used; to evaluate pain beliefs, the Pain Beliefs Scale (PBS), the Neck Disability Index (NDI) to assess neck disability, and the Digital Fatigue Scale (DFS) to determine fatigue levels. The questionnaire was designed to collect a single response per participant. Prior to analysis, all collected data were reviewed for completeness; responses with missing data were excluded from the dataset.

Demographic Information Form: The demographic information form asked students about their age, body weight, height, gender, marital status, university class level, and screen usage time (in average daily minutes). All data was recorded online using Google Forms.

Kinesiophobia Causes Scale (KCS): The KCS was used to assess kinesiophobia. The scale was developed by Kocjan et al. to determine the causes of motor inactivity and consists of 20 items (Kocjan & Knapik, 2014). The validity

and reliability of the Turkish version of the scale was established by Çayır et al (Çayır et al., 2020). The scale includes items covering biological and psychological domains. The KCS is rated on a 5-point Likert scale (1: strongly disagree, 5: strongly agree). High scores on the scale indicate a higher level of kinesiophobia (Çayır et al., 2020).

Neck Disability Index (NDI): The Turkish version of the NDI was used to assess the impact of neck pain on daily living activities. The Turkish validity and reliability study of this scale, which is an adapted form of the Oswestry Back Pain Index for the neck region (Vernon & Mior, 1991) was conducted by Telci et al. (Telci et al., 2009).

The NDI consists of a total of 10 items: pain intensity, personal care, lifting, reading, concentration, headache, work, driving, sleep, and recreational activities. Each item is scored between 0 and 5, and the total score that can be obtained from the scale ranges from 0 to 50.

Activity limitation due to neck pain is classified according to the total score as follows: no disability (0–4), mild disability (5–14), moderate disability (15–24), severe disability (25–34), and complete disability (35 and above).

Digital Fatigue Scale: The DFS was used to assess digital fatigue. The scale was originally developed in Turkish by Tutar and Mutlu (Tutar & Mutlu, 2024), who also established its validity and reliability. The DFS assesses digital addiction, psychological fatigue, physical and mental fatigue, and psychosomatic problems resulting from the intensive and continuous use of screen-based technologies. The scale is rated on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree).

Pain Beliefs Scale: The Pain Beliefs Scale (PBS) was used to assess pain beliefs. The scale was developed by Edwards et al. (Edwards et al., 1992). to evaluate individual beliefs about the causes and consequences of pain. The Turkish validity and reliability study of the scale was conducted by Sertel-Berk (Sertel-Berk, 2006).

The PBS consists of two subscales: the Organic Beliefs subscale (8 items) and the Psychological Beliefs subscale (4 items), for a total of 12 items. The scale is rated on a 6-point Likert scale, with items scored from 1 = never to 6 = always.

Statistical Analysis

The data obtained in this study were analysed using SPSS 23.0 (Statistical Package for the Social Sciences) software. Descriptive statistics for the participants' demographic and clinical characteristics were presented using the mean, standard deviation, median, interquartile range, and percentage frequency distributions. The normality of the data distribution was assessed using the Shapiro–Wilk test with skewness and kurtosis values. As the results indicated that the data did not conform to a normal distribution, non-parametric tests were used in the analyses.

Relationships between continuous variables were examined using Spearman's rank correlation analysis due to the non-normal distribution of the data. Correlation coefficients were interpreted according to Cohen's (1988) classification: $r<0.10$ negligible, 0.10–0.30 small, 0.30–0.50 medium, and >0.50 large (Cohen, 2013). In this context, the relationships between screen time and kinesiophobia, pain beliefs, neck disability, and fatigue levels were evaluated.

In all statistical analyses, the significance level was set at $p<0.05$.

Ethical Evaluation

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the Health Sciences Research Ethics Committee of Istanbul Kent University (meeting dated 10.09.2025, numbered 2025-07). All participants were informed about the purpose and scope of the study, and informed consent was obtained prior to the online

questionnaire. Participants' involvement in the study was entirely voluntary.

All data obtained from participants were collected in accordance with the principles of confidentiality and anonymity, used solely for scientific purposes, and not shared with third parties.

RESULTS

A total of 140 university students were included in this study. The mean age of participants was 22.51 ± 3.64 years (median: 22.00, IQR: 21.00–23.00), and 65.0% were female. The mean daily screen time was 305.57 ± 141.90 minutes (median: 300.00, IQR: 240.00–360.00). The demographic and descriptive characteristics of the participants are presented in Table 1.

Table 1. Demographic and Descriptive Characteristics of Participants

Variable	Mean ± SD	Median (IQR)
Age (years)	22.51 ± 3.64	22.00 (21.00-23.00)
Height (cm)	168.49 ± 9.21	165.00 (154.50–175.00)
Body weight (kg)	66.79 ± 14.78	63.50 (56.75-78.00)
Daily screen time (min)	305.57 ± 141.90	300.00 (240.00–360.00)

SD: Standard Deviation, IQR: Interquartile Range

When examining the descriptive statistics of the scale total scores; the KCS total score mean was 2.42 ± 0.63 (median: 2.35, IQR: 2.04–2.85), the Pain Beliefs Scale total score was 8.14 ± 1.25 (median: 8.38, IQR: 7.47–8.88), the Neck Disability Index total score was 8.67 ± 6.64 (median: 7.50, IQR: 4.00–12.00), and the Digital Fatigue Scale total score was 76.24 ± 21.32 (median: 78.00, IQR: 66.00–90.25). The descriptive statistics of the scale total scores are presented in Table 2.

Table 2. Descriptive Statistics of Scale Total Scores

Variable	Mean ± SD	Median (IQR)
KCS	2.42 ± 0.63	2.35 (2.04–2.85)
PBS	8.14 ± 1.25	8.38 (7.47–8.88)
NDI	8.67 ± 6.64	7.50 (4.00–12.00)
DFS	76.24 ± 21.32	78.00 (66.00–90.25)

SD: Standard Deviation, IQR: Interquartile Range; KCS: Kinesiophobia Causes Scale; PBS: Pain Beliefs Scale; NDI: Neck Disability Index; DFS: Digital Fatigue Scale.

The relationships between continuous variables were assessed using Spearman's rank correlation analysis. A positive, small, and statistically significant relationship was found between daily screen time and digital fatigue (r = 0.242, p = 0.004). In contrast, no significant relationship was found between screen time and kinesiophobia (r = 0.077, p = 0.365), pain beliefs (r = -0.081, p = 0.345), or neck disability (r = 0.151, p = 0.076) (Table 3).

Table 3. Relationship Between Daily Screen Time and Scale Total Scores

Variable	Daily Screen Time (min)	
	r	p
KCS	0.077	0.365
PBS	-0.081	0.345
NDI	0.151	0.076
DFS	**0.242**	**0.004**

KCS: Kinesiophobia Causes Scale; PBS: Pain Beliefs Scale; NDI: Neck Disability Index; DFS: Digital Fatigue Scale, r: Spearman correlation coefficient, p: statistical significance level.

When the relationships between variables were examined holistically, no significant relationship was found between kinesiophobia and pain beliefs (r = -0.096, p = 0.261). Kinesiophobia showed a positive and

significant medium relationship with neck disability (r = 0.537, p < 0.001) and digital fatigue (r = 0.505, p < 0.001). Pain beliefs showed a significant negative small relationship with digital fatigue (r = -0.198, p = 0.020), but no significant relationship with neck disability (r = -0.013, p = 0.879). The relationship between neck disability and digital fatigue was found to be medium and positive (r = 0.581, p < 0.001) (Table 4).

Table 4. Relationships Between All Parameters

Variable	KCS	PBS	NDI	DFS
KCS		-0.096 0.261	**0.537** **<0.001**	**0.505** **<0.001**
PBS			-0.013 0.879	**-0.198** **0.020**
NDI				**0.581** **<0.001**

KCS: Kinesiophobia Causes Scale; PBS: Pain Beliefs Scale; NDI: Neck Disability Index; DFS: Digital Fatigue Scale. Bold values indicate statistical significance (p<0.05).

DISCUSSION

When evaluated in relation to the study hypotheses, H4 was supported, as a significant positive association was found between screen time and digital fatigue levels. In contrast, H1, H2, and H3 were not supported; no significant associations were found between screen time and kinesiophobia, pain beliefs, or neck disability. Regarding H5, significant inter-correlations were identified among kinesiophobia, neck disability, and digital fatigue, supporting the hypothesis that these variables demonstrate meaningful relationships when evaluated together. Pain beliefs, however, showed a significant association only with digital fatigue.

This study examined the relationship between daily screen time and kinesiophobia, pain beliefs, neck disability, and fatigue among university students. The main findings of the study indicate that there is a significant relationship between screen time and digital fatigue, whereas no direct significant relationship was found between screen time and kinesiophobia, pain beliefs, and neck disability. However, significant and clinically noteworthy relationships were identified between psychological and physical variables.

The finding of a positive and significant relationship between daily screen time and digital fatigue in this study is consistent with the literature highlighting the effects of prolonged use of screen-based technologies on mental and physical fatigue.

Intensive use of digital devices has been associated with increased fatigue levels, including visual overload, cognitive overstimulation, and increased sedentary behaviour (Lee et al., 2021; Thomée et al., 2011). It is expected that digital fatigue will be more pronounced in populations with high academic and digital exposure, such as university students (Romero-Rodríguez et al., 2023).

However, it is noteworthy that no direct, meaningful relationship was found between screen time and kinesiophobia, pain beliefs, and neck disability. This finding suggests that screen time alone may not be sufficient to explain these variables. Previous studies have reported that neck pain and disability are influenced by numerous factors, including posture, ergonomic conditions, break frequency, and physical activity level, rather than screen time alone (Jun et al., 2017; Meng et al., 2025; Xie et al., 2017). Furthermore, the young age of the group included in the study and their high functional adaptation capacity may have contributed to the weak relationship found between neck disability and screen time. Furthermore, kinesiophobia and pain beliefs are primarily developed and reinforced through prior pain experiences and chronic pain processes rather than screen exposure alone (Vlaeyen & Linton, 2000). Research suggests that fear of movement may not play a significant role in individuals with limited pain

chronicity, as the relationship between kinesiophobia and functional limitations appears to be moderated by the stage of pain chronicity (Wideman et al., 2009). Similarly, pain beliefs are shaped by a complex interplay of cognitive, emotional, and experiential factors that extend beyond screen use duration (Crombez et al., 2023) . Therefore, the absence of a direct association between screen time and these psychological variables in the present study may reflect the relatively young age and limited chronic pain experience of the sample.

One of the study's important findings is the identification of significant and positive relationships between kinesiophobia, neck disability, and digital fatigue. This result supports the fear-avoidance model. Increased kinesiophobia has been associated with greater pain perception and movement avoidance, which may be related to functional limitations (Leeuw et al., 2007; Moseley, 2008). In particular, the significant relationship between neck disability and kinesiophobia highlights the role of psychological factors in the persistence of musculoskeletal symptoms. Notably, no significant association was found between kinesiophobia and pain beliefs in the present study. This finding may be explained by the sample's limited chronic pain experience, as the relationship between kinesiophobia and pain beliefs has been shown to strengthen with pain chronicity and intensity (Crombez et al., 2023; Wideman et al., 2009).

Regarding pain beliefs, no significant association was found with neck disability, and a small negative association was observed with digital fatigue. The absence of an association between pain beliefs and neck disability is consistent with findings suggesting that pain beliefs are more strongly linked to disability in populations with established chronic pain rather than in young, relatively healthy individuals (Domenech et al., 2011; Morton et al., 2019). The negative direction of the association between pain beliefs and digital fatigue is an unexpected finding that warrants further investigation. It may reflect that individuals with higher pain-related beliefs in this sample engage less with digital devices due to physical discomfort, thereby accumulating lower digital fatigue scores; however, this interpretation remains speculative and should be tested in future studies. The significant positive relationship between neck disability and digital fatigue warrants further investigation.

These findings indicate that the effects of screen time on university students cannot be explained solely by mechanical loading; psychological and cognitive factors such as kinesiophobia and fatigue play a significant role. Therefore, protective and rehabilitative approaches for university students should not only focus on reducing screen time, but also on comprehensive interventions targeting kinesiophobia reduction and fatigue management.

Several limitations of the present study should be considered when interpreting these findings. First, the correlational design of the study precludes causal inferences; the observed associations between variables reflect co-occurrence rather than directionality. Second, data were collected through self-report measures via an online survey, which may introduce response bias and limit the accuracy of participants' recall, particularly regarding daily screen time estimation. Third, screen time was assessed solely in terms of duration, without considering qualitative factors such as device type, posture, ergonomic conditions, or break frequency, which have been reported to influence musculoskeletal outcomes (Jun et al., 2017; Xie et al., 2017). Future studies employing longitudinal designs, objective measurement tools, and more detailed assessment of screen use behaviours would provide a more comprehensive understanding of the relationships examined in the present study.

CONCLUSION and RECOMMENDATIONS

This study found a significant positive association between screen time and digital fatigue in university students, while no significant associations were found between screen time and kinesiophobia, pain beliefs, or neck disability. Nevertheless, significant inter-correlations were identified among kinesiophobia, neck disability, and digital fatigue. Pain beliefs showed a significant negative association only with digital fatigue, but no significant association with neck disability. These findings suggest that the effects of digital device use among university students cannot be adequately understood by focusing on screen time duration alone, and that psychological variables such as kinesiophobia play an important role in musculoskeletal and fatigue-related outcomes.

Based on these findings, it is recommended that health professionals and educators working with university students incorporate assessments of digital fatigue and kinesiophobia alongside screen time duration, rather than focusing solely on screen use. Given the significant associations identified between kinesiophobia, neck disability, and digital fatigue, intervention strategies targeting university students should address fatigue management and movement-related beliefs as complementary components of digital health programmes. Future studies employing longitudinal designs and objective measurement tools are encouraged to further investigate the directionality of these relationships, particularly the unexpected negative association between pain beliefs and digital fatigue.

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