

Physiological stress response to multitasking with digital stressors

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Abstract

Multitasking is the common experience faced by many of us in this mechanical life, more common with the working women population in India. Its more with those working in the field of information technology, because of the added burden with digital stressors and work interruptions in the form of target achievement, year ending and so on. After the covid pandemic it has become worse than before of the online working platform which has forced the employees to do each and every work digitally. This is the right time to probe deep into the effect of digital stressors and work interruptions on the physiological functioning of various organ systems of our body. Though many research works has been done in the field of stress physiology, studies on physiological stress response to multitasking with digital stressors and work interruptions are sparsely been done. In this context, this article has been written to provoke the interest of research workers to do more studies on this; especially the exploration of changes in the autonomic nervous system and immune system should extensively be done.

Key words: covid pandemic, digital stressors, multitasking, stress response, work interruptions

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“A diamond is just a piece of charcoal that handles stress exceptionally well “

With this positive approach let us enter into the discussion on physiological response to multitasking, especially with digital stressors and work-interruptions.¹ Multitasking is performance or execution of more than one task or various diverse tasks simultaneously at a time, which most of us are undergoing in this spin top world, especially working women population. Work-interruptions are any form of distraction that disturb workers or disrupt operations.² It is

imperative at this juncture for us to know, how far the stress due to multitasking is spreading its prongs over the physiological functions of our body, since stress that's left unchecked can contribute to many health problems like hypertension, heart disease, diabetes, peptic ulcer, depression, anxiety and so on.³

One among the multitasking is the usage of digital gadgets by all age groups. In this highly digitalised world, the biophysical response patterns to digital stress, which is a potential stressor in modern working environments is having a serious impact on health of the individual which in turn is showing

its effect on the life expectancy too. Multitasking and work interruptions takes a lead in creating a physiological and biophysical stress response in the persons involved in digitalised work pattern. Let us proceed with studies intruding this health hazard and find a solution, which enable us to shine like a diamond rather falling prey to it.

In modern technology-driven working and living, more commonly used terminologies are techno-insecurity, techno-overload, techno-invasion, techno-strain and techno-stress. All these terms refer to the stress that are related to the usage of digital technology and media which is termed as digital stress.

Techno-insecurity is a condition where information and communication technology (ICT) users feel threatened that they will lose their job, either being reinstated by the new ICT or by other people who are better in ICT when compared to them.

Techno overload considered a techno-stressor, is associated with stressful situations that contribute to work longer and faster than normal.⁴ It can lead to handling a huge amount of information, provoking fatigue, memory difficulties, and loss of control for the workers.

Techno-invasion is defined as constant network connectivity, without boundaries of space and time, which maintains that employees are continuously available to work requests.

Techno-strain is a perceived stress experience resulting from the use of new information technologies.

Techno-stress is a form of occupational stress that is associated with information and communication technologies such as the Internet, mobile devices, and social media.⁵

Stress is a part of everyday private and working life which is experienced by almost everyone. The

potential digital stressors are multitasking and work interruptions.⁶ Both can be perceived as stressful which cannot be avoided in many situations. However, this does not necessarily indicate that the feeling of being stressed, when being faced with these demands is associated with a physiological stress response.

Although the bio-psychological effects of several acute (e.g., social evaluation) and chronic psychosocial stressors (e.g., care giving) and psychological determinants of biological stress-response patterns in general are well understood, only few attempts have been made so far to use this knowledge to understand the effects of stressors such as multitasking and work interruptions on biological stress system-activity.⁷ After the covid pandemic, there is an exponential increase in the percentage of population affected by the stress due to digital stressors.

Stress systems are stimulated to prepare the entire organism for dealing with the situation.⁸ The Sympathetic Nervous System activates all the systems throughout the body through noradrenergic innervations, which leads to the release of epinephrine and nor-epinephrine from the adrenal medulla and results in an increase in heart rate and blood pressure.⁹ The up-regulation of the sympathetic nervous system is accompanied by a down-regulation of the parasympathetic Nervous System. The slower response of the hypothalamic-pituitary adrenal (HPA) axis modulates the effects of the sympathetic and parasympathetic nervous system by releasing the stress hormone cortisol from the adrenal cortex.

In response to stress, interleukin-6 exerts its complex effects on the immune system, with an up-regulation of inflammatory pathways and down-regulation of cellular immunity.¹⁰ Temporarily, all these physiological stress responses are adaptive. When stress becomes

chronic, potentially harmful consequences arise i.e., when long-term stress exposure occurs or when the maladaptive stress-response patterns are used. We refer to stress-responses patterns as being maladaptive—in contrast to adaptive, when they do not allow the organism to efficiently cope up with or to adjust the individual's physiological responses or behaviour to the situation. Adaptive coping strategies generally involve confronting problems directly, making reasonably realistic appraisals of problems, recognizing and changing unhealthy emotional reactions, and trying to prevent adverse effects on the body. Maladaptive coping includes indirect or false approach to tackle the stressful situations, like using alcohol or drugs to escape from the problems.

With regard to stress effects on health, sympathetic nervous system, parasympathetic nervous system and hypothalamo-pituitary adrenal axis interact with patho-physiologically relevant systems, one among which is the inflammatory system, e.g., release of glucocorticoids. Inflammatory processes are one of the central mechanisms in mediating the negative effects of stress on health. Ultimately, acute stress exposure leads to systemic low-grade inflammation, which in long term will be a key factor for the development of the most important diseases such as cardiovascular diseases, type-2 diabetes, and cancer.¹¹

Although physiological responses can be triggered by stressors in principle, the actual stress response is associated with the nature of the stressor i.e. specificity hypothesis.¹² According to this hypothesis, specific situations that are perceived as threatening in contrast to challenging trigger HPA axis responses. Moreover, situations which are shameful or in which the social self is devaluated are associated with strong HPA responses (social self-preservation theory). For cognitive stressors, both sympathetic nervous

system and HPA axis responses have been reported, depending on task difficulty and on the presence of further stressors. Sympathetic nervous system activity is significantly higher and parasympathetic nervous system activity is significantly lower during dual- or multitasking than during single tasking.¹³ The number of studies in which HPA axis reactivity to dual- or multitasking investigated was meagre. There are literally no eligible studies in which immune system reactivity was investigated.

Multitasking and work interruptions differ from commonly investigated stressors in their nature as they primarily include a cognitive component in contrast to a psychosocial component, especially when induced digitally i.e., without the presence of further persons.¹⁴ Therefore, with regard to the specificity hypothesis, it remains an open question whether physiological stress responses to multitasking and work interruptions differ between digital and non-digital stressors.¹⁵ Further studies can be done to differentiate between the effects of stress on pure digital multitasking as well as work interruptions when compared with other tasks in which another person is involved.

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