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Impact of Hope, Resilience, Cognitive Flexibility on Stress and Immunity

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A B S T R A C T

We humans have certain innate resources which helps us in difficult times. These resources need to be identified and should be used to fight from the danger that our body and mind perceives. One of these resources include hope which means being optimistic for future while focusing on individual strengths and not just relying on past. Resilience and cognitive flexibility are other resources which helps individuals to recover from difficult situations and easily adapt themselves to new challenges. The present study tries to incorporate the impact of hope, resilience and cognitive flexibility on stress and immunity by using a sample of 200 individuals aged between 18 to 30 years. Standardized scales related to above mentioned variables were applied. The findings of the research revealed that there is a significant negative relationship between hope and stress; resilience and stress; and cognitive flexibility and stress. The findings also revealed a positive relationship between resilience and immunity and between cognitive flexibility and immunity. Moreover, it was also found that women have better immune functioning than men.

Keywords: Immunity, Resilience, Cognitive flexibility, Hope, Mental flexibility, Stress, Perceived Stress

1. Introduction

No matter where you are or what you are doing, stress is a part of life. Stress cannot be avoided, but it can be controlled so that it does not control you. The term "stress" refers to a relationship between an individual and their environment that the individual perceives as exhausting or exceeding their resources and posing a threat to their wellbeing. Stress is fundamental to the human experience. (Lazarus & Folkman, 1984, p 21). Transitions in our lives such as going to college, getting married, changing employment, or illness are regular sources of stress. Therefore, cognitive flexibility plays a major role in helping an individual quickly adapt to these transitions in our lives. In general, cognitive flexibility is the capacity to change one's mental models (also known as "mental sets") and behavior in response to external pressures (Cragg & Chevalier, 2012; Ionesca, 2012). Moreover, not only cognitive flexibility but resilience is an equally important internal resource which determines the recovery capacity of an individual under major stressors of life. According to biopsychosocial research, resilience aid in preventing the negative effects of stressors on physiology in general and immunity in particular. Furthermore, those with chronic illnesses may be more likely to experience difficulty in being hopeful for future or for their goal, possibly as a result of functional constraint or social dysfunction, which could increase the chance of discomfort and lead to mental and physical exhaustion (Hirsch, Sirois, & Lyness, 2011). On the other hand, the capacity to uphold appropriate, possibly changed goals and to continue to problem-solve in an effort to get beyond obstacles in their way may help to prevent stress and the ensuing tiredness reactions, eventually influencing positive immune reactions. (Rasmussen, Wrosch, Scheier, & Carver, 2006).

1.1 Stress

Selye (1956) utilized the expression "stress" to address the impacts of whatever truly compromises homeostasis. The danger an individual perceives in his or her environment is alluded to as the "stressor" and the reaction to the stressor is known as the "stress reaction". Perceived stress consolidates emotions about the unmanageable and incalculable of one's life, how frequently one needs to manage disturbing issues, how much change is happening in one's life, and trust in one's capacity to manage issues or challenges (Lazarus and Folkman, 1984). It isn't estimating the sorts or frequencies of stressful occasions which have happened to an individual, yet rather how a person feels about the overall stressfulness of their life and their capacity to deal with such stress. Individuals could encounter relative negative life events yet survey the earnestness of these to different degrees due to factors like adjusting to new situations, and backing. Along these lines, perceived stress mirrors the collaboration between an individual and their current circumstance which they assess as compromising or overpowering their internal resources that will eventually influence their health (Lazarus and Folkman, 1984).

1.2 Immunity

A satisfactorily functioning immune system is fundamental for the body to perceive and safeguard itself against openness to outer specialists, including microorganisms, infections, and substances (e.g., liquor and medications). Openness to mental elements (e.g., stress) can likewise affect immune

functioning. The immune system assumes a significant part, either positive or negative, indifferent infections and problems and is a significant well-being determinant. For example, adjusted immune working could pronouncedly influence conventional physiological cycles and yet is related to the pathology of various relentless ailments as well as specific mental problems like misery and chemical imbalance. A blend of neuroinflammatory, neuroendocrine, and metabolic effects can achieve lessened immune working and, in this manner, unfavorably influence the flourishing and individual fulfillment (Dickstein & Moldofsky,1999). There are multiple ways of assessing immune functioning. The most often involved include objective, subjective and quantitative appraisals in blood, e.g., counts of the sort and number of immune cells, immune go-between like cytokines, chemokines, and antibodies (Chaussabel et al., 2010).

1.3 Hope

Snyder (2002) offered a definition where hope joins individual insights, to produce elective ways of accomplishing desirable objectives. While Snyder (1994, 2000) focused on the conceptual part of hope, Jacoby and Goldzweig (2014) clarified Snyder's concept of hope and recognized three sub-thoughts that highlight the profound pieces of hope. In their view, the term intrapersonal hope alludes to hope in which an individual investigates him/herself while evaluating his/her resources. Interpersonal hope suggests to the connections one has with various critical and significant people whom one can trust. While Transpersonal hope hints to hope that depends on extraordinary powers and which provides a person with a feeling of significance and reason. Moreover, Hope is characterized as the apparent ability to determine pathways to wanted objectives, and propel oneself through organizational thinking to utilize those pathways. There are two aspects of hope- Agency (goal-directed energy) and Pathway (planning to accomplish goals). If goals influence how people behave, then in order to successfully achieve them, people must be able to create possibilities. Yet, creating pathways alone won't be enough to achieve objectives. Also, people must feel confident in their "perceived ability to use one's pathways to achieve desired goals" (Snyder, 2002). The hope theory's motivating element is this "agency concept."

1.4 Resilience

Resilience includes positive transformation, or then again, the capacity to keep up with or recover emotional well-being, despite encountering difficulty (Wald et al, 2006). The past literature on resilience demonstrates that cognitive functioning, intellectual adaptability, social connection, positive self-ideas, emotion regulation, positive feelings, other worldliness, dynamic adapting, solidness, confidence, trust, creativity, and versatility are related to resilience (Joseph & Linley, 2006). Previous findings of research on biological and genetic factors in resilience (Luthar & Brown, 2007) suggest that harsh early environments can affect developing brain structure, function, and neurobiological systems (Cicchetti & Cohen, 2006). Changes may occur in brain size, neural organizations, the affectability of receptors, and the synthesis and reuptake of neurotransmitters (Curtis & Nelson, 2003). These actual changes in the brain can generously worsen or lessen weakness to future psychopathology (Cicchetti & Cohen, 2006). Brain changes and other biological processes can influence the ability to moderate negative emotions, and thereby affect resilience to adversities. An EEG study (Curtis & Cicchetti, 2007) in abused and non-maltreated youngsters matured 6 to 12 years saw critical cooperation in examples of EEG action between resilience, abuse status, and sexual orientation.

1.5 Cognitive Flexibility

Cognitive Flexibility is a capacity that could infer a course of realizing, that is, it could be acquired with experience. Besides, Cognitive Flexibility involves the transformation of cognitive handling strategies. Cognitive flexibility, subsequently, refers to changes in complex practices, and not in discrete responses. At long last, the adaptation will happen to new and unexpected ecological changes after an individual has been playing out an errand for quite a while. What's more, all together to adapt their conduct to the new conditions, the person needs to rebuild their insight to effectively interpret the new circumstance and the new environmental requirements. Cognitive flexibility, in this manner, relies upon attentional processes and information portrayal. Spiro and Jehng (2012) have proposed the Cognitive Flexibility Theory as indicated by which individuals who represent a portrayal of the task according to numerous points of view can undoubtedly decipher situational changes in the environment and, hence, can be all the more cognitively adaptable. These individuals, therefore, can rapidly rebuild their insight, henceforth adjusting their reactions to fundamentally changing situational requirements.

2. Purpose

To study the impact of hope, resilience, cognitive flexibility on stress and immunity.

2.1 Hypotheses

1. There will be a negative relationship between hope and stress; resilience and stress; cognitive flexibility and stress.
2. There will be a positive relationship between hope and immunity; resilience and immunity; cognitive flexibility and immunity.
3. There will be no gender differentiation in immune functioning

3. Method

3.1 Measures

Students were presented with a personal information schedule (age, gender, contact number, email, medium of instruction) and questionnaires measuring hope, resilience, cognitive flexibility, perceived stress, and immunity.

Hope. The 12-item measure of an individual's level of hope by Snyder et al. (1991) which comprises the cognitive model of hope was used. It consists of two subscales to measure goal-directed energy and planning to accomplish goals. It is an 8-point Likert-type scale ranging from Definitely False to Definitely True.

Resilience. The 6-item scale by Smith et al. (2008) was used. It consists of both positively and negatively worded items and the possible range lies between 1 indicating low resilience and 5 indicating high resilience.

Cognitive Flexibility. The 12-item scale developed by Martin and Rubin in 1995 to access a person's awareness of communication alternatives, willingness to adapt to the situation, and self-efficacy in being flexible was used.

Perceived Stress. The 10-item scale by Cohen et al. (1988) to access an individual's perception of stress. The items in this scale enquire about the feelings and thoughts of an individual during the last month.

Immunity. The 7-item scale was developed by Wilod Versprille et al. in 2019 to access respondents' past year's immune status by inquiring about specific immune-related complaints.

3.2 Sample and Statistical power

A sample of 200 students was used for the present study. The participants were selected, using convenience sampling. Forty percent (N=80) of the participants were male and sixty percent (N=120) of the participants were female. The mean age for females was 21.23 years and the mean age of males was 20.51 years.

3.3 Procedure

The measures were presented to the participants in a booklet with a brief general introduction about the research, a consent form, and instructions. Some students were contacted in class, in college cafes, and some in their dormitory rooms. The participants were given half an hour to answer and return the booklets. All the confusion in instructions or questions was solved at that present moment.

3.4 Analysis

The model predicting hope, resilience, and cognitive flexibility was analyzed using stepwise regression (SPSS Statistics 20) based on a theoretical framework where variables were entered in increasing order of importance. Descriptive statistics of measures are reported in Table 1. While, independent t test two sample assuming unequal variances of immunity is reported in Table 2. Furthermore, Table 3 shows the correlation between hope, resilience, cognitive flexibility, stress and immunity. Table 4 and Table 5 shows stepwise regression.

4. Results

Table 1.

Descriptive Statistics

	Mean	**Std. Deviation**	**N**
Hope	48.35	8.782	200
Resilience	3.01	.780	200
Cognitive Flexibility	50.36	6.536	200
Stress	19.85	6.490	200
Immunity	6.66	2.687	200

Table 2.

	Female	**Male**
Mean	6.2	7.35
SD	8.178151	5.065823
N	120	80
T	3.1716**	

p<0.01**, p<0.05*

Table 3.

Variables	**Hope**	**Resilience**	**Cognitive Flexibility**	**Stress**	**Immunity**
Hope	1				
Resilience	.227**	1			
Cognitive Flexibility	.489**	.240**	1		
Stress	-.363**	-.308**	-.339**	1	
Immunity	.098	.233**	.217**	-.360**	1

p<0.01**, p<0.05*

Table No. 4 Linear Regression Analyses of Hope, Cognitive Flexibility, Resilience, and Stress.

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Adjusted R^2**	**F**
	B	**Std. Error**	**Beta**				
1 (Constant)	32.815	2.405		13.647	.000		
1 Hope	-.268	.049	-.363	-5.482	.000	.127	30.049
2 (Constant)	36.826	2.588		14.229	.000		
2 Hope	-.228	.049	-.309	-4.680	.000		
2 Resilience	-1.976	.550	-.237	-3.596	.000	.177	22.393
3 (Constant)	42.141	3.393		12.422	.000		
3 Hope	-.169	.054	-.229	-3.111	.002		
3 Resilience	-1.777	.550	-.214	-3.233	.001	.196	17.180
3 Cognitive Flexibility	-.175	.073	-.176	-2.385	.018		

a. Dependent Variable: Perceived Stress

Table No. 5 Linear Regression Analyses of Cognitive Flexibility, Resilience, and Immunity.

Model	**Unstandardized Coefficients**		**Standardized Coefficients**		**Sig.**	**Adjusted R^2**	**F**
	B	**Std. Error**	**Beta**				
1 (Constant)	4.242	.739		5.739	.000		
1 Resilience	.804	.238	.233	3.378	.001	.050	11.413

	(Constant)	1.139	1.474		.773	.441		
2	Resilience	.663	.242	.193	2.737	.007		
	CF	.070	.029	.170	2.423	.016	.073	5.869

a. Dependent Variable: Immunity

5. Discussion

In this study, we tried to find out the relationship between hope, resilience, cognitive flexibility, stress, and immunity. Most studies focus on either the aspects of positive psychology or biological aspects but this study attempts to investigate both aspects. The results suggested that those who scored high on hope experience less stress ($r= -0.363$, $p<0.01$), indicating negative relationship. The results also suggested a negative significant relationship between resilience and stress ($r= -0.308$, $p<0.01$). Similarly, a negative relationship was found between cognitive flexibility and stress ($r= -0.339$, $p<0.01$). Furthermore, we found a positive and significant relationship between resilience and immunity (($r= 0.233$, $p<0.01$); cognitive flexibility and immunity ($r= 0.217$, $p<0.01$) but no significant relationship was found between hope and immunity ($r= .098$). Moreover, it was also found that females have better immune functioning than men ($t= 3.1716$, $p<0.01$).

According to research on perceived stress, in the study by Sucan (2019) which was conducted to study the relationship between hope and perceived stress in teacher candidates who participated in a special KPSS preparation course in Kayseri. It was concluded that there exists a high, negative, and significant relationship between perceived stress scores with the level of hope scores of teacher candidates. Moreover, a study by Fitness 2001; by Runcan and Iovu, 2013 argued that higher quality of life and less stress were experienced by those, who have high levels of hope. Also, the findings of the present study were aligned with the theory given by Palmer in 1997. According to past literature, similar results were found in a study by Steinhardt et al., 2008 which suggested that those young adults who had poor resilience were less capable of dealing and coping with stress and it was opined that those who had better resilience were able to easily cope up with stressful situations. Also, a study conducted by Steinhardt et al in 2008 suggested that poor coping skills were observed in people having low resilience, and Chou et al., 2011; Ng & Hurry, 2011 argued that high-stress levels are linked with poor coping skills. Furthermore, a study by Alexander et al., 2007; Plessow et al., 2011 on humans, and a study by Laredo et al., 2015 on rodents found that cognitive flexibility is affected in stressful situations. The study on rodents even suggested that less cognitive flexibility is more likely to be seen in men than women in stressful situations.

According to past literature on immunity, Similar results were found in a study by Wagnild in 2009 which proposed that high resilience scores are positively associated with physical health and lesser symptoms, and it is contrarily associated with depression and other psychiatric disorders, therefore determining the quality of life. Also, another study by Girtler in 2010 suggested that certain facets of resilience which involve optimism, vitality, positive emotions, and extroversion are associated with increased efficacy, coping and physical activities, and acceptance of social support leading to better immune functioning. Moreover, a study by Norte et al., 2011 suggested that interventions that help to develop resilience in patients with post-traumatic stress disorder helped in the reduction of symptoms such as reduction in heart rate, respiratory rate, skin conductance, and cortisol levels, and sympathetic balance. Furthermore, similar to our findings, a study by Luo et al., 2018 found that patients with ulcerative colitis showed lower cognitive flexibility and therefore their quality of life was impacted. Also, a study by Rudnik et al., 2019 revealed a significant and positive correlation between cognitive flexibility and coping with stress and therefore, improvement in health-related quality of life and sense of satisfaction with life. Moreover, study by Gan et al., 2006; Cheng et al., 2014 seasoned that flexible adaption improves well-being and health. There is limited literature predicting the relationship between hope and immunity. According to Seligman, 1975, hope has been related to well-being and fruitful adapting while discouragement, depression, and sadness have been connected to capitulation, disease, and even death. Many studies have shown a connection between health and states of hope (Gottschalk, 1974; Snyder, Harris, Anderson, Holleran, Irving, Sigmon, Yoshinobu, Langelle, & Harney, 1991).

Moreover, the past literature on gender differentiation on immune functioning suggests a a study by Klein & Flanagan in 2016 revealed that for the most part, grown-up females mount more grounded natural and versatile immune reactions than males. This outcome in quicker freedom of microbes and more prominent immunization viability in females than men. Also, another study by Fargallo et al., 2007; Pap et al., 2010 showed that in birds, females show higher antibodies and cell-intervened immune reactions to immune difficulties, and these impacts are frequently generally articulated during the mating season when male testosterone focuses are most elevated. Moreover, females quite often show more prominent neutralizer reactions than men, higher basal immunoglobulin levels and higher B cell numbers (Abdullah et al., 2012).

6. Conclusion

Since we are exposed to stressors in our daily lives, from major life transitional events to minor stresses can affect an individual negatively. The finding of the study suggests that hopeful individual experience less stress and increased cognitive flexibility help them to adapt to new and unusual situations with little trouble. This also helps them in being resilient and increases their immune functioning. The findings of the study also indicate that hope, resilience, and cognitive flexibility have an impact on stress and immunity. People high on hope, resilience, and cognitive flexibility will have lower stress levels and vice versa. Similarly, people high on resilience and cognitive flexibility will have better immune functioning. Another interesting finding suggests that women have better immune functioning than men. Furthermore, the important implication is in hospitals where people with stress and lower immune functions may be taught to indulge in activities that may improve their hope, resilience, and cognitive flexibility.

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